THE

ENGLISH ENCYCLOPÆDIA.

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THE

ENGLISH ENCYCLOPÆDIA:

BEING

A COLLECTION OF TREATISES,

AND

A DICTIONARY OF TERMS,

ILLUSTRATIVE OF THE

ARTS AND SCIENCES.

COMPILED FROM MODERN AUTHORS OF THE FIRST EMINENCE IN THE DIFFERENT BRANCHES OF SCIENCE.

IN TEN VOLUMES.

THE WHOLE ILLUSTRATED WITH UPWARDS OF FOUR HUNDRED COPPER-PLATES.

VOL. V.

LONDON:

PRINTED FOR G. KEARSLEY, FLEET-STREET.

SOLD BY BELL AND BRADFUTE, EDINBURGH; BRASH AND REID, GLASGOW; BROWN AND BY BURNETT, ABERDEEN; COLBERT, DUBLIN; AND ALL OTHER BOOKSELLERS IN THE UNITED KINGDOM.

1802.

ENGLISH ENCYCLOPÆDIA.

KILLALA, a ſeaport of Ireland, in the county of Mayo, with a biſhop's ſee. It is 21 miles north of Caſtlebar. W. lon. 9. 11. E. lat. 54. 15.

KILLALOE, a biſhop's ſee in the county of Clare and province of Munſter, in Ireland, 86 miles from Dublin, otherwiſe *Lounia*. It was anciently written *Kill-da-Lua*, i e, "the church of Lua," from *Lua*, or *Molua*, who about the beginning of the 6th century founded an abbey near this place. St. Molua appears to have derived his name from *Loania*, the place of his reſidence, as was cuſtomary amongſt the ancient Iriſh. On the death of St. Molua, St. Flannan his diſciple, and ſon of the chief of the diſtrict, was conſecrated biſhop of this place at Rome about the year 639, and the church endowed with conſiderable eſtates by his father Theodoric. Towards the cloſe of the 12th century, the ancient ſee of Roſcrea was united to that of Killaloe; from which period theſe united biſhoprics have been governed by the ſame biſhops. At Killaloe is a bridge over the Shannon of 19 arches; and here is a conſiderable ſalmon and eel fiſhery. There are many ancient buildings in and about this town. The cathedral is a Gothic edifice in form of a croſs, with the ſteeple in the centre, ſupported by four arches; it was built by Donald king of Limerick in 1160. There is a building near it, once the oratory of St. Molua; and there is another of the ſame kind in an iſland on the Shannon, having marks of ſtill higher antiquity. The ſee-houſe of the biſhop is at Clariſford, near to Killaloe. Adjoining to the cathedral are yet ſome remains of the mauſoleum of Brien Boru.

KILLARNEY, a town of Ireland, in the county of Kerry, on the ſide of a lake of the ſame name. Within half a mile of this place are the ruins of the cathedral of Aghadoe, an ancient biſhopric united to Ardfert. It is 143 miles S. W. of Dublin.

KILLARNEY, a beautiful lake of Ireland, in the county of Kerry, otherwiſe called Lough Lean, from its being ſurrounded by high mountains, It is divided into three parts, called the Lower, Middle, and Upper Lake. The northern, or lower lake, is ſix miles in length, and from three to four in breadth. On the ſide of one of the mountains is O'Sullivan's Caſcade, which falls into the lake with a roar that ſtrikes the timid with awe. The view of this ſheet of water is uncommonly fine, appearing as if it were deſcending from an arch of wood, which overhangs it above 70 feet in height from the point of view. The iſlands are not ſo numerous in this as in the upper lake; but there is one of uncommon beauty, called Innisfallen, nearly oppoſite O'Sullivan's Caſcade. It contains 18 Iriſh acres; and the coaſt is formed into a variety of bays and promontories, ſkirted and crowned with arbutus, holly, and other ſhrubs and trees. The promontory of Mucruſs, which divides the upper from the lower lake, is a perfect land of enchantment; and a road is carried through the centre of this promontory, which unfolds all the interior beauties of the place. Among the diſtant mountains, Turk appears an object of magnificence; and Mangerton's more lofty though leſs intereſting ſummit ſoars above the whole. The paſſage to the upper lake is round the extremity of Mucruſs, which confines it on one ſide, and the approaching mountains on the other. Here is a celebrated rock, called the Eagle's Neſt, which produces wonderful echoes: the report of a ſingle cannon is anſwered by a ſucceſſion of peals reſembling the loudeſt thunder, which ſeems to travel the ſurrounding ſcenery, and die away among the diſtant mountains The upper lake is four miles in length, and from two to three in breadth. It is almoſt ſurrounded by mountains, from which deſcend a number of beautiful caſcades. The iſlands in this lake are numerous, and afford an amazing variety of pictureſque views. The centre lake, which communicates with the upper, is ſmall in compariſon with the other two, and cannot boaſt of equal variety; but the ſhores are, in many places, indented with beautiful bays, ſurrounded by dark groves of trees. The eaſt boundary is formed by the baſe of Mangerton, down the ſteep ſide of which deſcends a caſcade, viſible for 150 yards. This fall of water is ſupplied by a circular lake near the ſummit of the mountain, called the Devil's Punch-Bowl; which, on account of its immenſe depth, and the continual overflow of water, is conſidered as one of the greateſt curioſities in Killarney. One of the beſt proſpects which this admired lake affords, is from a riſing ground near the ruined cathedral of Aghadoe.

KILLAS, a genus of ſtones belonging to the argillaceous claſs, found chiefly in Cornwall in England. Its texture is either lamellar or coarſely granular; the ſpecific gravity from 2630 to 2666. It contains 60 parts of ſiliceous earth, 25 of argillaceous, 9 of magneſia, and 6 of iron. The greeniſh kind contains more iron, and gives a green tincture to the nitrous acid.

KILLEVAN, a town of Ireland, in the county of Monaghan, eight miles S. W. of Monaghan. W. lon. 7. 26. N. lat. 54. 10.

KILLICRANKY, a noted paſs of Perthſhire in Scotland. It is formed by the lofty mountains impending over the water of Garrie, which ruſhes through in a deep, darkſome, and horrid channel beneath. In the laſt century this was a paſs of much danger and difficulty; a path hanging over a tremendous precipice threatened deſtruction to the leaſt falſe ſtep of the traveller: at preſent a fine road formed by the ſoldiery lent by government, and encouraged by an additional 6d. per day, gives an eaſy acceſs to the remote Highlands; and the two ſides are joined by a fine arch.

Near the north end of this paſs, in its open and unimproved ſtate, was fought in the year 1689 the battle of Killicranky, between the adherents of James II. under Viſcount Dundee, and of William III. under General Mackay. Dundee's army was very much inferior to that of Mackay. When he came in ſight of the latter, he found them formed in eight battalions ready for action. They conſiſted of 4500 foot, and two troops of horſe. The Highlanders under Dundee amounted to little

178365

more than half that number. Theſe he ranged inſtantly in order of battle. Maclean with his tribe formed the right wing. The Macdonalds of Sky, under their chieftain's eldeſt ſon, formed the left. The Camerons, the Macdonalds of Glengary, the followers of Clanronald, and a few Iriſh auxiliaries, were in the centre. A troop of horſe were placed behind under Sir William Wallace. The officers ſent by James from Ireland were diſtributed through all the line. His whole army ſtood in ſight of the enemy for ſeveral hours on the ſteep ſide of a hill, which faced the narrow plain where Mackay had formed his line. Dundee wiſhed for the approach of night; a ſeaſon ſuited for either victory or flight.

At five of the clock in the afternoon, a kind of ſlight ſkirmiſh began between the right wing of the Highlanders and the left of the enemy. But neither army wiſhing to change their ground, the firing was diſcontinued for three hours. Dundee in the mean time flew from tribe to tribe, and animated them to action. At eight of the clock he gave the ſignal for battle, and charged the enemy in perſon at the head of the horſe. The Highlanders in deep columns ruſhed ſuddenly down the hill. They kept their ſhot till they were within a pike's length of the enemy; and, having fired their muſkets, fell upon them ſword in hand. Mackay's left wing could not for a moment ſuſtain the ſhock. They were driven by the Macleans with great ſlaughter from the field. The Macdonalds on the left of the Highlanders were not equally ſucceſsful. Colonel Haſtings' regiment of foot ſtood their ground. They even forced the Macdonalds to retreat. Maclean, with a few of his tribe, and Sir Evan Cameron at the head of his clan, fell ſuddenly on the flank of this gallant regiment, and forced them to give way. The ſlaughter ended not with the battle. Two thouſand fell in the field and the flight. The tents, baggage, artillery, and proviſions of the enemy, and even king William's Dutch ſtandard, which was carried by Mackay's regiment, fell into the hands of the Highlanders. The victory was now complete. But the Highlanders loſt their gallant leader. Perceiving the unexpected reſiſtance of Colonel Haſtings' regiment, and the confuſion of the Macdonalds, Dundee rode rapidly to the left wing. As he was raiſing his arm, and pointing to the Camerons to advance, he received a ball in his ſide. The wound proved mortal; and with Dundee fell all the hopes of king James at that time.

KILLIGREW (William), eldeſt ſon of Sir Robert Killigrew knight, was born in 1605. He was gentleman-uſher of the privy-chamber to king Charles I. and on the Reſtoration to Charles II. When the latter married the princeſs Catherine of Portugal, he was created vice-chamberlain; in which ſtation he continued 22 years, and died in 1693. He was the author of four plays, which, though now thrown aſide, were much applauded by the poets of that time, particularly by Mr. Waller; and in the decline of life he publiſhed ſome pious reflections on the inſtability of human happineſs when our views are not directed to a future ſtate.

Killigrew (Thomas), brother of the former, was born in 1611, and in proceſs of time diſtinguiſhed himſelf by his uncommon natural parts. He was page of honour to King Charles I. and groom of the bed-chamber to Charles II with whom he ſuffered many years exile; during which he applied his leiſure hours to the ſtudy of poetry, and to the compoſition of ſeveral plays. After the Reſtoration he continued in high favour with the king, and had frequently acceſs to him when he was denied to the firſt peers in the realm; and being a man of great wit and livelineſs of parts, and having from his long intimacy with that monarch, and being continually about his perſon during his troubles, acquired a freedom and familiarity with him which even the pomp of majeſty afterwards could not check in him, he ſometimes, by way of jeſt, which King Charles was ever fond of, if genuine, even though himſelf was the object of the ſatire, would adventure bold truths which ſcarcely any one beſides would have dared even to hint at. One ſtory in particular is related of him, which, if true, is a ſtrong proof of the great lengths he would ſometimes proceed in his freedoms of this kind, and is as follows:—When the king's unbounded paſſion for women had given his miſtreſs ſuch an aſcendant over him, that, like the effeminate Perſian monarch, he was much fitter to have handled a diſtaff than to wield a ſceptre, and for the converſation of his concubines utterly neglected the moſt important affairs of ſtate; Mr. Killigrew went to pay his majeſty a viſit in his private apartments, habited like a pilgrim who was bent on a long journey. The king, ſurpriſed at the oddity of his appearance, immediately aſked him what was the meaning of it, and whither he was going? "To hell," bluntly replied the wag. "Pr'ythee (ſaid the king), what can your errand be to that place?" "To fetch back Oliver Cromwell (rejoined he), that he may take ſome care of the affairs of England; for his ſucceſſor takes none at all."—One more ſtory is related of him, which is not barren of humour. King Charles's fondneſs for pleaſure, to which he almoſt always made buſineſs give way, uſed frequently to delay affairs of conſequence, from his majeſty's diſappointing the council of his preſence when met for the diſpatch of buſineſs; which neglect gave great diſguſt and offence to many of thoſe who were treated with this ſeeming diſreſpect. On one of theſe occaſions the duke of Lauderdale, who was naturally impetuous and turbulent, quitted the council-chamber in a violent paſſion; and, meeting Mr. Killigrew preſently after, expreſſed himſelf on the occaſion in very diſreſpectful terms of his majeſty. Killigrew begged his grace to moderate his paſſion, and offered to lay him a wager of 100l. that he himſelf would prevail on his majeſty to come to council in half an hour. The duke, ſurpriſed at the boldneſs of the aſſertion, and warmed by his reſentment againſt the king, accepted the wager; on which Killigrew immediately went to the king, and without ceremony told him what had happened; adding theſe words, "I know that your majeſty hates Lauderdale, though the neceſſity of your affairs compels you to carry an outward appearance of civility: now, if you chooſe to get rid of a man who is thus diſagreeable to you, you need only go this once to council; for I know his covetous diſpoſition ſo perfectly, that I am well perſuaded, rather than pay this 100l. he would hang himſelf out of the way, and never plague you more." The king was ſo pleaſed with the archneſs of this obſervation, that he immediately replied, "Well then, Killigrew, I poſitively will go;" and kept his word accordingly.—Killigrew died in 1682, and was buried in Weſtminſter-abbey.

Killigrew (Anne), "a Grace for beauty, and a Muſe for wit," as Mr. Wood ſays, was the daughter of Dr. Henry Killigrew, brother of the two foregoing, and was born a little before the Reſtoration. She gave early indications of genius, and became eminent in the arts both of poetry and painting. She drew the duke of York and his ducheſs, to whom ſhe was maid of honour, as well as ſeveral other portraits and hiſtory-pieces; and crowned all her other accompliſhments with unblemiſhed virtue and exemplary piety. Mr. Dryden ſeems quite laviſh in her praiſe, though Wood aſſures us he has ſaid no more of her than ſhe was equal if not ſuperior to. This amiable young woman died of the ſmall-pox in 1685; and the year after her poems were publiſhed in a thin 4to volume.

KILLILEAGH, a town of Ireland, in the county of Down and province of Ulſter, 80 miles from Dublin; otherwiſe written *Killyleagh*. It is the principal town in the barony of Duffrin; and ſeated on an arm of the lake of Strangford, from which it is ſupplied with a great variety of fiſh. The family

of the Hamiltons, created firſt lords Clanbois, and afterwards earls of Clanbraſſil, had their ſeat and reſidence here in a caſtle ſtanding at the upper end of the great ſtreet: at the lower end of the ſtreet is a little ſafe bay, where ſhips lie ſheltered from all winds: in the town are ſome good houſes, a decent market-houſe, a horſe-barrack, and a Preſbyterian meeting-houſe. On an eminence a ſmall diſtance from the town is a handſome church built in the form of a croſs. This place ſuffered much in the calamitous year 1641. It is now thriving, and the linen manufacture carried on in it, and fine thread made, for which it has a great demand. It returns two members to parliament, patronage in the Blackwood family; and holds three fairs. The celebrated naturaliſt and eminent phyſician Sir Hans Sloane was born here 16th April 1660, and his father Alexander Sloane was at the head of that colony of Scots which King James I. ſettled in the place. This town was incorporated by that king at the inſtance of the firſt earl of Clanbois.

KILLONY, a town of Ireland, in the county of Sligo, ſix miles S. of Sligo. W. lon. 8. 25 N lat. 54. 11.

KILLOUGH, alſo called PORT ST. ANNE, a port-town of Ireland, ſituated in the county of Down and province of Ulſter, 76 miles from Dublin. It lies north of St. John's Point, and has a good quay, where ſhips lie very ſafe. The town is agreeably ſituated; the ſea flowing all along the fronts of the houſes, where ſhips ride in full view of the inhabitants. There is here a good church, and a horſe-barrack. They have good fiſhing in the bay; but the principal trade of the place conſiſts in the exportation of barley, and the importation of ſuch commodities as are conſumed in the adjacent country. A manufacture of ſalt is alſo carried on with great advantage. The fairs held here are five. At a ſmall diſtance from the town is a charter working-ſchool for the reception of 20 children, which was ſet on foot by the late Mr. Juſtice Ward. There is a remarkable well here, called *St. Scordin's well*, and highly eſteemed for the extraordinary lightneſs of its water. It guſhes out of a high rocky bank, cloſe upon the ſhore, and is obſerved never to diminiſh its quantity in the drieſt ſeaſon. There is alſo a mineral ſpring near the ſchool, the waters of which the inhabitants affirm to be both purgative and emetic. At a ſmall diſtance from the town, near the ſea, is a rock in which there is an oblong hole, from whence at the ebbing and flowing of the tide a ſtrange noiſe is heard ſomewhat reſembling the ſound of a huntſman's horn. In an open field about a quarter of a mile from the town towards St. John's Point there is a very curious cave, which has a winding paſſage two feet and a half broad, with three doors in it beſides the entrance, and leading to a circular chamber three yards in diameter, where there is a fine limpid well. The cave is about 27 yards long.

KILLOUGH-*Harbour* is tolerably ſafe and commodious; a ſmall degree of caution, however, is neceſſary in ſailing into it; for a rock ſtands in the middle of the entrance, covered at half flood, commonly called the *water rock*. Either to the eaſt or weſt of this rock is a ſecure paſſage, the inlet lying ſouth by eaſt and north by weſt. On the weſt ſide of the rock open to Coney-iſland is a ſtrong quay, and a baſon for ſhips, where they are defended from all winds, within which the harbour on both ſides affords good anchorage for veſſels of 150 tons. At the end of the quay the channel is 400 yards wide. The bay of Killough is formed by Rin-fad at the Long point to the eaſt, and St. John's point to the weſt, as the inner harbour is by a peninſula called *Coney-iſle* from the number of rabbits thereon, and not *Cane iſle* as Sir William Petty has it. An impetuous ſea runs on all this coaſt in ſtorms and ſpring tides.

KILLYBEGS, a borough and fair-town in the county of Donegal and province of Ulſter, 123 miles from Dublin. It is ſituated on the north ſide of Donegal bay; but is a place of no great trade, though it has a harbour ſpacious enough to contain a large fleet: it has a bold and ample opening to the ſea on the ſouth, and is ſecured within by the ſhelter of high lands furrounding it; ſo that veſſels may enter at any time of the tide, there being from 5 to 8 fathom water. The herring-fiſhery is the moſt conſiderable of any carried on here; but the town is likely to increaſe in trade and conſequence. It returns two members to parliament, patronage in the Conyngham family. It has two fairs.

KILMAC-THOMAS, a town of Ireland, in the county of Waterford, 12 miles S. E. of Waterford. W. lon. 7. 10. N. lat. 52. 14.

KILMAINHAM, a town of Ireland, ſituated about half a mile from Dublin. It has a ſeſſion-houſe and handſome gaol; and here the quarter ſeſſions are held for the county of Dublin, and knights of the ſhire elected for that county. This place was ſometimes the ſeat of government before Dublin caſtle was converted to that purpoſe; and though now much decayed, it gives title of baron to the family of Wenman. An ancient priory was founded here, and a houſe for knights hoſpitalers of St. John of Jeruſalem.

KILMALLOCK, a town of Ireland, in the county of Limerick and province of Munſter, 16 miles from the city of Limerick, and 107 from Dublin.—This town makes a conſpicuous figure in the military hiſtory of Ireland. In the 16th century it was a populous place; and the remains of the wall, which entirely furrounded the town, and of ſeveral large houſes, are ſtill to be ſeen. Edward VI. granted a charter to it with many privileges, as did Queen Elizabeth another, dated 24th April 1584. In 159 , it was inveſted by the Iriſh forces; when the earl of Ormond haſtened to its relief, and arrived in time to raiſe the ſiege: here was alſo ſome conteſt during the grand rebellion in 1641 and 1642. By an inquiſition 11 Aug. 29 Eliz. it appears that there had been an abbey in Kilmallock called *Kaciſpaghe*; on which a ſtone houſe was erected. In the cathedral church are the remains of a monument erected over the Verdon family, one of whom repreſented this town in parliament in 1613. Kilmallock returns two members to parliament; patron Silver Oliver, Eſq. This place once gave title of viſcount to one of the Sarsfield family. Sir James Ware informs us, that an abbey of Dominicans or black friars was built here in the 13th century by the ſovereign, brethren, and commonalty. From the many ruins here of caſtles and ancient buildings, it has acquired the name of the *Iriſh Balbec*. The pariſh church was formerly an abbey for regular canons, founded by St. Mochoallog, who died between the years 639 and 656; and ſome writers ſay, that the Dominican abbey juſt mentioned was founded in 1291, by Gilbert the ſecond ſon of John of Calleen. Fairs are held at this town on Whit Tueſday.

KILMARNOCK, a populous and flouriſhing town of Ayrſhire in Scotland, noted for its manufacture of carpets, milled hoſiery, and Scotch bonnets. It gave the title of earl to the noble family of Boyd, reſiding in this neighbourhood. This title was forfeited by the late earl, who by engaging in the rebellion of 1745 was deprived of his honours, and loſt his life on the ſcaffold. His ſon, however, who ſerved in the king's army, afterwards ſucceeded to the earldom of Errol, a title much more ancient and honourable.

KILMORE, a biſhop's ſee in the county of Cavan and province of Ulſter in Ireland. It was called in former ages *Cluncs*, or *Cluain* i. e. the "ſequeſtered place;" and is ſituated near Lough Oughter. St. Fedlimid founded this biſhopric in the ſixth century: it was afterwards removed to an obſcure village called *Triburna*; where it continued until the year 1454, when Andrew Mac Brady biſhop of Triburna erected a church on the ſite of that founded by St. Fedlimid, to whoſe memory it was dedicated, and denominated *Kilmore*, or "the great church." At preſent there are neither cathedral, chapter, nor

canons, belonging to this ſee; the ſmall pariſh-church contiguous to the epiſcopal houſe ſerving for the purpoſe of a cathedral.

KILN, a ſtove uſed in the manufacture of various articles. A fabric formed for admitting heat, in order to dry or burn materials placed in it to undergo ſuch operations.

In Vol. V. of the Repertory of Arts the following deſcription is given of a patent kiln for drying malt, invented by Mr. Pepper of Newcaſtle under Line. See the plans delineated in pl. 1.

Fig. 1 is the ground plan, ſuppoſed to be twenty feet ſquare, but, if required larger or ſmaller, by following the ſame proportion may be made agreeable to any ſize or ſituation. The dark ſhaded walls riſe four feet high, to put the reflector upon, over the fire, and alſo what the ſide-arches ſtand upon, the brick piers that carry the ſpark-ſtone, and bearers that the tiles lie upon. Letter A, firegrate, lies nine inches below the bottom edge of the reflector. B, bottom edge of the reflector. C C C C, brick pillars, nine inches ſquare, that carry the ſpark-ſtone. D D D D D D, brick pillars, nine inches ſquare, that carry the bearers for the floor-tiles to lie upon. E ſhows the bottom of the ſide-arches on each ſide of the kiln. F ſhows the ſpace between the fire-place and the ſide-arches, for the man to go round to clean the kiln. G, the wall on each ſide the kiln, that the ſide-arches ſtand upon.

Fig. 2 is a ſection. G ſhows the ſection of the wall which the ſide arches ſtand upon. H, the door to go to the fire-place. I, the reflector of caſt-iron that covers the fire. K, ſmall door in the reflector, to feed the fire. L L, the ears of the reflector, that the iron pipes are fitted upon, which convey the ſmoke, &c. from the reflector, round the kiln, to the chimney. M, what is commonly called the ſpark-ſtone; it prevents the kiln from being too hot in the middle, and aſſiſts in ſpreading the heat to the outſides. N, bearers of caſt iron, or wood, that carry the kiln floor. O O ſhow the ends of the ribs that carry the tiles. P, the kiln-tiles that the malt lies upon. Q, the ſteam-pipe that conveys the ſteam from the malt. C C, brick pillars, nine inches ſquare, that carry the ſpark-ſtone. D D, brick pillars, nine inches ſquare, that carry the bearers for the floor-tiles to lie upon. E E ſhow the arches on each ſide the kiln. U U ſhow the ſituation of the pipes under the floor.

Fig. 3 is a plan of the kiln-floor, and ſhows the ribs that the kiln-tiles lie upon. O O the caſt-iron or wood ribs that the tiles lie upon. N N, the bearers that carry the ribs. D D ſhow the tops of the brick pillars that carry the bearers, &c. B, the reflector that covers the fire, of caſt iron, about an inch thick, hollow, and on a ſemicircular plan, as ſhown in the drawings. R R, the iron pipes that convey the ſmoke and heat from the reflector, round the kiln, to the chimney, which lies about three feet under the kiln-floor, and about the ſame diſtance from the ſide-walls, which are ſupported by iron ſtays from the ſide arches. S S ſhow the ends of the iron pipes that go into the chimney. T T, regiſters to regulate the draught and heat.

In the plate, the pillars, bearers, &c. that belong to the ſame thing, are marked with the ſame letters in all the figures.

That moſt ingenious philoſopher Count Rumford has deſcribed, in his 6th Eſſay, a model of a perpetual lime-kiln, of which we have given a repreſentation in pl. 1.

"The particular objects principally had in view in the conſtruction of this lime-kiln," ſays the Count, "(which ſtands in the court-yard of the Dublin Society) were, *firſt*, to cauſe the fuel to burn in ſuch a manner as to conſume the ſmoke, which was done by obliging the ſmoke to deſcend and paſs through the fire, in order that as much heat as poſſible might be generated.—Secondly, to cauſe the flame and hot vapour which riſe from the fire to come into contact with the lime-ſtone by a very large ſurface, in order to economiſe the heat, and prevent its going off into the atmoſphere; which was done by making the body of the kiln in the form of a hollow truncated cone, and very high in proportion to its diameter; and by filling it quite up to the top with limeſtone, the fire being made to enter near the bottom of the cone.

"Thirdly, to make the proceſs of burning lime *perpetual*, in order to prevent the waſte of heat which unavoidably attends the cooling of the kiln in emptying and filling it, when, to perform that operation, it is neceſſary to put out the fire.

"And, fourthly, to contrive matters ſo that the lime in which the proceſs of burning is *juſt finiſhed*, and which of courſe is ſtill *intenſely hot*, may, in *cooling*, be made to give off its heat in ſuch a manner as to aſſiſt in heating the freſh quantity of cold limeſtone with which the kiln is repleniſhed as often as a portion of lime is taken out of it.

"To effectuate theſe purpoſes, the fuel is not mixed with the lime-ſtone, but is burned in a cloſed fire-place, which opens into one ſide of the kiln, ſome diſtance above the bottom of it. For large lime-kilns on theſe principles there may be ſeveral fire-places, all opening into the ſame cone, and ſituated on different ſides of it; which fire places may be conſtructed and regulated like the fire-places of the furnaces uſed for burning porcelaine.

"At the bottom of the kiln there is a door, which is occaſionally opened to take out the lime.

"When, in conſequence of a portion of lime being drawn out of the kiln, its contents ſettle down or ſubſide, the empty ſpace in the upper part of the kiln, which is occaſioned by this ſubtraction of the burned lime, is immediately filled up with freſh limeſtone.

"As ſoon as a portion of lime is taken away, the door by which it is removed muſt be immediately ſhut, and the joinings well cloſed with moiſt clay, to prevent a draught of cold air through the kiln. A ſmall opening however muſt be left, for reaſons which I ſhall preſently explain.

"As the fire enters the kiln at ſome diſtance from the bottom of it, and as the flame *riſes* as ſoon as it comes into this cavity, the lower part of the kiln (that below the level of the bottom of the fire-place) is occupied by lime already burned; and as this lime is intenſely hot, when, on a portion of lime from below being removed, it deſcends into this part of the kiln, and as the air in the kiln, to which it communicates its heat, muſt *riſe upwards* in conſequence of its being heated, and paſs off through the top of the kiln; this lime in cooling is, by this contrivance, made to aſſiſt in heating the freſh portion of cold lime-ſtone with which the kiln is charged. To facilitate this communication of heat from the red-hot lime juſt burned to the lime-ſtone above in the upper part of the kiln, a gentle draught of air through the kiln from the bottom to the top of it muſt be eſtabliſhed by leaving an opening in the door below, by which the cold air from without may be ſuffered to enter the kiln. This opening (which ſhould be furniſhed with ſome kind of a regiſter) muſt be very ſmall, otherwiſe it will occaſion too ſtrong a draught of cold air into the kiln, and do more harm than good; and it will probably be found beſt to cloſe it entirely, after the lime in the lower part of the kiln has parted with a certain proportion of its heat.

"Conceiving the improvement of lime-kilns to be a matter of very great national importance, eſpecially ſince the uſe of lime as manure has become ſo general, I intend to devote the firſt leiſure time I can ſpare to a thorough inveſtigation of that ſubject;—in the mean time, I have here thrown out the looſe ideas I have formed reſpecting it, in order that they may be examined, corrected, and improved upon by others who may be engaged in the ſame purſuits."

The height of the kiln repreſented in the plate is en a ſcale

of 15 feet; its internal diameter below, 2 feet; and above, 9 inches. In order more effectually to confine the heat, its walls, which are of bricks and very thin, are double, and the cavity between them is filled with dry wood aſhes. To give greater ſtrength to the fabric, theſe two walls are connected in different places by horizontal layers of bricks, which unite them firmly.

a Is the opening by which the fuel is put into the fire-place. Through this opening the air *deſcends* which feeds the fire. The fire-place is repreſented nearly full of coals, and the flame paſſing off laterally into the cavity of the kiln, by an opening made for that purpoſe at the bottom of the fire-place. The opening above, by which the fuel is introduced into the fire-place, is covered by a plate of iron, moveable on hinges; which plate, by being lifted up more or leſs by means of a chain, ſerves as a regiſter for regulating the fire. A ſection of this plate, and of the chain by which it is ſupported, are ſhown in the figure.

b Is an opening in the front wall of the fire-place, which ſerves occaſionally for cleaning out the fire-place, and the opening by which the flame paſſes from the fire-place into the kiln. This opening, which muſt never be quite cloſed, ſerves likewiſe for admitting a ſmall quantity of air to paſs horizontally into the fire-place. A ſmall proportion of air admitted in this manner has been found to be uſeful and even neceſſary in fire-places in which, in order to conſume the ſmoke, the flame is made to deſcend. Several ſmall holes for this purpoſe, fitted with conical ſtoppers, may be made in different parts of the front wall of the fire-place.

The bottom of the fire-place is a grate conſtructed of bricks placed edgewiſe, and under this grate there is an aſh-pit; but as no air muſt be permitted to paſs up through this grate into the fire-place, the aſh-pit door, *c*, is kept conſtantly cloſed, being only opened occaſionally to remove the aſhes.

d Is the opening by which the lime is taken out of the kiln; which opening muſt be kept well cloſed in order to prevent a draught of cold air through the kiln. As only as much lime muſt be removed at once as is contained in that part of the kiln which lies below the level of the bottom of the fire-place, to be able to aſcertain when the proper quantity is taken away, the lime, as it comes out of the kiln, may be directed into a pit ſunk in the ground in front of the opening by which the lime is removed; this pit being made of proper ſize to ſerve as a meaſure.

While the lime is removing from the bottom of the kiln, freſh lime-ſtone ſhould be put into it above; and, during this operation, the fire may be damped by cloſing the top of the fire-place with its iron plate. Should it be found neceſſary, the fire, and the diſtribution of the heat, may, in burning the lime, be further regulated by cloſing more or leſs the opening at the top of the lime-kiln with a flat piece of fire-ſtone, or a plate of caſt iron. The double walls of the kiln, and the void ſpace between them, as alſo the horizontal layers of bricks by which they are united, are clearly and diſtinctly expreſſed in the figure.

We have no doubt but theſe improvements will be followed by others of ſtill greater magnitude; as Count Rumford is engaged in a variety of experiments to aſcertain the moſt effectual and œconomical way of applying heat to all ſubſtances which require to be ſubmitted to the action of fire. See the article PROPAGATION *of Heat*.

KILWORTH, a town of Ireland, ſituated in the county of Cork and province of Munſter, 108 miles from Dublin. It is a thriving place with a good church, at the foot of a large ridge of mountains called *Kilworth mountains*, through which a good turnpike road is carried from Dublin to Cork: below the town runs the river Funcheon, which is well ſtored with ſalmon and trout, and diſcharges itſelf a mile ſouth of this into the Blackwater. Near Kilworth is a good glebe and vicarage houſe. At this place is Moor-park, the ſuperb ſeat of Lord Mountcaſhel; and adjoining to his lordſhip's improvements ſtands the caſtle of Clough leagh boldly ſituated on the river Funcheon, which has ſtood ſeveral ſieges. Six fairs are held here.

KIMBOLTON, a town in Huntingdonſhire, with a market on Friday. The caſtle (the ſeat of the duke of Mancheſter) has been much improved. Queen Catharine, after her divorce from Henry VIII, reſided ſome time in this caſtle. It is eight miles N. W. of St. Neot's, and 64 N. by W. of London. W. lon. 0. 18. N. lat. 52. 15.

KIMCHI (DAVID), a Jewiſh rabbi, famous as a commentator on the Old Teſtament, lived at the cloſe of the 12th and beginning of the 13th centuries. He was a Spaniard by birth, ſon of rabbi Joſeph Kimchi, and brother of rabbi Moſes Kimchi, both men of eminent learning among the Jews: but he exceeded them both, being the beſt Hebrew grammarian the Jews ever had. He wrote a Grammar and Dictionary of that language; out of the former of which Buxtorf made his *Theſaurus linguæ Hebreæ*, and his *Lexicon linguæ Hebreæ* out of the latter. His writings have been held in ſuch eſtimation among the Jews, that no one can arrive at any reputation in letters and theology without ſtudying them.

KIMI, a town of Sweden, capital of a province of the ſame name in E. Bothnia, at the mouth of the Kimi, which here falls into the gulf of Bothnia, 10 miles S. E. of Tornea.

KINBURN, a fortreſs of the Ruſſian empire, at the mouth of the Dnieper, oppoſite Oczakow. In the laſt war with Ruſſia, the Turks made ſeveral attacks upon it by land and ſea, but were finally repulſed.

KINCARDINE-O-NIEL, a village in Aberdeenſhire, ſeated on the river Dee, 23 miles W. of Aberdeen.

KINCARDINESHIRE. See MEARNS.

KINDRED, in law, perſons related to one another, whereof the law reckons three degrees or lines, *viz.* the deſcending, aſcending, and collateral line. See CONSANGUINITY and DESCENT. On there being no kindred in the deſcending line, the inheritance paſſes in the collateral one.

KINETON, a town in Warwickſhire, with a market on Tueſday. King John kept his court in a caſtle here. It is 10 miles S. S. E. of Warwick, and 88 N. W. of London. W. lon. 1. 24. N. lat. 52. 11.

KING, a monarch or potentate who rules ſingly and ſovereignly over a people. Camden derives the word from the Saxon *cyning*, which ſignifies the ſame: and that from *can* "power," or *ken* "knowledge," wherewith every monarch is ſuppoſed to be inveſted. The Latin *rex*, the Scythian *reix*, the Punic *reſh*, the Spaniſh *rey*, and the French *roy*, come all, according to Poſtel, from the Hebrew ראש, *raſh*, "chief, head."

Kings were not known amongſt the Iſraelites till the reign of Saul. Before him they were governed at firſt by elders as in Egypt; then by princes of God's appointment, as Moſes and Joſhua; then by judges till the time of Samuel; and laſt of all by kings, as we read in ſcripture.

Moſt of the Grecian ſtates were governed at firſt by kings, who were choſen by the people to decide differences and exerciſe a power which was limited by laws. They commanded armies, preſided over the worſhip of the gods, &c. This royalty was generally hereditary; but if the vices of the heir to the crown were odious to the people, or if the oracle had ſo commanded, he was cut off from the right of ſucceſſion; yet the kings were ſuppoſed to hold their ſovereignty by the appointment of Jupiter. The enſign of majeſty was the ſceptre, which was made

of wood adorned with ſtuds of gold, and ornamented at the top with ſome figure; commonly that of an eagle, as being the bird of Jove.

Rome alſo was governed at firſt by kings, who were elected by the people, with the approbation of the ſenate and concurrence of the augurs. Their power extended to religion, the revenues, the army, and the adminiſtration of juſtice. The monarchical form of government ſubſiſted 244 years in Rome, under ſeven kings, the laſt of whom was Tarquinius Superbus.

Among the Greeks the king of Perſia had anciently the appellation of the *great king*; the king of France had that of the *moſt Chriſtian king*; and the king of Spain has that of *Catholic king*. The king of the Romans is a prince choſen by the electors, as a coadjutor in the government of the empire.

The kings of England, by the Lateran council, under Pope Julius II. had the title of *Chriſtianiſſimus* conferred on them; and that of *defender of the faith* was added by pope Leo X. though it had been uſed by them ſome time before. The title of *grace* was firſt given to our kings about the time of Henry IV. and that of *majeſty* firſt to Henry VIII. before which time our kings were called *grace*, *highneſs*, &c.—In all public inſtruments and letters, the king ſtyles himſelf *nos*, "we;" though till the time of king John he ſpoke in the ſingular number.

The definition of *king* above given, is according to the general acceptation of the term. It will not therefore ſtrictly apply to the ſovereign of this country. In Britain, the power of the king is indeed ſubject to great limitations; but they are the limitations of wiſdom, and the ſources of dignity; being ſo far from diminiſhing his honour, that they add a glory to his crown. For while other kings are abſolute monarchs over innumerable multitudes of ſlaves, the king of Britain has the diſtinguiſhed glory of governing a free people, the leaſt of whom is protected by the laws. He has great prerogatives, and a boundleſs power in doing good; and is at the ſame time only reſtrained from acting inconſiſtently with his own happineſs, and that of his people.

To underſtand the royal rights and authority in Britain, we muſt conſider the king under ſix diſtinct views. *Firſt*, With regard to his title. *Secondly*, His royal family. *Thirdly*, His councils. *Fourthly*, His duties. *Fifthly*, His prerogative. *Sixthly*, His revenue.

1. His title. For this, ſee HEREDITARY *Right*, and SUCCESSION.

2. His royal family. See ROYAL *Family*.

3. His councils. See COUNCIL.

4. His duties. By our conſtitution, there are certain duties incumbent on the king; in conſideration of which, his dignity and prerogative are eſtabliſhed by the laws of the land: it being a maxim in the law, that protection and ſubjection are reciprocal. And theſe reciprocal duties are what Sir William Blackſtone apprehends were meant by the convention in 1688, when they declared that king James had broken the original contract between king and people. But however, as the terms of that original contract were in ſome meaſure diſputed, being alleged to exiſt principally in theory, and to be only deducible by reaſon and the rules of natural law, in which deduction different underſtandings might very conſiderably differ; it was, after the revolution, judged proper to declare theſe duties expreſſly, and to reduce that contract to a plain certainty. So that, whatever doubts might be formerly raiſed by weak and ſcrupulous minds about the exiſtence of ſuch an original contract, they muſt now entirely ceaſe; eſpecially with regard to every prince who hath reigned ſince the year 1688.

The principal duty of the king is, To govern his people according to law. *Nec regibus infinita aut libera poteſtas*, was the conſtitution of our German anceſtors on the continent. And this is not only conſonant to the principles of nature, of liberty, of reaſon, and of ſociety; but has always been eſteemed an expreſs part of the common law of England, even when prerogative was at the higheſt. "The king (ſaith Bracton, who wrote under Henry III.) ought not to be ſubject to man; but to God, and to the law: for the law maketh the king. Let the king therefore render to the law, what the law has inveſted in him with regard to others; dominion, and power: for he is not truly king, where will and pleaſure rules, and not the law." And again: "The king hath a ſuperior, namely God; and alſo the law, by which he was made a king." Thus Bracton; and Forteſcue alſo, having firſt well diſtinguiſhed between a monarchy abſolutely and deſpotically-regal, which is introduced by conqueſt and violence, and a political or civil monarchy, which ariſes from mutual conſent (of which laſt ſpecies he aſſerts the government of England to be), immediately lays it down as a principle, that "the king of England muſt rule his people according to the decrees of the laws thereof; inſomuch that he is bound by an oath at his coronation to the obſervance and keeping of his own laws." But to obviate all doubts and difficulties concerning this matter, it is expreſsly declared by ſtatute 12 and 13 W. III. c. 2. "that the laws of England are the birthright of the people thereof; and all the kings and queens who ſhall aſcend the throne of this realm ought to adminiſter the government of the ſame according to the ſaid laws, and all their officers and miniſters ought to ſerve them reſpectively according to the ſame: and therefore all the other laws and ſtatutes of this realm, for ſecuring the eſtabliſhed religion, and the rights and liberties of the people thereof, and all other laws and ſtatutes of the ſame now in force, are by his majeſty, by and with the advice and conſent of the lords ſpiritual and temporal, and commons, and by authority of the ſame, ratified and confirmed accordingly."

And as to the terms of the original contract between king and people, theſe, it is apprehended, are now couched in the coronation oath, which by the ſtatute 1 W. & M. ſt. 1. c. 6. is to be adminiſtered to every king and queen who ſhall ſucceed to the imperial crown of theſe realms, by one of the archbiſhops or biſhops of the realm, in the preſence of all the people; who on their parts do reciprocally take the oath of allegiance to the crown. This coronation-oath is conceived in the following terms:

"*The archbiſhop or biſhop ſhall ſay*, Will you ſolemnly promiſe and ſwear to govern the people of this kingdom of Britain, and the dominions thereto belonging, according to the ſtatutes in parliament agreed, and the laws and cuſtoms of the ſame?—*The king or queen ſhall ſay*, I ſolemnly promiſe ſo to do.

"*Archbiſhop or biſhop*. Will you to your power cauſe law and juſtice, in mercy, to be executed in all your judgments?—*King or queen*. I will.

"*Archbiſhop or biſhop*. Will you to the utmoſt of your power maintain the laws of God, the true profeſſion of the goſpel, and the Proteſtant reformed religion eſtabliſhed by the law? And will you preſerve unto the biſhops and clergy of this realm, and to the churches committed to their charge, all ſuch rights and privileges as by law do or ſhall appertain unto them, or any of them?—*King or queen*. All this I promiſe to do.

"*After this the king or queen, laying his or her hand upon the holy goſpel, ſhall ſay*, The things which I have here before promiſed, I will perform and keep: ſo help me God. *And then ſhall kiſs the book*."

This is the form of the coronation-oath, as it is now preſcribed by our laws; the principal articles of which appear to be at leaſt as ancient as the Mirror of Juſtices, and even as the time of Bracton: but the wording of it was changed at the revolution, becauſe (as the ſtatute alleges) the oath itſelf had been

framed in doubtful words and expreſſions, with relation to ancient laws and conſtitutions at this time unknown. However, in what form ſoever it be conceived, this is moſt indiſputably a fundamental and original expreſs contract; though, doubtleſs, the duty of protection is impliedly as much incumbent on the ſovereign before coronation as after: in the ſame manner as allegiance to the king becomes the duty of the ſubject immediately on the deſcent of the crown, before he has taken the oath of allegiance, or whether he ever takes it at all. This reciprocal duty of the ſubject will be conſidered in its proper place. At preſent we are only to obſerve, that in the king's part of this original contract are expreſſed all the duties which a monarch can owe to his people, viz. to govern according to law; to execute judgment in mercy; and to maintain the eſtabliſhed religion. And with reſpect to the latter of theſe three branches, we may farther remark, that by the act of union, 5 Ann, c. 8. two preceding ſtatutes are recited and confirmed; the one of the parliament of Scotland, the other of the parliament of England: which enact; the former, that every king at his acceſſion ſhall take and ſubſcribe an oath, to preſerve the Proteſtant religion, and preſbyterian church government in Scotland; the latter, that at his coronation he ſhall take and ſubſcribe a ſimilar oath, to preſerve the ſettlement of the church of England within England, Ireland, Wales, and Berwick, and the territories thereunto belonging.

5. His prerogative. See PREROGATIVE.

6. His revenue. See REVENUE.

Having in the preceding remarks pointed out the principal outlines of this vaſt engine of the law, the ſupreme executive magiſtrate, or the king's majeſty, conſidered in his ſeveral capacities and points of view; it may not be improper to take a ſhort comparative review of the power of the executive magiſtrate, or prerogative of the crown, as it ſtood in former days, and as it ſtands at preſent. And we cannot but obſerve, that moſt of the laws for aſcertaining, limiting, and reſtraining this prerogative, have been made within the compaſs of little more than a century paſt; from the petition of right in 3 Car. I. to the preſent time. So that the powers of the crown are now to all appearance greatly curtailed and diminiſhed ſince the reign of king James I. particularly by the abolition of the ſtar chamber and high-commiſſion courts in the reign of Charles I. and by the diſclaiming of martial law, and the power of levying taxes on the ſubject, by the ſame prince: by the diſuſe of foreſt-laws for a century paſt: and by the many excellent proviſions enacted under Charles II.; eſpecially the abolition of military tenures, purveyance, and pre-emption; the *habeas corpus* act; and the act to prevent the diſcontinuance of parliaments for above three years; and ſince the revolution, by the ſtrong and emphatical words in which our liberties are aſſerted in the bill of rights, and act of ſettlement; by the act for triennial, ſince turned into ſeptennial, elections; by the excluſion of certain officers from the houſe of commons; by rendering the ſeats of the judges permanent, and their ſalaries independent; and by reſtraining the king's pardon from obſtructing parliamentary impeachments. Beſides all this, if we conſider how the crown is impoveriſhed and ſtripped of all its ancient revenues, ſo that it greatly depends on the liberality of parliament for its neceſſary ſupport and maintenance, we may perhaps be led to think that the balance is inclined pretty ſtrongly to the popular ſcale, and that the executive magiſtrate has neither independence nor power enough left, to form that check upon the lords and commons which the founders of our conſtitution intended.

But, on the other hand, it is to be conſidered, that every prince, in the firſt parliament after his acceſſion, has by long uſage a truly royal addition to his hereditary revenue ſettled upon him for his life; and ſhould never have occaſion to apply to parliament for ſupplies, but upon ſome public neceſſity of the whole realm. This reſtores to him that conſtitutional independence, which at his firſt acceſſion ſeems, it muſt be owned, to be wanting. And then with regard to power, we may find perhaps that the hands of government are at leaſt ſufficiently ſtrengthened; and that a Britiſh monarch is now in no danger of being overborne by either the nobility or the people. The inſtruments of power are not perhaps ſo open and avowed as they formerly were, and therefore are the leſs liable to jealous and invidious reflections; but they are not the weaker upon that account. In ſhort, our national debt and taxes (beſides the inconveniences before mentioned) have alſo in their natural conſequences thrown ſuch a weight of power into the executive ſcale of government, as we cannot think was intended by our patriot anceſtors; who glorioufly ſtruggled for the abolition of the then formidable parts of the prerogative, and by an unaccountable want of foreſight eſtabliſhed this ſyſtem in their ſtead. The entire collection and management of ſo vaſt a revenue, being placed in the hands of the crown, have given riſe to ſuch a number of new officers, created by and removable at the royal pleaſure, that they have extended the influence of government to every corner of the nation. Witneſs the commiſſioners, and the multitude of dependents on the cuſtoms, in every port of the kingdom: the commiſſioners of exciſe, and their numerous ſubalterns, in every inland diſtrict; the poſt-maſters and their ſervants, planted in every town, and upon every public road; the commiſſioners of the ſtamps, and their diſtributors, which are fully as ſcattered and fully as numerous; the officers of the ſalt-duty, which, though a ſpecies of exciſe, and conducted in the ſame manner, are yet made a diſtinct corps from the ordinary managers of that revenue; the ſurveyors of houſes and windows; the receivers of the land-tax; the managers of lotteries; and the commiſſioners of hackney-coaches; all which are either mediately or immediately appointed by the crown, and removable at pleaſure without any reaſon aſſigned: theſe, it requires but little penetration to ſee, muſt give that power, on which they depend for ſubſiſtence, an influence moſt amazingly extenſive. To this may be added the frequent opportunities of conferring particular obligations, by preference in loans, ſubſcriptions, tickets, remittances, and other money-tranſactions, which will greatly increaſe this influence; and that over thoſe perſons whoſe attachment, on account of their wealth, is frequently the moſt deſirable. All this is the natural, though perhaps the unforeſeen, conſequence of erecting our funds of credit, and, to ſupport them, eſtabliſhing our perpetual taxes: the whole of which is entirely new ſince the reſtoration in 1660; and by far the greateſt part ſince the revolution in 1688. And the ſame may be ſaid with regard to the officers in our numerous army, and the places which the army has created. All which put together give the executive power ſo perſuaſive an energy with reſpect to the perſons themſelves, and ſo prevailing an intereſt with their friends and families, as will amply make amends for the loſs of external prerogative.

But though this profuſion of offices ſhould have no effect on individuals, there is ſtill another newly acquired branch of power; and that is, not the influence only, but the force of a diſciplined army; paid indeed ultimately by the people, but immediately by the crown; raiſed by the crown, officered by the crown, commanded by the crown. They are kept on foot, it is true, only from year to year, and that by the power of parliament: but during that year they muſt by the nature of our conſtitution, if raiſed at all, be at the abſolute diſpoſal of the crown. And there need but few words to demonſtrate how great a truſt is thereby repoſed in the prince by his people: a truſt that is more than equivalent to a thouſand little troubleſome prerogatives.

Add to all this, that, beſides the civil liſt, the immenſe revenue of almoſt ſeven millions ſterling, which is annually paid to

the creditors of the public, or carried to the ſinking fund, is firſt depoſited in the royal exchequer, and thence iſſued out to the reſpective offices of payment. This revenue the people can never refuſe to raiſe, becauſe it is made perpetual by act of parliament; which alſo, when well conſidered, will appear to be a truſt of great delicacy and high importance.

Upon the whole, therefore, it ſeems clear, that whatever may have become of the *nominal*, the real power of the crown has not been too far weakened by any tranſactions in the laſt century. Much is indeed given up; but much is alſo acquired. The ſtern commands of prerogative have yielded to the milder voice of influence: the ſlaviſh and exploded doctrine of non-reſiſtance has given way to a military eſtabliſhment by law; and to the diſuſe of parliaments has ſucceeded a parliamentary truſt of an immenſe perpetual revenue. When, indeed, by the free operation of the ſinking fund, our national debts ſhall be leſſened; when the poſture of foreign affairs, and the univerſal introduction of a well planned and national militia, will ſuffer our formidable army to be thinned and regulated; and when (in conſequence of all) our taxes ſhall be gradually reduced; this adventitious power of the crown will ſlowly and imperceptibly diminiſh, as it ſlowly and imperceptibly roſe. But till that ſhall happen, it will be our eſpecial duty, as good ſubjects and good Engliſhmen, to reverence the crown, and yet guard againſt corrupt and ſervile influences from thoſe who are intruſted with its authority; to be loyal, yet free; obedient, and yet independent; and above every thing, to hope that we may long, very long, continue to be governed by a ſovereign, who, in all thoſe public acts that have perſonally proceeded from himſelf, hath manifeſted the higheſt veneration for the free conſtitution of Britain; hath already in more than one inſtance remarkably ſtrengthened its outworks; and will therefore never harbour a thought, or adopt a perſuaſion, in any the remoteſt degree detrimental to public liberty.

KING *at Arms*, or *of Arms*, is an officer of great antiquity, and anciently of great authority, whoſe buſineſs is to direct the heralds, preſide at their chapters, and have the juriſdiction of armoury. In England there are three kings of arms, viz. garter, clarencieux, and norroy.

Garter, principal KING *at Arms*, was inſtituted by Henry V. His buſineſs is to attend the knights of the garter at their aſſemblies, to marſhal the ſolemnities at the funerals of the higheſt nobility, and to carry the garter to kings and princes beyond the ſea; on which occaſion he uſed to be joined in commiſſion with ſome principal peer of the kingdom. See GARTER.

Clarencieux KING *at Arms*, is ſo called from the duke of Clarence, to whom he firſt belonged. His office is to marſhal and diſpoſe the funerals of all the inferior nobility, as baronets, knights, eſquires, and gentlemen, on the ſouth ſide of the Trent. See CLARENCIEUX.

Norroy KING *at Arms*, is to do the ſame on the north ſide of the river Trent. Clarencieux and Norroy are alſo called *provincial heralds*, in regard they divide the kingdom between them into provinces. By charter, they have power to viſit noblemen's families, to ſet down their pedigrees, diſtinguiſh their arms, appoint perſons their arms, and with Garter to direct the other heralds. Anciently the kings at arms were created and ſolemnly crowned by the kings of England themſelves; but of later days, the earl marſhal has a ſpecial commiſſion at every creation to perſonate the king.

Lyon KING *at Arms*, for Scotland, is the ſecond king at arms for Great Britain; he is inveſted and crowned with great ſolemnity. To him belongs the publiſhing king's proclamations, marſhalling funerals, reverſing arms, &c. See LYON.

KING (Dr. John), a learned Engliſh biſhop in the 17th century, bred at Weſtminſter-ſchool, and afterward at Chriſt-church Oxford. He was appointed chaplain to queen Elizabeth. In 1605 he was made dean of Chriſt-church, and was for ſeveral years vice-chancellor of Oxford. In 1611 he was advanced to the biſhopric of London. Beſides his *Lectures upon Jonah*, delivered at York, he publiſhed ſeveral ſermons. King James I. uſed to ſtyle him *the king of preachers*; and lord chief juſtice Coke often declared, that *he was the beſt ſpeaker in the ſtar-chamber in his time*. He was ſo conſtant in preaching after he was a biſhop, that, unleſs he was hindered by want of health, he omitted no Sunday whereon he did not viſit ſome pulpit in London or near it. Soon after his death, the Papiſts reported, that he died a member of their church. But the falſity of this ſtory was ſufficiently expoſed by his ſon Mr. Henry King, in a ſermon at St. Paul's croſs ſoon after; by biſhop Godwin in the *Appendix* to his *Commentarius de præſulibus Angliæ*, printed in 1622; and by Mr. John Gee, in his book, entitled, *The foot out of the ſnare*.

KING (Dr. Henry), biſhop of Chicheſter, eldeſt ſon of the former, was born in 1591, and educated at Oxford. He became an eminent preacher, and chaplain to king James I. and Charles I. In 1638 he was made dean of Rocheſter; and in 1641 was advanced to the ſee of Chicheſter. Upon the breaking out of the civil wars, and the diſſolution of epiſcopacy, he was treated with great ſeverity by the friends to the parliament; but recovered his biſhopric at the reſtoration. This worthy prelate, who had a moſt amiable character, died in 1669; and was interred at his cathedral of Chicheſter, where a monument was erected to his memory. He publiſhed, 1. The pſalms of David turned into metre. 2. Poems, elegies, paradoxes, and ſonnets. 3. Several ſermons, and other works.

KING (Dr. William), a facetious Engliſh writer in the beginning of the 18th century, was well deſcended, being allied to the noble families of Clarendon and Rocheſter. He was elected a ſtudent of Chriſt-church from Weſtminſter-ſchool in 1681, aged 18. He afterward entered upon the law line, and took the degree of doctor of civil law. He ſoon acquired a conſiderable reputation as a civilian, and was in great practice. He attended the earl of Pembroke, lord lieutenant of Ireland, into that kingdom, where he was appointed judge-advocate, ſole commiſſioner of the prizes, keeper of the records, vicar-general to the lord primate of Ireland; was countenanced by perſons of the higheſt rank, and might have made a fortune. But ſo far was he from heaping up riches, that he returned to England with no other treaſure than a few merry poems and humorous eſſays, and retired to his ſtudent's place at Chriſt-church. He died on Chriſtmas-day in 1712, and was interred in the Cloiſters of Weſtminſter-abbey. His writings are pretty numerous. The principal are, 1. *Animadverſions on a pretended account of Denmark*, wrote by Mr. Moleſworth, afterwards lord Moleſworth. The writing of theſe procured Dr. King the place of ſecretary to princeſs Anne of Denmark. 2. Dialogues of the dead. 3. The art of love, in imitation of Ovid *De arte amandi*. 4. A volume of poems. 5. Uſeful tranſactions. 6. An hiſtorical account of the heathen gods and heroes. 7. Several tranſlations.—As to the character of Dr. King, he naturally hated buſineſs, eſpecially that of an advocate; but made an excellent judge when appointed one of the court of delegates. His chief pleaſure conſiſted in trifles; and he was never happier than when he thought he was hid from the world. Yet he loved company, provided they were ſuch as tallied with his humour. He would ſay a great many ill-natured things, but never do one. He was made up of tenderneſs and pity, and tears would fall from him on the ſmalleſt occaſion. His education had been ſtrict, and he was naturally of a religious diſpoſition.

KING (Dr. William), archbiſhop of Dublin in the 18th century, was deſcended from an ancient family in the north of Scotland, but born in the county of Antrim in the north of Ireland. In 1674 he went into prieſt's orders. In 1679 he was promoted

by his patron, Dr. Parker, archbiſhop of Dublin, to the chancellorſhip of St. Patrick. In 1687 Peter Manby, dean of Londonderry, having publiſhed at London, in 4to, a pamphlet entitled *Conſiderations which obliged* Peter Manby *dean of Londonderry to embrace the Catholic religion*, our author immediately wrote an anſwer. Mr. Manby, encouraged by the court, and aſſiſted by the moſt learned champions of the church of Rome, publiſhed a reply under this title, *A reformed catechiſm, in two dialogues concerning the Engliſh reformation*, &c. *in reply to Mr. King's anſwer*, &c. Our author ſoon rejoined in *A vindication of the anſwer*. Mr. Manby dropped the controverſy; but diſperſed a looſe ſheet of paper, artfully written, with this title, *A letter to a friend, ſhowing the vanity of this opinion, that every man's ſenſe and reaſon are to guide him in matters of faith*. This Dr. King refuted in *A vindication of the Chriſtian religion and reformation, againſt the attempts of A letter*, &c. In 1689 he was twice confined in the Tower by order of king James II. and the ſame year commenced doctor of divinity. In 1690, upon king James's retreat to France after the battle at the Boyne, he was advanced to the ſee of Derry. In 1692 he publiſhed at London, in 4to, *The ſtate of the Proteſtants of Ireland under the late king James's government*, &c. "A hiſtory (ſays biſhop Burnet) as truly as it is finely written." He had by him at his death atteſted vouchers of every particular fact alleged in this book, which are now in the hands of his relations. However, it was ſoon attacked by Mr. Charles Leſly. In 1693 our author finding the great number of Proteſtant diſſenters, in his dioceſe of Derry, increaſed by a vaſt addition of colonies from Scotland, in order to perſuade them to conformity to the eſtabliſhed church, publiſhed *A diſcourſe concerning the inventions of men in the worſhip of God*. Mr. Joſeph Boyſe, a diſſenting miniſter, wrote an anſwer. The biſhop anſwered Mr. Boyſe. The latter replied. The biſhop rejoined. In 1702 he publiſhed at Dublin, in 4to, his celebrated treatiſe *De origine mali*. Mr. Edmund Law, M. A. fellow of Chriſt's college in Cambridge, afterward publiſhed a complete tranſlation of this, with very valuable notes, in 4to. In the ſecond edition he has inſerted, by way of notes, a large collection of the author's papers on the ſame ſubject, which he had received from his relations after the publication of the former edition. Our author in this excellent treatiſe has many curious obſervations. He aſſerts and proves that there is more moral good in the earth than moral evil. A ſermon by our author, preached at Dublin in 1709, was publiſhed under the title of *Divine predeſtination and foreknowledge conſiſtent with the freedom of man's will*. This was attacked by Anthony Collins, Eſq. in a pamphlet entitled, "*A vindication of the divine attributes*; in ſome remarks on the archbiſhop of Dublin's ſermon entitled, *Divine predeſtination*, &c." He publiſhed likewiſe, *A diſcourſe concerning the conſecration of churches; ſhowing what is meant by dedicating them, with the grounds of that office*. He died in 1720.

KING (Dr. William), late principal of St. Mary's hall, Oxford, ſon of the reverend Peregrine King, was born at Stepney in Middleſex in the year 1685. He was made doctor of laws in 1715, was ſecretary to the duke of Ormond, and earl of Arran, as chancellors of the univerſity; and was made principal of St. Mary's hall on the death of Dr. Hudſon in 1719. When he ſtood candidate for member of parliament for the univerſity, he reſigned his office of ſecretary, but enjoyed his other preferment, and it was all he did enjoy to the time of his death. Dr. Clark, who oppoſed him, carried the election: and after this diſappointment, he in the year 1727 went over to Ireland, where he is ſaid to have written an epic poem, called *The Toaſt*, which was a political ſatire, printed and given away to his friends, but never ſold. On the dedication of Dr. Radcliff's library in 1749, he ſpoke a Latin oration in the theatre at Oxford, which was received with the higheſt acclamations; but it was otherwiſe when printed, he being attacked in ſeveral pamphlets on account of it. Again, at the memorable conteſted election in Oxfordſhire 1755, his attachment to the old intereſt drew on him the reſentment of the new, and he was libelled in newſpapers and pamphlets, againſt which he defended himſelf in an *Apology*, and warmly retaliated on his adverſaries. He wrote ſeveral other things, and died in 1762. He was a polite ſcholar, an excellent orator, an elegant and eaſy writer, and eſteemed by the firſt men of his time for his learning and wit.

KING (Peter), lord high chancellor of Great Britain, was deſcended of a good family of that name in Somerſetſhire, and ſon to an eminent grocer and ſalter in the city of Exeter in Devonſhire. He was born at Exeter in 1669, and bred up for ſome years to his father's buſineſs: but his inclination to learning was ſo ſtrong, that he laid out all the money he could ſpare in books, and devoted every moment of his leiſure hours to ſtudy: ſo that he became an excellent ſcholar before the world ſuſpected any ſuch thing; and gave the public a proof of his ſkill in church hiſtory, in his *Inquiry into the conſtitution, diſcipline, unity, and worſhip, of the primitive church, that flouriſhed within the firſt 300 years after Chriſt*, London 1691, in 8vo. This was written with a view to promote the ſcheme of a comprehenſion of the diſſenters. He afterwards publiſhed the ſecond part of the *Inquiry into the conſtitution*, &c.; and having deſired, in his preface, to be ſhewn, either publicly or privately, any miſtakes he might have made, that requeſt was firſt complied with by Mr. Edmund Elys; between whom and our author there paſſed ſeveral letters upon the ſubject, in 1692, which were publiſhed by Mr. Elys in 1694, 8vo, under the title of *Letters on ſeveral ſubjects*. But the moſt formal and elaborate anſwer to the *Inquiry* appeared afterwards, in a work entitled, *Original draught of the primitive church*.

His acquaintance with Mr. Locke, to whom he was related, and who left him half his library at his death, was of great advantage to him: by his advice, after he had ſtudied ſome time in Holland, he applied himſelf to the ſtudy of the law; in which profeſſion his learning and diligence made him ſoon taken notice of. In the two laſt parliaments during the reign of king William, and in five parliaments during the reign of queen Anne, he ſerved as burgeſs for Beer-Alſton in Devonſhire. In 1702, he publiſhed at London, in 8vo, without his name, his *Hiſtory of the apoſtle's creed*, with critical obſervations on its ſeveral articles; which is highly eſteemed. In 1708, he was choſen recorder of the city of London; and in 1710, was one of the members of the houſe of commons at the trial of Dr. Sacheverell. In 1714, he was appointed lord chief juſtice of the common-pleas; and the April following, was made one of the privy-council. In 1715, he was created a peer, by the title of *Lord King, baron of Ockham in Surry*, and appointed lord high-chancellor of Great Britain; in which poſt he continued till 1733, when he reſigned; and in 1734 died at Ockham in Surry.

KING's *Bench*. See *King's* BENCH.

KING *Bird*. See PARADISEA.

KING's *Fiſher*. See ALCEDO.

Books of KINGS, two canonical books of the Old Teſtament, ſo called, becauſe they contain the hiſtory of the kings of Iſrael and Judah from the beginning of the reign of Solomon down to the Babyloniſh captivity, for the ſpace of near 600 years. The firſt book of kings contains the latter part of the life of David, and his death; the flouriſhing ſtate of the Iſraelites under Solomon, his building and dedicating the temple of Jeruſalem, his ſhameful defection from the true religion, and the ſudden decay of the Jewiſh nation after his death, when it was divided into two kingdoms: the reſt of the book is taken

up in relating the acts of four kings of Judah and eight of Iſrael. The ſecond book, which is a continuation of the ſame hiſtory, is a relation of the memorable acts of 16 kings of Judah, and 12 of Iſrael, and the end of both kingdoms, by the carrying of the 10 tribes captive into Aſſyria by Salmanaſſar, and the other two into Babylon by Nebuchadnezzar. It is probable that theſe books were compoſed by Ezra, who extracted them out of the public records which were kept of what paſſed in that nation.

King's-*County*, a county of the province of Leinſter in Ireland, taking its name from king Philip of Spain, huſband to queen Mary. It is bounded on the north by Weſt Meath; on the ſouth by Tipperary and Queen's-county, from which it is divided by the Barrow; and part of Tipperary and Galway on the weſt, from which it is ſeparated by the Shannon. It is a fine fruitful country, containing 257,510 Iriſh plantation acres, 56 pariſhes, 11 baronies, and two boroughs, and returns ſix members to parliament. It is about 47 miles long, and 17 broad, and the chief town is Philipſtown.

King's *Evil*, or *Scrophula*. See Medicine.

KING-TE-TCHING, a famous village belonging to the diſtrict of Jao tcheou-fou, a city of China in the province of Kiang-ſi. This village, in which are collected the beſt workmen in porcelain, is as populous as the largeſt cities of China. It is reckoned to contain a million of inhabitants, who conſume every day more than ten thouſand loads of rice. It extends a league and a half along the banks of a beautiful river, and is not a collection of ſtraggling houſes intermixed with ſpots of ground; on the contrary, the people complain that the buildings are too crowded, and that the long ſtreets which they form are too narrow; thoſe who paſs through them imagine themſelves tranſported into the midſt of a fair, where nothing is heard around but the noiſe of porters calling out to make way. Proviſions are dear here, becauſe every thing conſumed is brought from remote places; even wood, ſo neceſſary for their furnaces, is actually tranſported from the diſtance of an hundred leagues. This village, notwithſtanding the high price of proviſions, is an aſylum for a great number of poor families, who could not ſubſiſt any where elſe. Children and invalids find employment here, and even the blind gain a livelihood by pounding colours. The river in this place forms a kind of harbour about a league in circumference: two or three rows of barks placed in a line ſometimes border the whole extent of this vaſt baſon.

KINGDOM, the territories or extent of country ſubject to a king.

Kingdoms, in natural hiſtory. Moſt naturaliſts and chemiſts divide all natural bodies into three great claſſes, which they call *kingdoms*. Theſe are the *mineral*, the *vegetable*, and the *animal* kingdoms. This great and firſt diviſion is founded on this conſideration, that any plant or vegetable which is produced, which grows, which is organized, which contains a ſeed, and which produces its like, ſeems to be a being very diſtinct and different from a ſtone or a metal, in which we at moſt obſerve only a regular arrangement of parts, but not a true organization, and which contains no ſeed by which it is capable of reproduction; and another foundation of this diviſion is, that an animal differs no leſs from a ſimple plant, by ſenſation, by the uſe of its ſenſes, and by the power of voluntary motion which it poſſeſſes, while theſe qualities do not belong to any thing which is merely vegetable.

But notwithſtanding theſe ſo diſtinctive marks, philoſophers pretend that this diviſion of natural bodies into claſſes is only ideal. They affirm, that, by obſerving nature attentively, we may perceive, that all her productions are connected together by an uninterrupted chain; and that, by ſurveying the ſeveral beings, we muſt be convinced, that any one being differs very little from ſome other two between which it ſeems to be placed; ſo that we may deſcend from the moſt perfect animal to the rudeſt mineral by inſenſible degrees, and without finding any interval from which a diviſion might be made. The opinions of naturaliſts are therefore divided upon this ſubject; and each opinion ſeems to be founded upon obſervations, analogies, and reaſonings more or leſs concluſive.

If we avoid inveſtigating extremes, however, the diſtinctive marks muſt be acknowledged ſufficiently obvious to juſtify the triple diviſion above mentioned, and to diſcriminate the individuals of each

For a general view of the operations or conduct of nature in thoſe her three kingdoms, ſee the article Nature. For a particular conſideration of them—(in the animal kingdom), ſee Zoology, Animal, Brute, Bird, Ornithology, Inſect, Entomology, Ichthyology, Fish, Comparative *Anatomy*, and the different animals under their reſpective names;—(in the vegetable kingdom), Botany, Plant, Husbandry, Vegetation, Defoliation, Frondescentia, Gemmatio, Fruit, Leaf, Germination, &c. and the different plants under their reſpective names;—(in the mineral kingdom) Mineralogy, Metallurgy, and the different ſtones and metals under their reſpective names.

In what remains of this article we ſhall conſider natural bodies only in a chemical view; that is to ſay, relatively to the ſeveral principles which we obtain in the analyſis of thoſe bodies. In the decompoſition of all beings truly living, organized, and containing within themſelves a ſeed by which they may be reproduced, ſuch as vegetables and animals, we always obtain an inflammable, fat, or oily ſubſtance; and on the contrary, we do not find the ſmalleſt trace of this principle in any ſubſtance purely mineral, not even in ſulphur, which is the moſt inflammable of all theſe ſubſtances. On the other ſide, if we carefully examine and compare with each other the analogous principles obtained from the three kingdoms; ſuch as the ſaline ſubſtances obtained in the analyſis of animals, vegetables, and minerals; we ſhall eaſily perceive, that all the ſaline matter which comes from the vegetable or animal kingdoms is altered by oil, while all the ſaline matter which comes from the mineral kingdom is entirely free from oil.

We ought to obſerve here, that becauſe any matter is found in one or more individuals of any kingdom, we muſt not therefore conclude, that it belongs to the kingdom of ſuch individuals; for we may be convinced, from a ſlight obſervation of nature, that by a thouſand combinations, and particular circumſtances, ſubſtances of quite different claſſes or kingdoms are daily found mixed and confounded together. Thus, for example, within the earth, and even at great depths, that is, in the region appropriated to minerals, ſometimes ſubſtances are found evidently oily, ſuch as all bitumens; but we at the ſame time can prove, and all the obſervations of natural hiſtory prove, that theſe oily ſubſtances are only accidentally within the earth, and that they proceed from the vegetable or animal bodies which have been buried in the earth by ſome of thoſe great revolutions which have happened from time to time upon the ſurface of our globe. Alſo in decompoſing ſeveral vegetables and animals, ſalts are obtained; ſuch as common ſalt, Glauber's ſalt, and others, which contain nothing oily, and which are conſequently matters evidently mineral. But, on the other ſide, we are certain that theſe mineral ſalts are extraneous to the animals and vegetables in which they are found; that they are only introduced into theſe living bodies, becauſe they happen to be mixed with the matters which have been applied to them as aliments, and that they ought not to be numbered amongſt their principles. The proof of this is, that not only the quantity of theſe mineral ſalts is not uniform in animals and vegetables; but alſo, that not a particle of ſuch ſalts is con-

tained in ſome plants and animals equally ſtrong and healthy, and of the ſame ſpecies as thoſe in which theſe ſalts have generally been obſerved.

In the ſecond place, we obſerve, that oils do only exiſt in the proximate principles of vegetables and animals; that is, in thoſe of their principles which enter immediately into their compoſition, when thoſe principles have not been altered by further decompoſitions, and conſequently when they ſtill preſerve their animal or vegetable character; for by a natural putrefaction continued during a long time, or by chemical operations, not only the materials of which animal and vegetable bodies are formed may be deprived entirely of oil, but alſo this oil may itſelf be entirely deſtroyed or decompoſed. Theſe ſubſtances in that ſtate contain nothing by which they can be diſtinguiſhed from minerals. The earths, for example, of vegetables and animals, when they are deprived, by a ſufficient calcination, of all inflammable matter, have been thought to become entirely ſimilar to the calcareous and argillaceous earths found within the globe, and which may be conſidered as mineral ſubſtances, although probably they have been formerly a part of animal and vegetable bodies. See Bones.

Hence we conclude, that, when we conſider natural bodies in a chemical view, we ought to divide them into two great claſſes. The firſt claſs is of ſubſtances inanimate, unorganiſed, and the principles of which have a degree of ſimplicity which is eſſential to them: theſe are minerals. The other claſs contains all thoſe bodies which not only have been diſtinctly organized, but which alſo contain an oily matter, which is no where to be found in ſubſtances which have not made part of animate bodies, and which, by combining with all the other principles of theſe animate bodies, diſtinguiſhes theſe principles from thoſe of minerals by a leſs degree of ſimplicity. This ſecond claſs contains vegetables and animals. We ought alſo to remark, that the oil contained in vegetable and animal ſubſtances renders them ſuſceptible of fermentation, properly ſo called, which cannot by any means take place in any mineral.

We ſhall now proceed to examine, if, by comparing the principles obtained in the decompoſition of vegetables with thoſe obtained in the decompoſition of animals, we can find ſome eſſential character by which theſe two kingdoms may be chemically diſtinguiſhed, in the ſame manner as we have ſeen that both of them may be diſtinguiſhed from minerals. From experiments we indeed learn, that the principles of vegetables differ evidently enough from thoſe of animals; that in general the ſaline principles of the former are acid, and are transformable in great meaſure into fixed alkali by incineration, while the principles of the latter are volatile alkalis, or eaſily changeable into theſe; that vegetables are much farther removed from putrefaction than animals; laſtly, that oils truly animal have a character different from vegetable oils, and are in general more attenuated, or at leaſt more diſpoſed to be attenuated, and volatiliſed. But we muſt at the ſame time confeſs, that theſe differences are not clear and deciſive, like thoſe betwixt theſe two kingdoms and the mineral kingdom; for we do not find any eſſential principle, either in animals or in vegetables, which is not alſo to be found in the other. In ſome plants, chiefly the cruciform, as much volatile alkali, as little fixed alkali, and as much diſpoſition to putrefy, are found as in animal matters; and thence we conclude, that if theſe two great claſſes of natural bodies differ chemically from each other, this difference proceeds only from the quantities or proportions of their ſeveral principles and properties, and not from any thing diſtinct and peculiar; nor is it ſimilar to the manner in which both vegetable and animal ſubſtances differ from minerals, namely, by containing an oil, and poſſeſſing a fermentable quality. Beſides, the degrees of the chemical differences betwixt theſe three great claſſes of natural bodies are found to be the ſame, in whatever manner we conſider them or compare them together. See Chemistry.

KING GEORGE'S SOUND, the name given by Captain Cook, in 1778, to the harbour which he diſcovered on the W. coaſt of N. America. at the mouth of a great river, in W. lon. 126. 48 and N. lat. 49. 33. But the natives call it Nootka; the name now generally adopted by the Engliſh. The woods are compoſed of the Canadian pine, white cypreſs, and two or three other ſorts of pine; and, in general, they are of a large ſize. About the rocks and borders of the woods, were ſeen ſome ſtrawberry plants, and raſpberry, currant, and gooſeberry buſhes, all in a flouriſhing ſtate. The principal animals ſeen here were racoons, martens, and ſquirrels. Birds are far from being numerous, and thoſe that are to be ſeen are remarkably ſhy, owing, perhaps, to their being continually haraſſed by the natives, either to eat them, or to wear their feathers as ornaments. The quebrantahueſſos, ſhags, and gulls, were ſeen off the coaſt; and the laſt two were alſo frequent in the Sound. The ſtature of the natives is, in general, below the common ſtandard; but their perſons are not proportionably ſlender, being uſually pretty plump, though not muſcular. The women are of the ſame ſize and form as the men; nor is it eaſy to diſtinguiſh them, as they poſſeſs no natural feminine graces. Their bodies are always covered with red paint; but their faces are ornamented with a variety of colours, a black, a bright red, or a white colour; the laſt of which gives them a ghaſtly appearance. They are docile, courteous, and good-natured; but quick in reſenting injuries, and, like moſt other paſſionate people, as quickly forgetting them. A rattle and a ſmall whiſtle are the only inſtruments of muſic that were ſeen among them. Their houſes conſiſt of very long broad planks, reſting upon the edges of each other, tied, in different parts, with withes of pine-bark. Their furniture conſiſts principally of cheſts and boxes of various ſizes, piled upon each other, at the ſides or ends of their houſes, in which are depoſited their garments, and whatever they deem valuable: they have alſo ſquare and oblong pails, bowls to eat their food out of, &c. The irregularity and confuſion of their houſes is far exceeded by their naſtineſs and ſtench. Every thing about the houſe ſtinks of train-oil, fiſh, and ſmoke; and every part of it is as filthy as can be imagined. In 1786, a ſmall aſſociation of Britiſh merchants, reſident in the E. Indies, formed the project of opening a trade to this place, for ſupplying the Chineſe market with furs, and took meaſures, in 1788, to ſecure themſelves a permanent ſettlement; but the Spaniards being jealous of the intruſion of the Engliſh into a part of the world which they had long regarded as their excluſive property, ſent a frigate from Mexico to put an end to this commerce. The frigate arrived in Nootka Sound in May 1789, and, in July following, captured two Engliſh veſſels, at the ſame time taking poſſeſſion of the ſettlement that had been formed upon the coaſt. The Britiſh miniſtry, on receiving intelligence of this tranſaction, immediately ordered a powerful armament to give weight to their demand of reparation; but the affair was amicably terminated by a convention in 1790.

KINGHORN, a parliament town in the county of Fife in Scotland, on the Frith of Forth, directly oppoſite to Leith. Here is a manufacture of thread-ſtockings knit by the women; the men, being chiefly mariners, are employed in coaſting ſhips, in the fiſhery, or the paſſage-boats from hence to Leith, from which the town of Kinghorn derives conſiderable advantage. This place gives a ſecond title to the earl of Strathmore.

KINGSBRIDGE, a town of Devonſhire, 215 miles from London. It is a pretty place, with a harbour for boats, a free ſchool, a market, and a fair. This is a chapel of eaſe to Cheſton, and has a bridge over the Salcomb to Dodbrook.

KINGSBURY, a village in Herts, to the N. of St. Alban's, once famous for a palace of the Saxon kings.

KINGSCLEAR, a pleaſant town of Hampſhire, ſituated on the Oxford road from Baſingſtoke. It is 56 miles from London, and was once the ſeat of the Saxon kings. It has a market and two fairs.

KING'S COUNTY, a county of Ireland, in the province of Leinſter, 38 miles long and 30 broad; bounded on the N. by W. Meath, on the E. by Kildare, on the S. by Queen's-County and Tipperary, and on the W. by the Shannon, which divides it from Roſcommon, Galway, and another part of Tipperary. It contains 56 pariſhes, and ſends ſix members to parliament. It is not ſo rich as ſome of the other counties, nor is it ſo well inhabited. The capital is Philipſtown.

KINGSFERRY, in Kent, the common way from the main land into the iſle of Shepey; where a cable of about 140 fathom in length, faſtened at each end acroſs the water, ſerves to get the boat over by hand. For the maintenance of this ferry and keeping up the highway leading to it through the marſhes for above one mile in length, and for ſupporting a wall againſt the ſea, the land-occupiers tax themſelves yearly one penny *per* acre for freſh marſh-land, and one penny for every 10 acres of ſalt marſh land. Here is a houſe for the ferry keeper, who is obliged to tow all travellers over free, except on theſe four days, viz. Palm-Monday, Whit-Monday, St. James's-day, and Michaelmas-day, when a horſeman pays two-pence and a footman one penny. But on Sunday, or after eight o'clock at night, the ferry-keeper demands ſix-pence of every horſeman, and two-pence of every footman, whether ſtrangers or the land occupiers.

KING'S LANGLEY, a village in Herts, five miles W. of St. Alban's. It received its name from a royal palace built by Henry III, the ruins of which are to be ſeen. Richard II. was buried in its monaſtery, but removed, by Henry V. to Weſtminſter.

KINGSTON UPON THAMES, a corporate town in Surry, with a market on Saturday. A great national council was held here in the year 838, at which Egbert, the firſt king of all England, and his ſon Athelwolf, were preſent; and ſeveral of the Saxon monarchs were crowned here. This town ſent members to parliament in the reigns of the ſecond and third Edward; but it ceaſed afterward, in conſequence of a petition from the corporation praying to be releaſed from the burden. Queen Elizabeth founded here a free-ſchool; and the Lent aſſizes are conſtantly held at this place. The wooden bridge over the Thames is the moſt ancient on that river, except London-bridge; and the corporation have a revenue for its ſupport. It is 12 miles S. W. of London. W. lon. 0. 12. N. lat. 51. 27.

KINGSTON *upon Hull*, a town in the eaſt riding of Yorkſhire, 173 miles from London. Its common name is ſimply *Hull*. It is ſituated at the conflux of the rivers Hull and Humber, and near the place where the latter opens into the German Ocean. It lies ſo low, that by cutting the banks of the Humber the country may be laid under water for five miles round. Towards the land it is defended by a wall and a ditch, with the farther fortification of a caſtle, a citadel, and a block-houſe. A dock was begun here, but after great expence left unfiniſhed. —A new cut has been lately made to Hull by Weighton. The town is large, and populous, containing two churches, ſeveral meeting-houſes, a free-ſchool, a charity-ſchool, and ſome hoſpitals. Among the latter is one called *Trinity-houſe*, in which are maintained many diſtreſſed ſeamen, both of Hull and other places, that are members of its port. It is governed by 12 elder brethren and ſix aſſiſtants; out of the former are choſen annually two wardens, and out of the younger brethren two ſtewards; they determine queſtions between maſters and ſeamen, and other ſea matters. A handſome infirmary has lately been erected without the town to the north. Here are alſo an exchange and a cuſtom-houſe, and over the Hull a ſtone bridge conſiſting of 14 arches. A good harbour was made here by Richard II. This town has not only the moſt conſiderable inland traffic of any port in the north of England, but a foreign trade ſuperior to any in the kingdom, excepting the ports of London, Briſtol, Liverpool, and Yarmouth. By means of the many large rivers that fall into the Humber, it trades to almoſt every part of Yorkſhire, as well as to Lincolnſhire, Nottinghamſhire, Staffordſhire, Derbyſhire, and Cheſhire; the commodities of which counties are brought hither, and exported to Holland, Hamburgh, France, Spain, the Baltic, and other parts of Europe. In return for thoſe are imported iron, copper, hemp, flax, canvas, Ruſſia linen and yarn, beſides wine, oil, fruit, and other articles. Such quantities of corn are alſo brought hither by the navigable rivers, that Hull exports more of this commodity than London. The trade of Hull with London, particularly for corn, lead, and butter, and with Holland and France, in times of peace, for thoſe commodities, as well as for cloth, kerſeys, and other manufactures of Yorkſhire, is ſo conſiderable as to employ not only ſingle veſſels, but fleets; the Hull fleets to London being generally from 50 to 60 ſail, and in time of war frequently 100 ſail or upwards. The mayor of Hull has two ſwords, one given by king Richard II, the other by Henry VIII. but only one is borne before him at a time; alſo a cap of maintenance, and an oar of lignum vitæ as a badge of his admiralty juriſdiction within the limits of the Humber. This town gave title of earl to Robert Pierpoint of Holme Pierpoint, viſcount Newark, created in the 4th of Charles I. Being unfortunately ſlain in croſſing the Humber in 1643, he was ſucceeded by his ſon Henry, created marquis of Dorcheſter in 1645, only for life; who dying in 1680, without male iſſue, was ſucceeded in the earldom by Robert, grandſon of his younger brother William Pierpoint of Thoreſby; who dying unmarried in 1682, left this honour to William his brother and heir; and he alſo dying without iſſue in 1690, it deſcended to his brother Evelyn, who was further advanced to the honours of marquis of Dorcheſter in 1706 and duke of Kingſton in 1715; and dying in 1725 was ſucceeded by his grandſon Evelyn laſt duke of Kingſton, who died in 1773, and the title became extinct.

KINGSTON, a town of Ireland, in the province of Leinſter and capital of King's county. W. long. 7. 20. N. lat. 53. 15. It is otherwiſe called *Philip's-Town*.

KINGSTON, a town of Jamaica, ſeated on the north-ſide of the bay of Port-Royal. It was founded in the year 1693, when the repeated deſolations by earthquake and fire had driven the inhabitants from Port-Royal. It extends a mile from north to ſouth, and about as much from eaſt to weſt, on the harbour. It contains about 3000 houſes, beſides negro-houſes and ware-houſes. The number of white inhabitants is about 8000; of free people of colour, 1500; and of ſlaves, about 14,000. It is the county-town, where the aſſizes are held, in January, April, July, and October, and laſt about a fortnight. It is a place of good trade; and is much reſorted to by merchants and ſeamen, becauſe moſt of the ſhips come to load and unload their cargoes here. W. long. 76. 32. N. lat. 17. 40.

KINGTON, or KYNETON, a pretty large town in Herefordſhire, 146 miles from London. It is ſituated on the river Arrow, and is inhabited chiefly by clothiers, who drive a conſiderable trade in narrow cloth. It has a charity-ſchool, a market, and three fairs. The markets on Wedneſday before Eaſter, Whitſuntide, and Chriſtmas, are ſo conſiderable for corn, cattle, leather, home-made linen and woollen cloth, and all ſorts of proviſions, that they are more like fairs.

KINNOR, or CHINNOR. See CHINNOR.

KINO, in the materia medica, a gum reſin. This drug was firſt recommended to the attention of medical practitioners by Dr. Fothergill, as being a very uſeful vegetable aſtringent; and in the hands of other practitioners it has been ſo far found to anſwer the character he gave of it, that it is now in very common uſe. It has a conſiderable reſemblance to the catechu; but is much more of a reſinous nature, and of a leſs firm texture: it is alſo redder and more aſtringent; its watery ſolution more decompoſable by acids; and its ink leſs permanent. Its colouring and aſtringent matter are more perfectly taken up by ſpirit than by water, though water readily enough extracts a conſiderable ſhare of both. It is uſed as an aſtringent in diarrhœa, hæmorrhages, &c. In proof-ſpirit it forms an elegant tincture; and it is a principal ingredient in the *pulvis ſypticus*, and ſome other officinal compoſitions.

KINROSS, the county town of Kinroſs-ſhire in Scotland, ſituated in W. long. 3. 7. N. lat. 56. 15. on the weſt ſide of Lochleven, a freſh water lake about 10 miles in compaſs, abounding with pike, trout, perch, and water-fowl. The manufactures are linen and ſome cutlery ware. The houſe of Kinroſs, an elegant ancient ſtructure, ſtands on the north ſide of the town. Kinroſs ſends a member to parliament by turns with Clackmannan. In the lake are two iſlands; on one of which appear the ruins of a priory, heretofore poſſeſſed by the Culdees: the other is famous for the caſtle in which queen Mary was impriſoned by her rebellious ſubjects.

KINSALE, a town of the county of Cork in Ireland, ſituated at the mouth of the river Ban or Bandon, 136 miles from Dublin. It is reckoned the third town in the kingdom, and inferior only to Cork in point of trade. It is neat, well built, and wealthy; is governed by a ſovereign and recorder, and returns two members to parliament, patronage in the Southwell family. It is defended by a ſtrong fort built by king Charles II. called *Charles's Fort*; and on the oppoſite ſhore there are two well built villages, called *Cove* and *Scilly*. In the town and liberties are 6 pariſhes, 30 plough-lands, and therein 6846 acres. The barracks hold 12 companies of foot, beſides a regiment at Charles's fort. In the centre of the town is a good market-houſe, and near it a ſtrong built priſon; and there are ſcattered up and down the ruins of ſeveral monaſteries and religious houſes. It has two fairs. In time of war Kinſale is a place of much buſineſs, being then frequented by rich homeward bound fleets and ſhips of war, for which reaſon moſt of the houſes are then let at double rents. The harbour is very commodious, and perfectly ſecure; ſo large that the Engliſh and Dutch Smyrna fleets have anchored in it at the ſame time. There is a dock and yard for repairing ſhips of war, and a crane and gun wharf for landing and ſhipping heavy artillery. Ships may ſail into or out of this harbour, keeping in the middle of the channel, with the utmoſt ſafety. Within the haven on the weſt ſide lies a great ſhelf, which ſhoots a great way off from the land; but leaves an ample paſſage by the ſide of it, in which, as in all the reſt of the harbour, it is many fathoms deep. Lord Kinſale has the ancient privilege of keeping his hat on in the king's preſence. Kinſale gives the title of *baron* to the very ancient family of Courcy, lineally deſcended from John de Courcy earl of Ulſter, who from him have the privilege to be covered in the preſence of the king of England.

KINTORE, a royal borough of Aberdeenſhire in Scotland, ſituated on the river Don, in W. long. 2. 5. N. lat. 57. 38. It gives the title of *earl* to a branch of the noble family of Keith, but in other reſpects is inconſiderable.

KINTYRE. See CANTIRE.

KIOF, a town of Poland, in a palatinate of the ſame name, with an archbiſhop's ſee, and a caſtle. It is the capital of the Ruſſian government of Kiof, and carries on a conſiderable trade. It is divided into the Old and New Town, and ſeated on the W. ſide of the Dnieper, 180 miles N. E. of Kaminieck, and 335 E. by S. of Warſaw. E. long. 31. 51. N. lat. 50. 30.

KIOF, or KIOW, a government of the Ruſſian empire, being part of the Ukraine, or Little Ruſſia. It lies on the E. ſide of the Dnieper, although Kiof, the capital, is on the W. ſide. It was once a duchy, belonging to the great dukes of Ruſſia, and Kiof was their capital. This country was conquered by the Tartars, and came again into the poſſeſſion of the great dukes, but was overrun and poſſeſſed by the Coſſacks, under the protection of Poland. In 1664, the natives, diſcontented with John Caſimir, king of Poland, ſubmitted to Ruſſia, and have ever ſince remained ſubject to that empire. The vaſt privileges that they enjoyed have been gradually aboliſhed, and they are now reduced to the ſame ſtate as the other provinces of the Ruſſian empire. This government contains eleven diſtricts; and its principal rivers are the Dnieper, Deſna, Oſter, Udai, Sula, Pſol, and Trubeſh.

KIOF, or KIOW, a palatinate of Poland, in that part of the Ukraine which lies on the W. ſide of the Dnieper. It contains only two diſtricts, and ſeveral ſmall towns ſcarcely worthy of notice; its capital, Kiof, being ſubject to Ruſſia.

KIOGE, or KOGE, a ſeaport of Denmark, in the iſle of Zealand, 10 miles S. of Copenhagen. E. lon. 12. 40. N. lat. 59. 31.

KIOPING, a town of Sweden, in Wermeland, ſeated on a ſmall ſtream, that falls at a little diſtance into the lake Maeler. E. lon. 16. 40. N. lat. 59. 38.

KIPPING (HENRY), in Latin *Kippingius*, a learned German Lutheran, born at Roſtock; where, after having received the degree of maſter of arts, he was met by ſome ſoldiers who preſſed him into the ſervice. This, however, did not prevent his following his ſtudies. One day while he was upon duty, holding his muſket in one hand and the poet Statius in the other, a Swediſh counſellor, who perceived him in that attitude, came up to him, entered into diſcourſe with him, and then taking him to his houſe made him his librarian, and procured him the under-rectorſhip of the college of Bremen, where he died in 1678. He wrote many works in Latin; the principal of which are, 1. A treatiſe on the antiquities of the Romans. 2. Another on the works of Creation. 3. Several diſſertations on the Old and New Teſtament, &c.

KIRBY. See KIRKBY.

KIRCH (CHRISTIAN FREDERIC), of Berlin, a celebrated aſtronomer, was born at Guben in 1694, and acquired great reputation in the obſervatories of Dantzic and Berlin. Godfrey Kirch his father, and Mary his mother, acquired conſiderable reputation by their aſtronomical obſervations. This family correſponded with all the learned ſocieties of Europe, and their aſtronomical works are in high repute.

KIRCHER (ATHANASIUS.) a famous philoſopher and mathematician, was born at Fulde in 1601. In 1618 he entered into the ſociety of the Jeſuits, and taught philoſophy, mathematics, the Hebrew and Syriac languages, in the univerſity of Wirtſburg, with great applauſe till the year 1631. He went to France on account of the ravages committed by the Swedes in Franconia, and lived ſome time at Avignon. He was afterwards called to Rome, where he taught mathematics in the Roman college, collected a rich cabinet of machines and antiquities, and died in 1680.—The quantity of his works is immenſe, amounting to 22 vols. in folio, 11 in quarto, and 2 in 8vo; enough to employ a man for a great part of his life even to tranſcribe them. Moſt of them are rather curious than uſeful; many of them viſionary and fanciful; and if they are not always accompanied with the greateſt exactneſs and preciſion, the reader, it is preſumed, will not be aſtoniſhed.

The principal of his works are, 1. *Prælusiones magneticæ.* 2. *Primitiæ gnomonicæ catoptricæ.* 3. *Ars magna lucis & umbræ.* 4. *Musurgia universalis.* 5. *Obeliscus Pamphilius.* 6. *Oedipus Ægyptiacus*, four volumes, folio. 7. *Itinerarium extaticum.* 8. *Obeliscus Ægyptianus*, in four volumes, folio. 9. *Mundus subterraneus.* 10. *China illustrata.*

KIRCHMAN (John), an eminent German divine, was born at Lubec in 1575. He studied in several places of Germany; in 1602 was made professor of poetry at Rostock, and in 1613 rector of the university at Lubec. He exercised this last employment with an extraordinary application during the rest of his life, and died in 1643. He wrote several works; the most esteemed of which are, 1. *De funeribus Romanorum.* 2. *De annulis liber singularis.*

KIRIATHAIM, in ancient geography, one of the towns built by the Reubenites; reckoned to the tribe of Reuben (Joshua, xiii.), 12 miles to the west of Midaba. The ancient residence of the giants called *Emim.*

KIRIATH-ARBA. See Hebron.

Kiriath-*Baal*, or *Cariath-baal*, called also *Kiriath-jearim*, "the city of the woods;" one of the cities of the Gibeonites belonging to the tribe of Judah, nine miles from Aelia, in the road to Diospolis. It was also called *Baala* (Joshua). The ark of the covenant, after its recovery from the Philistines, stood for some time in this city (1 Sam. vii).

KIRK, a Saxon term, signifying the same with church. The word is now used in that sense in Scotland.

Kirk-*Sessions*, the name of a petty ecclesiastical judicatory in Scotland. Each parish, according to its extent, is divided into several particular districts; every one of which has its own elder and deacon to oversee it. A consistory of the ministers, elders, and deacons of a parish form a kirk-session. These meet once a week, the minister being their moderator, but without a negative voice. It regulates matters relating to public worship, elections, catechising, visitations, &c. It judges in matters of less scandal; but greater, as adultery, are left to the presbytery; and in all cases an appeal lies from it to the presbytery. Kirk-sessions have likewise the care of the poor and poor's-funds.

KIRKALDY, a town of the county of Fife in Scotland, two miles to the north east of Kinghorn. It is a royal borough, the seat of a presbytery, and gives the title of *baron* to the earl of Melvill The town is populous, well built, and extends a mile in length from east to west, enjoying a tolerable share of trade by exporting its own produce and manufactures of corn, coal, linen, and salt. W. long. 3 0. N. lat. 56. 8.

KIRKBY-Lonsdale, a town of Westmoreland, 253 miles from London. It is a large place, with a woollen manufactory, and a market on Tuesday. It has a free-school well endowed, with three presentations to Christ's college Cambridge. It has a large church, and a good stone bridge of three arches over the Lon. From its churchyard and the banks of the river, there is a very fine prospect of the mountains at a vast distance, as well as of the course of the river, which abounds with salmon, trout, &c. and provisions of all sorts are very cheap here.

Kirkby-*Steven*, or *Stephen's-Church*, a town of Westmoreland, 257 miles from London, stands on the River Eden near Sedbergh and Asgarth. The church is a large building with a lofty tower; in it are several old monuments. Here is a good free-school that has two exhibitions. The town is noted for the manufactory of yarn stockings; and it has a market and a fair.

Kirkby-*Thore*, a town of Westmoreland, stands also on the river Eden, north-west of Appleby, 267 miles from London. A horn of a moose deer was found here a few years since, at the depth of four feet from the surface of the earth; and several other antiquities have been dug up or taken out of a well discovered at the end of the town near the bridge. Below it are the vast ruins of an ancient town, where Roman coins and urns are frequently dug up. The people call it Whelycastle, 300 yards in length, and 150 in breadth, with three entrances on each side, with bulwarks before them. At a little distance from thence Roman urns are found containing bones and ashes. The old military way runs through it, called the *Maiden way*, because it began at Maiden-castle in Stainmore in Yorkshire, north riding.

KIRKCUDBRIGHT, beginning at the middle of Dumfries-shire in Scotland, makes a considerable part of Galloway, of which the earls of Nithisdale were hereditary stewards. The face of the country exhibits the appearance of one continued heath, producing nothing but pasture for sheep and small black cattle, which are generally sold in England; yet these dusky moors are interfected with pleasant valleys, and adorned with a great number of castles belonging to private gentlemen, every house being surrounded with an agreeable plantation. It is watered by the river Dee; which, taking its rise from the mountains near Carrick, runs through a tract of land about 70 miles in length, and, entering the Irish sea, forms the harbour of Kirkcudbright, a small inconsiderable borough, admirably situated for the fishery and other branches of commerce, which are almost totally neglected through the poverty and indolence of the inhabitants. There is no other town of any consequence in this stewartry. Kirkcudbright gives title of *baron* to the Maclellans, who formerly were a powerful family in the county.

KIRKHAM, a town of Lancashire, 221 miles from London, stands near the Ribble, six miles from the Irish sea, in that part of the county called the *Field-lands*. It has a market and three fairs, and a free-school well endowed. By the late inland navigation, it has a communication with the rivers Mersey, Dee, Ribble, Ouse, Trent, Darwent, Severn, Humber, Thames, Avon, &c. which navigation, including its windings, extends above 500 miles, in the counties of Lincoln, Nottingham, York, Westmoreland, Chester, Warwick, Leicester, Oxford, Worcester, &c.

KIRKOSWALD, a town of Cumberland on the Eden, 291 miles from London. It had formerly a castle, which was demolished above 100 years ago. It has a market and two fairs. Its church is a very irregular old building; and the belfry is placed distant from the church on the top of an hill, that the sound of the bells might be more easily heard by the circumjacent villages.

KIRKWALL, the capital of the Orkneys, situated in the island of Pomona, in W. lon. 0. 25. N. lat. 58. 33. It is built upon an inlet of the sea near the middle of the island, having a very safe road and harbour for shipping. It is a royal borough, governed by a provost, four bailiffs, and a common-council. It was formerly possessed by the Norwegians, who bestowed upon it the name of *Crucoviaca.* From king James III. of Scotland they obtained a new charter empowering them to elect their own magistrates yearly, to hold borough-courts, arrest, imprison, make laws and ordinances for the right government of the town; to have a weekly market, and three fairs annually at certain fixed terms: he moreover granted to them some lands adjoining to the town, with the customs and shore-dues, the power of a pit and gallows, and exempted them from the expence of sending commissioners to parliament. This charter has been confirmed by succeeding monarchs. At present Kirkwall is the seat of justice, where the steward, sheriff, and commissary hold their several courts of jurisdiction: here is likewise a public grammar-school, endowed with a competent salary for the master. The town consists of one narrow street about a mile in length; the houses are chiefly covered with slate,

though not at all remarkable for neatneſs and convenience.—The principal edifices are the cathedral church and the biſhop's palace. The former, called *St. Magnus*, from Magnus king of Norway, the ſuppoſed founder of the town, is a large Gothic ſtructure: the roof is ſupported by 14 pillars on each ſide, and the ſpire is built upon four large columns. The gates are decorated with a kind of Moſaic work, of red and white ſtones elegantly carved and flowered. By the ruins of the king's caſtle or citadel, it appears to have been a ſtrong and ſtately fortreſs. At the north end of the town there is a ſort of fortification built by the Engliſh in the time of Oliver Cromwell. It is ſurrounded with a ditch and rampart, and ſtill mounted with ſome cannon for the defence of the harbour.

KIRSTENIUS (Peter), profeſſor of phyſic at Upſal, and phyſician-extraordinary to the queen of Sweden, was born at Breſlaw in 1577. He ſtudied Greek, Latin, Hebrew, Syriac, natural philoſophy, anatomy, botany, and other ſciences. Being told that a man could not diſtinguiſh himſelf in phyſic unleſs he underſtood Avicenna, he applied himſelf to the ſtudy of Arabic; and not only to read Avicenna, but alſo Meſue, Rhaſis, Abenzoar, Abukaſis, and Averroes. He viſited Spain, Italy, England, and did not return home from his travels till after ſeven years. He was choſen by the magiſtrates of Breſlaw to have the direction of their college and of their ſchools. A fit of ſickneſs having obliged him to reſign that difficult employment, with which he was alſo much diſguſted, he applied himſelf chiefly to the practice of phyſic, and went with his family into Pruſſia. Here he obtained the friendſhip and eſteem of the chancellor Oxenſtiern, whom he accompanied into Sweden; where he was made profeſſor of phyſic in the univerſity of Upſal, and phyſician to the queen. He died in 1640. It is ſaid in his epitaph, that he underſtood 26 languages. He wrote many works; among which are, 1. *Liber ſecundus Canonis Avicennæ, typis Arabicis, ex MSS. editus, et ad verbum in Latinum tranſlatus*, in folio. 2. *De vero uſu et abuſu Medicinæ.* 3. *Grammatica Arabica*, folio. 4. *Vitæ quatuor Evangeliſtarum, ex antiquiſſimo codice MS. Arabico erutæ*, in folio. 5. *Notæ in Evangelium S. Matthæi, ex collatione textuum Arabicorum, Syriacorum, Ægyptiacorum, Græcorum, & Latinorum*, in folio, &c.

He ought not to be confounded with *George Kerſtenius*, another learned phyſician and naturaliſt, who was born at Stettin, and died in 1660; and alſo wrote ſeveral works which are eſteemed.

KIRTLE, a term uſed for a ſhort jacket; alſo for a quantity of flax about a hundred weight.

KIRTON, or Kirkton, a town of Lincolnſhire, 151 miles from London. It had its name from its kirk or church, which is truly magnificent. It has a market and two fairs. This place is famous for the pippin, which, when grafted on its ſtock, is called the *rennet*. It gives names to its hundreds, in which are four villages of the ſame name.

KISSER, the ancient Colonia Aſſuras in Africa, as appears from many inſcriptions ſtill to be met with in the place. Here is a triumphal arch done in a very good taſte: there is alſo a ſmall temple of a ſquare figure, having ſeveral inſtruments of ſacrifice carved upon it; but the execution is much inferior to the deſign, which is very curious. The town is ſituated in the kingdom of Tunis, on the declivity of a hill, above a large fertile plain; which is ſtill called the plain of *Surſo*, probably from its ancient name *Aſſuras*.

KISSING, by way of ſalutation, or as a token of reſpect, has been practiſed in all nations. The Roman emperors ſaluted their principal officers by a kiſs. Kiſſing the mouth or the eyes was the uſual compliment upon any promotion or happy event. Soldiers kiſſed the general's hand when he quitted his office. Fathers, amongſt the Romans, had ſo much delicacy, that they never embraced their wives in the preſence of their daughters. Near relations were allowed to kiſs their female kindred on the mouth: but this was done in order to know whether they ſmelt of wine or not; becauſe the Roman ladies, in ſpite of a prohibition to the contrary, were found ſometimes to have made too free with the juice of the grape. Slaves kiſſed their maſter's hand, who uſed to hold it out to them for that purpoſe. Kiſſing was a cuſtomary mode of ſalutation amongſt the Jews, as we may collect from the circumſtance of Judas approaching his Maſter with a kiſs. Relations uſed to kiſs their kindred when dying, and when dead; when dying, out of a ſtrange opinion that they ſhould imbibe the departing ſoul; and when dead, by way of valedictory ceremony. They even kiſſed the corpſe after it was conveyed to the pile, when it had been ſeven or eight days dead.

KISTI, an Aſiatic nation, which extends from the higheſt ridge of Caucaſus, along the Sundſha rivulets. Major Rennel, in his Memoir of a map of the countries comprehended between the Black Sea and the Caſpian, ſays, they are bounded to the weſt by the little Cabarda, to the eaſt by the Tartars and Leſguis, and to the ſouth by the Leſguis and Georgians. He imagines they may be the people whom Gaerber calls the *Taulinzi*, i. e. "mountaineers," and to whom he attributes the following ſtrange cuſtom:—"When a gueſt or ſtranger comes to lodge with them, one of the hoſt's daughters is obliged to receive him, to unſaddle and feed his horſe, take care of his baggage, prepare his dinner, paſs the night with him, and continue at his diſpoſal during his ſtay. At his departure, ſhe ſaddles his horſe and packs up his baggage. It would be very uncourtly to refuſe any of theſe marks of hoſpitality." The different tribes of this reſtleſs and turbulent nation are generally at variance with each other, and with all their neighbours. Their dialects have no analogy with any known language, and their hiſtory and origin are at preſent utterly unknown.

Their diſtricts, as enumerated in Major Rennel's Memoir, are, 1. Inguſhi, about 60 miles to the ſouthward of Moſdok, in the high mountains about the Kumbelei. 2. Endery; and, 3. Axai, on a low ridge between the Sundſha and Iaxai rivers. In their territories are the hotwells. 4. Ackinyurt, towards the upper part of the Sundſha and Kumbelei. 5. Ardakli, on the Roſhni that joins the Sundſha. 6. Wapi, near the Oſſetin village Tſhim, towards the ſource of the Terek. 7. Anguſht, on the upper part of the Kumbelei. 8. Shalkha, called by the Ruſſians *Maloi Anguſht*. 9. Tſhetſhen, on the lower part of the Argun river. 10. Atakhi, a ſmall diſtrict on the upper part of the Argun. 11. Kulga, or Dſhanti, in the high mountains. 12. Galgai, or Halha, about the ſource of the Aſai, a Sundſha rivulet. 13. Tſhabrilo, and Shabul, on the Sundſha. 14. Tſhiſhni-Kabul, on the Roſhni, a Sundſha rivulet. 15. Karaboulak, a wandering tribe, who have their little villages about the ſix uppermoſt rivulets of the Sundſha, particularly the Fortan. 16. Meeſti, Meredſhi, Galaſhka, and Duban, are ſmall tribes on the Axai.

The Inguſhi, or firſt of the above tribes, ſubmitted to Ruſſia in 1770. They are capable of arming about 5000 men; they call themſelves *Inguſhi*, *Kiſti*, or *Halha*; they live in villages near each other, containing about 20 or 30 houſes; are diligent huſbandmen, and rich in cattle. Many of their villages have a ſtone tower, which ſerves in time of war as a retreat to their women and children, and as a magazine for their effects. Theſe people are all armed, and have the cuſtom of wearing ſhields.—Their religion is very ſimple, but has ſome traces of Chriſtianity: they believe in one God, whom they call *Daile*, but have no ſaints or religious perſons; they celebrate Sunday, not by any religious ceremony, but by reſting from labour; they have a faſt in ſpring, and another in ſummer; they obſerve no ceremonies either at births or deaths; they allow of polygamy,

and eat pork. One kind of sacrifice is usual among them: at certain times a sheep is killed by a person who seems to be considered as a kind of priest, as he is obliged to live in a state of celibacy. His habitation is in the mountains, near an old stone church, which is said to be adorned with various statues and inscriptions. Under the church is a vault that contains certain old books, which, however, no one ever attempts to approach. Mr. Guldenstaedt was prevented by the weather from visiting this church.

The 6th, 7th, and 8th tribes, which were formerly tributary to the Cabardean princes, submitted to Russia in 1770. The 9th, Tshetshen, is governed by its own chiefs, who are related to the Avar-Khan. This tribe is so numerous and warlike, and has given the Russians so much trouble, that its name is usually given by them to the whole Kisti nation. The chief village of Tshetshen lies on the Argun, about 15 miles from its mouth. Its other principal villages are Hadshiaul and Iangejent, both on the Sundsha.

KIT, in music, the name of a small violin of such form and dimension as to be capable of being carried in a case or sheath in the pocket. Its length, measuring from the extremities, is about 16 inches, and that of the bow about 17. Small as this instrument is, its powers are co-extensive with those of the violin.

Kit-*Kat Club*, an association of above 30 noblemen and gentlemen of distinguished merit, formed in 1703, purely to unite their zeal in favour of the Protestant succession in the house of Hanover. Their name was derived from Christopher Kat, a pastry-cook, near the tavern where they met in King's-street, Westminster, who often supplied them with tarts. Old Jacob Tonson was their bookseller; and that family is in possession of a picture of the original members of this famous club, painted by Sir Godfrey Kneller. The design of these gentlemen was to recommend and encourage true loyalty by the powerful influence of wit and humour; and Sir Samuel Garth distinguished himself by the extempore epigrams he made on their toasts, which were inscribed on their drinking-glasses.

KITCHEN, the room in a house where the provisions are cooked. Count Rumford, in his Essays, describes a method of constructing boilers and their fire-places, so as to cause a prodigious economy in the article of fuel. Having erected at Munich a kitchen for the purpose of supplying the poor with wholesome food at the least possible expence, the Count, on his return to his native country, published his account of the event, and personally assisted in the erection of several kitchens for the advantage of different charitable institutions, both in England and Ireland. As these were all upon the same principle, we shall here confine ourselves to a description of that fitted up under the Count's direction in the Foundling-hospital in London.

The size of the kitchen is 21 feet 2 inches by 17 feet. In the centre of the wall opposite the windows is the *roasting machine*, which is let into the wall, and is 5 feet deep by 2 feet wide and 15 inches high. In this the dinner on the roast meat days, being 112lb. of beef, for the officers and children, is now dressed (the time required being four hours and a half) with a peck of coals and a peck of cinders mixed together; the cinders being saved from the consumption of the former day. Instead of which the average consumption on the roasting days, in the former and common mode of roasting, was above ten times the quantity of coals, being from two and a half to three bushels. Communicating with the roaster there are two pipes, by which the hot air may be forced so as to make the meat more or less brown, at the discretion of the cook. For the convenience of taking out the meat, either to turn it in the course of the dressing, or to take it up when dressed, there is a table on castors, which is easily moved to or from the front of the roaster, and which in height and size corresponds exactly with the bottom of the roaster.

On the right side of the roaster is the *steam box*, 3 feet 8 inches by 2 feet, and the large oblong iron boiler, 5 feet by 3 feet 4 inches, divided into two parts; one containing 82 gallons for boiling the children's meat, the other 41 gallons for boiling greens. The fire-place that supplies this boiler and steam-box is sunk into the floor, so as that the upper part of the boiler is not higher than is convenient for the cook to reach over; the space occupied by this boiler, and by the flues belonging to it, including the part on which the steam-box stands, is 8 feet 2 inches by 5 feet 2 inches. This double boiler, and the steam-box, in which the potatoes of the hospital are dressed, and which is capable of boiling 200lb. weight of potatoes at once, are supplied by the heat of one small fire; the consumption of which, for dressing all this beef, greens and potatoes, is, at present, exactly one peck of coals, and the same quantity of cinders. The steam is conducted by a small pipe into the bottom of the steam-box, and by another pipe at the top of the steam-box into a chimney-flue in the wall. In order to prevent the evaporation of steam from either the boiler or the steam-box, an object of almost as much saving to food as to fuel, there is to each a double rim, that receives the edge of the cover, and which being kept supplied by a little water, makes it impervious to the steam.

The steam-box is a common deal box, guarded at the corners with iron, and lined with tin; in it there is, at the height of 5 inches above the bottom of the box, a false-cullender bottom, which permits the steam to pass equally under every part of the potatoes.

On the left side of the roaster, next the corner, is another *oblong double boiler*, 3 feet 4 inches by 2 feet 3 inches, containing in one part 35 gallons, and in the other 17 gallons, for the purpose of dressing a lesser quantity of food, when the larger boiler is not wanted. This has the same double rim as the larger boiler, for preventing the evaporation of steam. The average quantity of coals, that is used for this lesser boiler, for a day's dinner, is rather, but very little less than what is used for the great boiler. Next to this is a round iron boiler, of 53 gallons, for boiling milk-porridge, and for boiling hot water occasionally: this consumes, on an average, about half the fuel that is used in the larger boiler. The space occupied by these two boilers and their flues, and the shape and height, are made to correspond exactly with the other side of the room; so as to have a passage of 6 feet 8 inches clear between them, and to leave in the front of the room, next the windows, an unoccupied space of 13 feet by 17 feet.

The most important benefit to the hospital is the saving in point of fuel. How much that may eventually be, cannot yet be precisely stated; at present, the cost of the peck of coals, which is used in boiling the 112lb. of beef, a proportionable quantity of greens, and 200lb. weight of potatoes (supposing coals at the high price of 2*l.* 12*s.* the chaldron) is *four-pence*; a lesser quantity of coals than is now used will probably be sufficient; but it will require some time and experience to ascertain the exact amount; and it should be observed, that in cold weather it is very likely that the draught of the fire and the consumption of the fuel may be increased. For four chaldrons consumed in the Foundling kitchen in the former mode of cooking, there is, as nearly as can be estimated, but one chaldron now used with the new apparatus. Besides this, the food being dressed more gently, and with less evaporation, there is less waste in that respect; and the food of the hospital is better dressed than heretofore, and, now the cook is used to it, with much less trouble to her and the other persons employed in the kitchen.

With regard to the general use of the invention, it will appear that the benefit of these kitchens is in proportion to the magnitude of the scale; and that in private families the advantage will be of less consideration. To say nothing of the

application of his principles to the burning of lime (See KILN), or to engines or manufactories, where fire is the inſtrument of operation; or of the uſe to be made of his boilers in huſbandry and in breweries; it is worth notice, that ſo ſimple an invention as the ſteam-box, for preparing potatoes for cattle, may be applied by farmers with hardly any expence or trouble, and with the greateſt advantage: and in the cookery of all large eſtabliſhments, where a number of perſons is to be ſupplied from the ſame kitchen, the benefit is of the utmoſt importance. In ſoldiers' barracks, public ſchools, hoſpitals, manufactories, workhouſes, and cooks' ſhops, the ſaving in fuel, and in the mode of preparing food, and the conſequent increaſe of the comfort and accommodation of the poor are ſo great, as to make the encouragement and promotion of theſe valuable inventions a national object.

In a cook's ſhop, on the Foundling eſtate, there has alſo been fitted up, in a room only 15 by 11 feet, a kitchen on the foregoing plan, which is capable of dreſſing food for 300 perſons. This kitchen, the whole expence of fitting up which has hardly exceeded 50*l.* is intended for providing good and wholeſome food for the poor, at a very moderate price in money, or upon tickets given them by their opulent and charitable neighbours; a plan highly worthy the imitation of thoſe who are inclined to relieve poverty without diſcouraging induſtry.

Army KITCHEN, is a ſpace of earth 16 or 18 feet diameter, with a ditch ſurrounding it three feet wide; the oppoſite bank of which ſerves as a ſeat for the men who dreſs the victuals. The kitchens of the flank companies are contiguous to the outline of the camp; and the intermediate ſpace is generally diſtributed equally for the remaining kitchens; and as each tent forms a meſs, each kitchen muſt have as many fire-places as there are tents in the company.

In Count Rumford's 6th Eſſay, we have ſome account of a very eligible contrivance for cooking for an army. After remarking on the poſſibility of conſtructing boilers without employing any iron-work about them, he ſays: "I lately had an opportunity of fitting up a kitchen on theſe principles, in the conſtruction of which there was not a particle of iron uſed, or of any other metal, except for the boiler. On the approach of the French army under general Moreau in Auguſt laſt, the Bavarian troops being aſſembled at Munich (under my command) for the defence of the capital, the town was ſo full of ſoldiers, that ſeveral regiments were obliged to be quartered in public buildings, and encamped on the ramparts, where they had no conveniences for cooking.—For the accommodation of a part of them, four large oblong ſquare boilers, compoſed of very thin ſheet copper well tinned, were fitted up in a maſs of brick-work in the form of a croſs; each boiler with its ſeparate fire-place, communicating by double canals, furniſhed with dampers, with one common chimney, which ſtands in the centre of the croſs. The dampers are thin flat tiles;—the grates on which the fuel is burned are compoſed of common bricks, placed edgewiſe; and the paſſages leading to the fire-place, and to the aſh-pit, are cloſed by bricks which are made to ſlide in grooves.

"Under the bottom of each boiler, which is quite flat, there are three flues, in the direction of its length; that in the middle, which is as wide as both the others, being occupied by the burning fuel. The opening by which the fuel is introduced is at the end of the boiler *fartheſt from the chimney*; and the flame running along the middle flue to the end of it, divides there, and returning in the two ſide flues to the hither end of the boiler, there riſes up into two other flues, in which it paſſes along the outſide of the boiler into the chimney. The boilers are furniſhed with wooden covers divided into two equal parts, united by hinges. In order that the four boilers may be tranſported with greater facility from place to place (from one camp to another for inſtance), they are not all preciſely of the ſame ſize, but one is ſo much leſs than the other, that they may be packed one in the other. The largeſt of them, which contains the three others, is packed in a wooden cheſt, which is made juſt large enough to receive it. In the ſmalleſt may be packed a circular tent, ſufficiently large to cover them all. In the middle of the tent there muſt be a hole through which the chimney muſt paſs. The four boilers, together with the tent, and all the apparatus and utenſils neceſſary for a kitchen on this conſtruction for a regiment conſiſting of 1000 men, might eaſily be tranſported from place to place on an Iriſh car drawn by a ſingle horſe.

"I have been the more particular in my account of this portable kitchen, as I think it would be found very uſeful for troops in camp. The right hon. Mr. T. Pelham made a trial of one of them laſt ſummer for his regiment (the Suſſex militia), and found it to be very uſeful. The ſaving of fuel was very conſiderable indeed; and the ſaving of trouble in cooking not leſs important. The firſt experiment we made together in a ſingle boiler, fitted up for the purpoſe in the open air, in the middle of the court-yard of lord Pelham's houſe in London."

"There is one more invention (continues the Count) for the uſe of armies in the field, which I wiſh to recommend, and that is *a portable boiler* of a light and cheap conſtruction, in which victuals may be cooked *on a march*. There are ſo many occaſions when it would be very deſirable to be able to give ſoldiers, haraſſed and fatigued with ſevere ſervice, a warm meal, when it is impoſſible to ſtop to light fires and boil the pot, that I cannot help flattering myſelf that a contrivance, by which the pot *actually boiling* may be made to keep pace with the troops as they advance, will be an acceptable preſent to every humane officer and wiſe and prudent general. Many a battle has undoubtedly been loſt for the want of a good comfortable meal of warm victuals to recruit the ſtrength and raiſe the ſpirits of troops fainting with hunger and exceſſive fatigue."

KITCHEN-*Garden*, a piece of ground laid out for the cultivation of fruit, herbs, pulſe, and other vegetables, uſed in the kitchen. See GARDENING.

KITE, in ornithology. See FALCO, ſp. 8.

KITTIWAKE, in ornithology. See LARUS.

KIU-HOA. See PARTHENIUM.

KIUN-TCHEOU-FOU. See HAI-NAN.

KLEINHOVIA, in botany; a genus of the decandria order, belonging to the gynandria claſs of plants; and in the natural method ranking under the 37th order, *Columniferæ*. The calyx is pentaphyllous; the petals five; the nectarium campanulated and pedunculated, containing the ſtamina; the capſule is inflated and five-ſeeded.

KLEIST (EDWARD CHRISTIAN DE), a celebrated German poet, and a ſoldier of diſtinguiſhed bravery, was born at Zeblin, in Pomerania, in 1715. At nine years of age he was ſent to purſue his ſtudies at Cron in Poland; and he afterwards ſtudied at Dantzick and Koningſberg. Having finiſhed his ſtudies, he went to viſit his relations in Denmark, who invited him to ſettle there; and having in vain endeavoured to obtain preferment in the law, at 21 years of age accepted of a poſt in the Daniſh army. He then applied himſelf to the ſtudy of all the ſciences that have a relation to military affairs, with the ſame aſſiduity as he had before ſtudied civil law. In 1740, at the beginning of the reign of Frederic king of Pruſſia, Mr. de Kleiſt went to Berlin, and was preſented to his majeſty, who made him lieutenant of his brother prince Henry's regiment; and he was in all the campaigns which diſtinguiſhed the five firſt years of the king of Pruſſia's reign. In 1749 he obtained the poſt of captain; and in that year publiſhed his excellent poem on the Spring. Before the breaking out of the laſt war, the king choſe him, with ſome other officers at Potſdam, companion to the young prince Frederic-William of Pruſſia, and to eat at his table. In the firſt campaign, in 1756, he was

nominated major of Hauſen's regiment; which being in garriſon at Leipſic, he had time to finiſh ſeveral new poems. After the battle of Roſbach, the king gave him, by an order in his own hand-writing, the inſpection of the great hoſpital eſtabliſhed at Leipſic. And on this occaſion his humanity was celebrated by the ſick and wounded of both parties, and his diſintereſtedneſs was equally admired by all the inhabitants of that city. In 1758, Prince Henry coming to Leipſic, Mr. Kleiſt deſired to ſerve in his army with the regiment of Hauſen, which was readily granted. Opportunities of diſtinguiſhing himſelf could not be wanting under that great officer, and he always communicated his courage to the battalion under his command. He alſo ſerved that prince at the beginning of the campaign of 1759, when he was with him in Franconia, and in all the expeditions of that army, till he was detached with the troops under general de Fink to join the king's army. On the 12th of Auguſt was fought the bloody battle of Kunerſdorf, in which he fell. He attacked the flank of the Ruſſians, and aſſiſted in gaining three batteries. In theſe bloody attacks he received twelve contuſions; and the two firſt fingers of his right hand being wounded, he was forced to hold his ſword in the left. His poſt of major obliged him to remain behind the ranks; but he no ſooner perceived the commander of the battalion wounded and carried away, than he inſtantly put himſelf at the head of his troop. He led his battalion in the midſt of the terrible fire of the enemy's artillery, againſt the fourth battery. He called up the colours of the regiment; and, taking an enſign by the arm, led him on. Here he received a ball in his left arm; when, being no longer able to hold his ſword in his left hand, he took it again in the right, and held it with the two laſt fingers and his thumb. He ſtill puſhed forward, and was within thirty ſteps of the battery, when his right leg was ſhattered by the wadding of one of the great guns; and he fell from his horſe, crying to his men, "My boys, don't abandon your king." By the aſſiſtance of thoſe who ſurrounded him, he endeavoured twice to remount his horſe; but his ſtrength forſook him, and he fainted. He was then carried behind the line; where a ſurgeon, attempting to dreſs his wounds, was ſhot dead. The Coſſacs arriving ſoon after, ſtripped Mr. Kleiſt naked, and threw him into a mirey place; where ſome Ruſſian huſſars found him in the night, and laid him upon ſome ſtraw near the fire of the grand guard, covered him with a cloak, put a hat on his head, and gave him ſome bread and water. In the morning one of them offered him a piece of ſilver, which he refuſed; on which he toſſed it upon the cloak that covered him, and then departed with his companions. Soon after the Coſſacs returned, and took all that the generous huſſars had given him. Thus he again lay naked on the earth; and in that cruel ſituation continued till noon, when he was known by a Ruſſian officer, who cauſed him to be conveyed in a waggon to Frankfort on the Oder; where he arrived in the evening, in a very weak ſtate, and was inſtantly put into the hands of the ſurgeons. But the fractured bones ſeparating, broke an artery, and he died by the loſs of blood. The city of Frankfort being then in the hands of the enemy, they buried this Pruſſian hero with all military honours: the governor, a great number of the Ruſſian officers, the magiſtrates of the city, with the profeſſors and the ſtudents, formed the proceſſion, preceded by the funeral muſic. Mr. Kleiſt's poems, which are greatly admired, are elegantly printed in the German tongue, in 2 volumes 8vo.

KNAPDALE, one of the diviſions of Argyleſhire in Scotland. It is parted from Cowal on the eaſt by Lochfyn, borders with Kintyre on the ſouth, with Lorn on the north, by Braidalbin on the north-eaſt, and on the weſt by the Hebrides. Its length from north to ſouth does not exceed 20 miles, and the breadth in ſome places may amount to 13. It is joined to Kintyre by a neck of land not above a mile broad, over which the country people draw their boats, to avoid ſailing round Kintyre. This part of Knapdale abounds with lakes, ſome of them containing little iſlands, on which there are caſtles belonging to different proprietors. The grounds are more adapted for paſturage than grain; but that on the ſide of Lochow is fruitful in both.

KNAPSACK, in a military ſenſe, a rough leather bag which a ſoldier carries on his back, and which contains all his neceſſaries. Square knapſacks are moſt convenient; and ſhould be made with a diviſion to hold the ſhoes, black-ball and bruſhes, ſeparate from the linen. White goat-ſkins are the beſt.

KNARESBOROUGH, a town in the Weſt Riding of Yorkſhire, diſtant 199 miles from London, is an ancient borough by preſcription, called by foreigners *the Yorkſhire Spaw*. It is almoſt encompaſſed by the river Nid, which iſſues from the bottom of Craven-hills; and had a priory, with a caſtle, long ſince demoliſhed, on a craggy rock, whence it took the name. The town is about three furlongs in length; and the pariſh is famous for four medicinal ſprings near each other, and yet of different qualities. 1. The ſweet ſpaw, or vitriolic well, in Knareſborough foreſt, three miles from the town, which was diſcovered in 1620. 2. The ſtinking or ſulphureous ſpaw, which is uſed only in bathing. 3. St. Mungo's, a cold-bath, four miles from the town. 4. The dropping-well, which is in the town, and the moſt noted petrifying ſpring in England, ſo called by reaſon of its dropping from the ſpongy rock hanging over it. The ground which receives it, before it joins the well, is for 12 yards long become a ſolid rock. From the well it runs into the Nid, where the ſpring water has made a rock that ſtretches ſome yards into the river. The adjacent fields are noted for liquorice, and a ſoft yellow marle, which is rich manure. The town is governed by a bailiff. Its baths are not ſo much frequented ſince Scarborough Spaw came in vogue. It has a good market and ſix fairs. Here is a ſtone bridge over the river, near one end of which is a cell dug out of the rock, and called *St. Robert's chapel*.

KNAVE, an old Saxon word, which had at firſt a ſenſe of ſimplicity and innocence, for it ſignified a *boy*: Sax. *cnapa*, whence a *knave-child*, i. e. a boy, diſtinguiſhed from a girl, in ſeveral old writers; afterwards it was taken for a ſervant-boy, and at length for any ſervant-man. Alſo it was applied to a miniſter or officer that bore the ſhield or weapon of his ſuperior; as *field-knapa*, whom the Latins call *armiger*, and the French *eſcuyer*, 14 Edw. III. c. 3. And it was ſometimes of old made uſe of as a titular addition; as *Joannes C. filius Willielmi C. de Derby, knave*, &c. 22 Hen. VII. c. 37. The word is now perverted to the hardeſt meaning, viz. *a falſe deceitful fellow*.

KNAUTIA, in botany; a genus of the monogynia order, belonging to the tetrandria claſs of plants; and in the natural method ranking under the 48th order, *Aggregatæ*. The common calyx is oblong, ſimple, quinqueflorous; the proper one ſimple, ſuperior; the florets irregular; the receptacle naked.

KNEADING, the act of preſſing and mixing with the hand, or any inſtrument better calculated to produce an intimate union of its parts, any kind of moiſt earth, clay, or dough. The term however is moſt uſually applied to the latter ſubſtance as practiſed by the bakers, who, in undertaking the mixture of flour into bread in a large way, find it neceſſary to uſe a wooden implement or lever, which being faſtened at one end by a moveable hinge, is worked up and down ſo as to preſs and knead the dough, previous to its being formed into loaves. As this machine however is but ill adapted for the purpoſe, we ſhall here extract from the Tranſactions of the Patriotic Society at Milan, a deſcription of the kneading-mill uſed at the public baking-houſes of Genoa, where the bakers formerly uſed

the diſguſting practice of kneading the dough with their bare feet.

The object of this machine is to make a great quantity of flour into dough; and to knead that dough as completely as may be neceſſary, with a great ſaving of time and labour. From the figures in pl. 21. Vol. IV. a clear idea of this invention may be obtained; the various parts of which, marked with their reſpective letters, are as follow:

A, fig. 1, is a frame of wood, which ſupports the axis of the machine; a wall, 14 palms high from the ground, may be made uſe of inſtead of this frame. B, a wall, three palms and a half thick, through which the aforeſaid axis paſſes. C, another wall, ſimilar to the former, and facing it, at the diſtance of twenty-one palms. D, the axis, thirty palms in length, and one palm and one third in thickneſs. E, the great wheel fixed to the aforeſaid axis, between the frame and the wall; its diameter is twenty-eight palms; and its breadth, which is capable of holding one or two men, is five palms. F, ſteps, by treading on which the men turn the wheel with great velocity; they are two palms diſtant from each other, and one-third of a palm in height. G, a ſmaller wheel, with cogs, fixed almoſt at the extremity of the axis. Its diameter is twelve palms and a half. H, a piece of wood, or beam, which extends from one wall to the other; it is twenty-one palms long, and one palm and one third thick. A ſimilar beam (not ſeen in the figure) is on the oppoſite ſide. I, a croſs piece of wood, placed near the wall C; it is fixed in the two beams, and ſerves to ſupport the other extremity of the axis. Its length is fourteen palms, and its thickneſs one palm and one third: there is alſo a croſs piece (which cannot be ſeen in the figure), fourteen palms long, and half a palm thick, placed cloſe to the wall B. K, a ſtrong piece of oak, curved and fixed croſs-ways in the forementioned beams, to receive the axis of the trundle. Its length is fourteen palms, its thickneſs one and a half. L, a trundle, moved by the cogged wheel G, five palms and a half in diameter, and one palm and a quarter in height. M, an axis, proceeding from the trundle L, and continued through the croſs N, to the bottom of the tub P; its centre is made of iron, partly ſquare and partly round, and it turns in a ſocket of braſs. The firſt part of this axis, between the trundle L and the croſs N, is of ſquare iron, ſurrounded by two pieces of wood, held together by iron hoops, which may be removed at pleaſure, to examine the iron within: its length is three palms, its diameter about one palm. The ſecond part of the axis, which is within the tub, is made like the firſt part: its height is one palm and a half, its diameter one palm and one ſixth. The wooden ſheath of this part of the axis is fixed to the bottom of the tub, by means of three ſcrews with their nuts. This axis is one third of a palm diſtant from the neareſt triangular *beater* of the croſs. N, a croſs, formed of two bars of wood unequally divided, ſo that the four arms of the croſs are of different lengths. One of the two pieces of wood, of which the croſs is made, is ſix palms in length, the other five palms. Their thickneſs is ſeven-twelfths of a palm, and their breadth one palm. O, four pieces of wood, called *beaters*, of a triangular ſhape, fixed into the extremity of, and underneath, the arms of the abovementioned croſs; conſequently they beat or knead the dough in the tub at unequal diſtances from the centre: they are one palm and three quarters in length, or height, and half a palm in thickneſs. Other views of theſe, and of the neighbouring parts, are given in fig. 3 and 4. P, a ſtout tub of wood, about one quarter of a palm thick; and well hooped with iron. Its diameter is ſix palms, its height one palm and a half, in the clear.

Fig. 2, is a box or trough of wood, four palms long, and three palms wide, in which the leaven is formed (in about an hour) in a ſtove, and in which it is afterwards carried to the tub P.

Fig. 3, exhibits a view of the trundle, croſs, &c. with a ſection of the tub.

Fig. 4, is a bird's-eye view of the croſs and tub.

The meaſures in the foregoing deſcription are given in palms of Genoa, the proportion of which, to Paris feet, is ſaid to be as 771 to 1000.

From what has been ſaid it is eaſy to conceive that the men, by walking in the wheel E, cauſe the *beaters* O to turn round, and theſe mix, break, and knead the dough placed in the tub P.

This tub will contain 18 *rubbi* of flour, which is carried to it in barrels; the leaven is then carried to it in the box or trough, fig. 2; and, when the whole is tempered with a proper quantity of warm water, the wheel is turned round; by which the dough is properly and completely kneaded. In general a quarter of an hour is ſufficient to make very good dough; but an experienced baker, who ſuperintends, determines that the operation ſhall be continued a few minutes more or leſs, according to circumſtances.

KNEE, in anatomy, the articulation of the thigh and leg bones. See ANATOMY.

KNEE, in a ſhip, a crooked piece of timber, having two branches or arms, and generally uſed to connect the beams of a ſhip with her ſides or timbers. The branches of the knees form an angle of greater or ſmaller extent, according to the mutual ſituation of the pieces which they are deſigned to unite. One branch is ſecurely bolted to one of the deck-beams, whilſt the other is in the ſame manner attached to a correſponding timber in the ſhip's ſide.

Beſides the great utility of knees in connecting the beams and timbers into one compact frame, they contribute greatly to the ſtrength and ſolidity of the ſhip, in the different parts of her frame to which they are bolted; and thereby enable her with greater firmneſs to reſiſt the effects of a turbulent ſea. In fixing of theſe pieces, it is occaſionally neceſſary to give an oblique direction to the vertical or ſide branch, in order to avoid the range of an adjacent gun-port, or becauſe the knee may be ſo ſhaped as to require this diſpoſition; it being ſometimes difficult to procure ſo great a variety of knees as may be neceſſary in the conſtruction of a number of ſhips of war. In France, the ſcarcity of theſe pieces has obliged their ſhipwrights frequently to form their knees of iron.

Knees are ſaid to be either *lodging* or *hanging*. The former are fixed horizontally in the ſhip's frame, having one arm bolted to the beam, and the other acroſs two or three timbers, as repreſented in the deck, pl. 90. Vol. II. The latter are fixed vertically, as we have deſcribed above. See alſo SHIP-*Building*, DECK, and MIDSHIP-*Frame*.

KNEE *of the Head*, a large flat piece of timber, fixed edge-ways upon the fore-part of a ſhip's ſtem, and ſupporting the ornamental figure or image placed under the bowſprit. See SHIP-*Building*.

The *knee of the head*, which may properly be defined a continuation of the ſtem, as being prolonged from the ſtem forwards, is extremely broad at the upper-part, and accordingly compoſed of ſeveral pieces united into one, Y, Y. (*Pieces of the Hull, in* SHIP-*Building* plates.) It is let into the head and ſecured to the ſhip's bows by ſtrong knees fixed horizontally upon both, and called *the cheeks of the head*. The heel of it is ſcarfed to the upper-end of the fore-foot; and it is faſtened to the ſtem above by a knee, called *a ſtandard*, expreſſed by and in the plate.

Beſides ſupporting the figure of the head, this piece is otherwiſe uſeful, as ſerving to ſecure the boom or bumkin, by which the fore-tack is extended to windward; and by its great breadth preventing the ſhip from falling to leeward when cloſe-hauled ſo much as ſhe would otherwiſe do. It alſo affords a

greater ſecurity to the bowſprit, by increaſing the angle of the bob ſtay, ſo as to make it act more perpendicularly on the bowſprit.

The *knee of the head* is a phraſe peculiar to ſhip-wrights; as this piece is always called the *cut-water* by ſeamen, if we except a few, who, affecting to be wiſer than their brethren, have adopted this expreſſion, probably on the preſumption that the other is a cant-phraſe or vulgariſm.

Carling KNEES, in a ſhip, thoſe timbers which extend from the ſhip to the hatch-way, and bear up the deck on both ſides.

KNELLER (Sir GODFREY), a painter, whoſe fame is well eſtabliſhed in theſe kingdoms. He was born at Lubeck in 1648; and received his firſt inſtructions in the ſchool of Rembrandt, but became afterwards a diſciple of Ferdinand Bol. When he had gained as much knowledge as that ſchool afforded him, he travelled to Rome, where he fixed his particular attention on Titian and the Caraccii. He afterwards viſited Venice, and diſtinguiſhed himſelf ſo effectually in that city by his hiſtorical pictures and portraits of the noble families there, that his reputation became conſiderable in Italy. By the advice of ſome friends he came at laſt to England, where it was his good fortune to gain the favour of the duke of Monmouth: by his recommendation, he drew the picture of king Charles II. more than once; who was ſo taken with his ſkill in doing it, that he uſed to come and ſit to him at his houſe in Covent-garden piazza. The death of Sir Peter Lely left him without a competitor in England, and from that time his fortune and fame were thoroughly eſtabliſhed. No painter could have more inceſſant employment, and no painter could be more diſtinguiſhed by public honour. He was ſtate-painter to Charles II. James II. William III. queen Anne, and George I. equally eſteemed and reſpected by them all: the emperor Leopold made him a knight of the Roman empire, and king George I. created him a baronet. Moſt of the nobility and gentry had their likeneſſes taken by him, and no painter excelled him in a ſure outline, or in the graceful diſpoſition of his figures: his works were celebrated by the beſt poets in his time. He built himſelf an elegant houſe at Whitton near Hampton-court, where he ſpent the latter part of his life; and died in 1726.

KNIFE is a well-known inſtrument, made for cutting, and adapted in form to the uſes for which it is deſigned. Knives are ſaid to have been firſt made in England in 1563, by one Matthews, on Fleet-bridge, London. The importation of all ſorts of knives is prohibited.

KNIGHT, *eques*, among the Romans, a perſon of the ſecond degree of nobility, following immediately that of the ſenators. See EQUESTRIAN *Order*, and EQUITES.

KNIGHT, or *Cnecht* (Germ.), in feodal hiſtory, was originally an appellation or title given by the ancient Germans to their youth after being admitted to the privileges of bearing arms. The paſſion for arms among the Germanic ſtates, as deſcribed by Dr. Stuart in his "*View of Society in Europe*," was carried to extremity. It was amidſt ſcenes of death and peril that the young were educated: it was by valour and feats of proweſs that the ambitious ſignalized their manhood. All the honours they knew were allotted to the brave. The ſword opened the path to glory. It was in the field that the ingenious and the noble flattered moſt their pride, and acquired an aſcendancy. The ſtrength of their bodies, and the vigour of their counſels, ſurrounded them with warriors, and lifted them to command.

But, among theſe nations, when the individual felt the call of valour, and wiſhed to try his ſtrength againſt an enemy, he could not of his own authority take the lance and the javelin. The admiſſion of their youth to the privilege of bearing arms, was a matter of too much importance to be left to chance or their own choice. A form was invented by which they were advanced to that honour.

The council of the diſtrict, or of the canton to which the candidate belonged, was aſſembled. His age and his qualifications were inquired into; and if he was deemed worthy of being admitted to the privileges of a ſoldier, a chieftain, his father or one of his kindred adorned him with a ſhield and the lance. In conſequence of this ſolemnity, he prepared to diſtinguiſh himſelf; his mind opened to the cares of the public; and the domeſtic concerns, or the offices of the family from which he had ſprung, were no longer the objects of his attention. To this ceremony, ſo ſimple and ſo intereſting, the inſtitution of *knighthood* is indebted for its riſe.

Knighthood, however, as a ſyſtem, known under the denomination of CHIVALRY, is to be dated only from the 11th century. All Europe being reduced to a ſtate of anarchy and confuſion on the decline of the houſe of Charlemagne, every proprietor of a manor or lordſhip became a petty ſovereign; the manſion-houſe was fortified by a moat, defended by a guard, and called a *caſtle*. The governor had a party of 700 or 800 men at his command; and with theſe he uſed frequently to make excurſions, which commonly ended in a battle with the lord of ſome petty ſtate of the ſame kind, whoſe caſtle was then pillaged, and the women and treaſures borne off by the conqueror. During this ſtate of univerſal hoſtility, there were no friendly communications between the provinces, nor any high roads from one part of the kingdom to another: the wealthy traders, who then travelled from place to place with their merchandiſe and their families, were in perpetual danger; the lord of almoſt every caſtle extorted ſomething from them on the road; and at laſt, ſome one more rapacious than the reſt, ſeized upon the whole of the cargo, and bore off the women for his own uſe.

Thus caſtles became the warehouſes of all kinds of rich merchandiſe, and the priſons of the diſtreſſed females whoſe fathers or lovers had been plundered or ſlain, and who being therefore ſeldom diſpoſed to take the thief or murderer into favour, were in continual danger of a rape.

But as ſome are always diſtinguiſhed by virtue in the moſt general defection, it happened that many lords inſenſibly aſſociated to repreſs theſe ſallies of violence and rapine, to ſecure property, and protect the ladies. Among theſe were many lords of great fiefs; and the aſſociation was at length ſtrengthened by a ſolemn vow, and received the ſanction of a religious ceremony. As the firſt knights were men of the higheſt rank, and the largeſt poſſeſſions, ſuch having moſt to loſe, and the leaſt temptation to ſteal, the fraternity was regarded with a kind of reverence, even by thoſe againſt whom it was formed. Admiſſion into the order was deemed the higheſt honour; many extraordinary qualifications were required in a candidate, and many new ceremonies were added at his creation. After having faſted from ſun-riſe, confeſſed himſelf, and received the ſacrament, he was dreſſed in a white tunic, and placed by himſelf at a ſide-table, where he was neither to ſpeak, to ſmile, nor to eat; while the knights and ladies, who were to perform the principal parts of the ceremony, were eating, drinking, and making merry at the great table. At night his armour was conveyed to the church where the ceremony was performed; and here having watched it till the morning, he advanced with his ſword hanging about his neck, and received the benediction of the prieſt. He then kneeled down before the lady who was to put on his armour, who being aſſiſted by perſons of the firſt rank, buckled on his ſpurs, put an helmet on his head, and accoutred him with a coat of mail, a cuiraſs, bracelets, cuiſſes, and gauntlets.

Being thus armed cap-a-pee, the knight who dubbed him ſtruck him three times over the ſhoulder with the flat ſide of his

ſword, in the name of God, St. Michael, and St. George. He was then obliged to watch all night in all his armour, with his ſword girded, and his lance in his hand. From this time the knight devoted himſelf to the redreſs of thoſe wrongs which "patient merit of the unworthy takes;" to ſecure merchants from the rapacious cruelty of banditti, and women from raviſhers, to whoſe power they were, by the particular confuſion of the times, continually expoſed.

From this view of the origin of chivalry, it will be eaſy to account for the caſtle, the moat, and the bridge, which are found in romances; and as to the dwarf, he was a conſtant appendage to the rank and fortune of thoſe times, and no caſtle therefore could be without him. The dwarf and the buffoon were then introduced to kill time, as the card-table is at preſent. It will alſo be eaſy to account for the multitude of captive ladies whom the knights, upon ſeizing a caſtle, ſet at liberty; and for the prodigious quantities of uſeleſs gold and ſilver veſſels, rich ſtuffs, and other merchandiſe, with which many apartments in theſe caſtles are ſaid to have been filled.

The principal lords who entered into the confraternity of knights, uſed to ſend their ſons to each other to be educated, far from their parents, in the myſtery of chivalry. Theſe youths, before they arrived at the age of 21, were called *bachelors*, or *bas chevaliers*, inferior knights, and at that age were qualified to receive the order.

So honourable was the origin of an inſtitution, commonly conſidered as the reſult of caprice and the ſource of extravagance; but which, on the contrary, roſe naturally from the ſtate of ſociety in thoſe times, and had a very ſerious effect in refining the manners of the European nations. Valour, humanity, courteſy, juſtice, honour, were its characteriſtics: and to theſe were added religion; which, by infuſing a large portion of enthuſiaſtic zeal, carried them all to a romantic exceſs, wonderfully ſuited to the genius of the age, and productive of the greateſt and moſt permanent effects both upon policy and manners. War was carried on with leſs ferocity, when humanity, no leſs than courage, came to be deemed the ornament of knighthood, and knighthood a diſtinction ſuperior to royalty, and an honour which princes were proud to receive from the hands of private gentlemen: more gentle and poliſhed manners were introduced, when courteſy was recommended as the moſt amiable of knightly virtues, and every knight devoted himſelf to the ſervice of a lady: violence and oppreſſion decreaſed, when it was accounted meritorious to check and to puniſh them: a ſcrupulous adherence to truth, with the moſt religious attention to fulfil every engagement, but particularly thoſe between the ſexes as more eaſily violated, became the diſtinguiſhing character of a gentleman, becauſe chivalry was regarded as the ſchool of honour, and inculcated the moſt delicate ſenſibility with reſpect to that point; and valour, ſeconded by ſo many motives of love, religion, and virtue, became altogether irreſiſtible.

That the ſpirit of chivalry ſometimes roſe to an extravagant height, and had often a pernicious tendency, muſt however be allowed. In Spain, under the influence of a romantic gallantry, it gave birth to a ſeries of wild adventures which have been deſervedly ridiculed: in the train of Norman ambition, it extinguiſhed the liberties of England, and deluged Italy in blood; and at the call of ſuperſtition, and as the engine of papal power, it deſolated Aſia under the banner of the croſs. But theſe ought not to be conſidered as arguments againſt an inſtitution laudable in itſelf, and neceſſary at the time of its foundation: and thoſe who pretend to deſpiſe it, the advocates of ancient barbariſm and ancient ruſticity, ought to remember, that chivalry not only firſt taught mankind to carry the civilities of peace into the operations of war, and to mingle politeneſs with the uſe of the ſword; but rouſed the ſoul from its lethargy, invigorated the human character even while it ſoftened it, and produced exploits which antiquity cannot parallel. Nor ought they to forget, that it gave variety, elegance, and pleaſure to the intercourſe of life, by making woman a more eſſential part of ſociety; and is therefore intitled to our gratitude, though the point of honour, and the refinements in gallantry, its more doubtful effects, ſhould be excluded from the improvement of modern manners. For,

To illuſtrate this topic more particularly, we may obſerve, that women, among the ancient Greeks and Romans, ſeem to have been conſidered merely as objects of ſenſuality, or of domeſtic conveniency: they were devoted to a ſtate of ſecluſion and obſcurity, had few attentions paid them, and were permitted to take as little ſhare in the converſation as in the general commerce of life. But the northern nations, who paid a kind of devotion to the ſofter ſex, even in their native foreſts, had no ſooner ſettled themſelves in the provinces of the Roman empire, than the female character began to aſſume new conſequence. Thoſe fierce barbarians, who ſeemed to thirſt only for blood, who involved in one undiſtinguiſhing ruin the monuments of ancient grandeur and ancient ingenuity, and who devoted to the flames the knowledge of ages, always forbore to offer any violence to the women. They brought along with them the reſpectful gallantry of the north, which had power even to reſtrain their ſavage ferocity; and they introduced into the weſt of Europe a generoſity of ſentiment, and a complaiſance toward the ladies, to which the moſt poliſhed nations of antiquity were ſtrangers.—Theſe ſentiments of generous gallantry were foſtered by the inſtitution of chivalry, which lifted woman yet higher in the ſcale of life. Inſtead of being nobody in ſociety, ſhe became its *primum mobile*. Every knight devoting himſelf to danger, declared himſelf the humble ſervant of ſome lady, and that lady was often the object of his love. Her honour was ſuppoſed to be intimately connected with his, and her ſmile was the reward of his valour: for her he attacked, for her he defended, and for her he ſhed his blood. Courage, animated by ſo powerful a motive, loſt ſight of every thing but enterpriſe: incredible toils were cheerfully endured, incredible actions were performed, and adventures ſeemingly fabulous were more than realiſed. The effect was reciprocal. Women, proud of their influence, became worthy of the heroiſm which they had inſpired: they were not to be approached but by the high-minded and the brave; and men then could only be admitted to the boſom of the chaſte fair, after proving their fidelity and affection by years of perſeverance and of peril.

Again, as to the change which took place in the operations of war, it may be obſerved, that the perfect hero of antiquity was ſuperior to fear, but he made uſe of every artifice to annoy his enemy: impelled by animoſity and hoſtile paſſion, like the ſavage in the American woods, he was only anxious of attaining his end, without regarding whether fraud or force were the means. But the true knight or modern hero of the middle ages, who ſeems in all his rencounters to have had his eye on the judicial combat or judgment of God, had an equal contempt for ſtratagem and danger. He diſdained to take advantage of his enemy: he deſired only to ſee him, and to combat him upon equal terms, truſting that heaven would declare in behalf of the juſt; and as he profeſſed only to vindicate the cauſe of religion, of injured beauty, or oppreſſed innocence, he was further confirmed in this enthuſiaſtic opinion by his own heated imagination. Strongly perſuaded that the deciſion muſt be in his favour, he fought as if under the influence of divine inſpiration rather than of military ardour. Thus the ſyſtem of chivalry, by a ſingular combination of manners, blended the heroic and ſanctified characters, united devotion and valour, zeal and gallantry, and reconciled the love of God and of the ladies.

Chivalry flouriſhed moſt during the time of the croiſades.

From theſe holy wars it followed, that new fraternities of knighthood were invented: hence the knights of the Holy Sepulchre, the Hoſpitallers, Templars, and an infinite number of religious orders. Various other orders were at length inſtituted by ſovereign princes: the Garter, by Edward III. of England; the Golden Fleece, by Philip the Good, duke of Burgundy; and St. Michael, by Louis XI. of France. From this time ancient chivalry declined to an empty name; when ſovereign princes eſtabliſhed regular companies in their armies, knights-bannerets were no more, though it was ſtill thought an honour to be dubbed by a great prince or victorious hero; and all who profeſſed arms without knighthood aſſumed the title of *eſquire*.

There is ſcarce a prince in Europe that has not thought fit to inſtitute an order of knighthood; and the ſimple title of *knight*, which the kings of Britain confer on private ſubjects, is a derivation from ancient chivalry, although very remote from its ſource. See *Knight* Bachelor.

Knight-*Service (ſervitium militare*, and in law-French *chivalry)*; a ſpecies of Tenure, the origin and nature of which are explained under the articles Chivalry, and Feodal *Syſtem*. The knights produced by this tenure differed moſt eſſentially from the knights deſcribed in the preceding article; though the difference ſeems not to have been accurately attended to by authors. The one claſs of knights was of a high antiquity; the other was not heard of till the invention of a fee. The adorning with arms and the blow of the ſword made the act of the creation of the ancient knight; the new knight was conſtituted by an inveſtment in a piece of land. The former was the member of an order of dignity which had particular privileges and diſtinctions; the latter was the receiver of a feudal grant. Knighthood was an honour; knight-ſervice a tenure. The firſt communicated ſplendor to an army; the laſt gave it ſtrength and numbers. The knight of honour might ſerve in any ſtation whatever; the knight of tenure was in the rank of a ſoldier.—It is true at the ſame time, that every noble and baron were knights of tenure, as they held their lands by knight-ſervice. But the number of fees they poſſeſſed, and their creation into rank, ſeparated them widely from the ſimple individuals to whom they gave out grants of their lands, and who were merely the knights of tenure. It is no leſs true, that the ſovereign, without conferring nobility, might give even a ſingle fee to a tenant; and ſuch vaſſals *in capite* of the crown, as well as the vaſſals of ſingle fees from a ſubject, were the mere knights of tenure. But the former, in reſpect of their holding from the crown, were to be called to take upon themſelves the knighthood of honour; a condition in which they might riſe from the ranks, and be promoted to offices and command. And as to the vaſſals *in capite* of the crown who had many fees, their wealth of itſelf ſufficiently diſtinguiſhed them beyond the ſtate of the mere knights of tenure. In fact, they poſſeſſed an authority over men who were of this laſt deſcription; for, in proportion to their lands were the fees they gave out and the knights they commanded.

By the tenure of knight-ſervice, Judge Blackſtone obſerves, the greateſt part of the lands in England were holden, and that principally of the king *in capite*, till the middle of the laſt century; and which was created, as Sir Edward Coke expreſsly teſtifies, for a military purpoſe, viz. for the defence of the realm by the king's own principal ſubjects, which was judged to be much better than to truſt to hirelings or foreigners. The deſcription here given is that of knight-ſervice proper, which was to attend the king in his wars. There were alſo ſome other ſpecies of knight-ſervice; ſo called, though improperly, becauſe the ſervice or render was of a free and honourable nature, and equally uncertain as to the time of rendering as that of knight-ſervice proper, and becauſe they were attended with ſimilar fruits and conſequences. Such was the tenure by *grand ſerjeanty*, *per magnum ſervitium*, whereby the tenant was bound, inſtead of ſerving the king *generally* in his wars, to do ſome ſpecial honorary ſervice to the king in perſon; as to carry his banner, his ſword, or the like; or be his butler, champion, or other officer, at his coronation. It was, in moſt other reſpects, like knight-ſervice, only he was not bound to pay aid or eſcuage; and when tenant by knight-ſervice paid five pounds for a relief on every knight's fee, tenant by grand-ſerjeanty paid one year's value of his land, were it much or little. Tenure by *cornage*, which was to wind a horn when the Scots or other enemies entered the land, in order to warn the king's ſubjects, was (like other ſervices of the ſame nature) a ſpecies of grand-ſerjeanty.

Theſe ſervices, both of chivalry and grand-ſerjeanty, were all perſonal, and uncertain as to their quantity or duration. But the perſonal attendance in knight-ſervice growing troubleſome and inconvenient in many reſpects, the tenants found means of compounding for it, by firſt ſending others in their ſtead, and in proceſs of time making a pecuniary ſatisfaction to the lords in lieu of it. This pecuniary ſatisfaction at laſt came to be levied by aſſeſſments, at ſo much for every knight's fee; and therefore this kind of tenure was called *ſcutagium* in Latin, or *ſervitium ſcuti*; *ſcutum* being then a well-known denomination of money: and in like manner it was called, in our Norman French, *eſcuage*; being indeed a pecuniary inſtead of a military ſervice. The firſt time this appears to have been taken was in the 5 Hen. II. on account of his expedition to Toulouſe; but it ſoon came to be ſo univerſal, that perſonal attendance fell quite into diſuſe. Hence we find in our ancient hiſtories, that, from this period, when our kings went to war, they levied ſcutages on their tenants, that is, on all the land-holders of the kingdom, to defray their expences and to hire troops: and theſe aſſeſſments in the time of Henry II. ſeem to have been made arbitrarily, and at the king's pleaſure. Which prerogative being greatly abuſed by his ſucceſſors, it became matter of national clamour; and king John was obliged to conſent, by his *magna charta*, that no ſcutage ſhould be impoſed without conſent of parliament. But this clauſe was omitted in his ſon Henry III.'s charter; where we only find, that ſcutages or eſcuage ſhould be taken as they were uſed to be taken in the time of Henry II.; that is, in a reaſonable and moderate manner. Yet afterwards, by ſtatute 25 Edw. I. c. 5. & 6. and many ſubſequent ſtatutes, it was enacted, that the king ſhould take no aids or taſks but by the common aſſent of the realm. Hence it is held in our old books, that eſcuage or ſcutage could not be levied but by conſent of parliament; ſuch ſcutages being indeed the ground-work of all ſucceeding ſubſidies, and the land-tax of later times.

Since, therefore, eſcuage differed from knight-ſervice in nothing but as a compenſation differs from actual ſervice, knight ſervice is frequently confounded with it. And thus Littleton muſt be underſtood, when he tells us, that tenant by homage, fealty, and eſcuage, was tenant by knight-ſervice: that is, that this tenure (being ſubſervient to the military policy of the nation) was reſpected as a tenure in chivalry. But as the actual ſervice was uncertain, and depended upon emergencies, ſo it was neceſſary that this pecuniary compenſation ſhould be equally uncertain, and depend on the aſſeſſments of the legiſlature ſuited to thoſe emergencies. For had the eſcuage been a ſettled invariable ſum, payable at certain times, it had been neither more nor leſs than a mere pecuniary rent; and the tenure, inſtead of knight-ſervice, would have then been of another kind, called Socage.

By the degenerating of knight-ſervice, or perſonal military duty, into eſcuage or pecuniary aſſeſſments, all the advantages (either promiſed or real) of the feodal conſtitutions were de-

ſtroyed, and nothing but the hardſhips remained. Inſtead of forming a national militia compoſed of barons, knights, and gentlemen, bound by their intereſt, their honour, and their oaths, to defend their king and country, the whole of this ſyſtem of tenures now tended to nothing elſe but a wretched means of raiſing money to pay an army of occaſional mercenaries. In the mean time the families of all our nobility and gentry groaned under the intolerable burthens which (in conſequence of the fiction adopted after the conqueſt) were introduced and laid upon them by the ſubtlety and fineſſe of the Norman lawyers. For, beſides the ſcutages to which they were liable in defect of perſonal attendance, which, however, were aſſeſſed by themſelves in parliament, they might be called upon by the king or lord paramount for *aids*, whenever his eldeſt ſon was to be knighted, or his eldeſt daughter married; not to forget the ranſom of his own perſon. The heir, on the death of his anceſtor, if of full age, was plundered of the firſt emoluments ariſing from his inheritance, by way of *relief* and *primer ſeiſin*; and if under age, of the whole of his eſtate during infancy. And then, as Sir Thomas Smith very feelingly complains, "when he came to his own, after he was out of *wardſhip*, his woods decayed, houſes fallen down, ſtock waſted and gone, lands let forth and ploughed to be barren," to make amends, he was yet to pay half a year's profits as a fine for ſuing out his *livery*; and alſo the price or value of his *marriage*, if he refuſed ſuch wife as his lord and guardian had bartered for, and impoſed upon him; or twice that value, if he married another woman. Add to this, the untimely and expenſive honour of *knighthood*, to make his poverty more completely ſplendid. And when, by theſe deductions, his fortune was ſo ſhattered and ruined, that perhaps he was obliged to ſell his patrimony, he had not even that poor privilege allowed him, without paying an exorbitant fine for a *licence* of *alienation*.

A ſlavery ſo complicated and ſo extenſive as this, called aloud for a remedy in a nation that boaſted of her freedom. Palliatives were from time to time applied by ſucceſſive acts of parliament, which aſſuaged ſome temporary grievances. Till at length the humanity of king James I. conſented, for a proper equivalent, to aboliſh them all, though the plan then proceeded not to effect; in like manner as he had formed a ſcheme, and began to put it in execution, for removing the feodal-grievance of heritable juriſdictions in Scotland, which has ſince been purſued and effected by the ſtatute 20 Geo. II. c. 43. King James's plan for exchanging our military tenures ſeems to have been nearly the ſame as that which has been ſince purſued; only with this difference, that by way of compenſation for the loſs which the crown and other lords would ſuſtain, an annual fee-farm rent ſhould be ſettled and inſeparably annexed to the crown, and aſſured to the inferior lords, payable out of every knight's fee within their reſpective ſeignories. An expedient, ſeemingly much better than the hereditary exciſe which was afterwards made the principal equivalent for theſe conceſſions. For at length the military tenures, with all their heavy appendages, were deſtroyed at one blow by the ſtatute 12 Car. II. c. 24. which enacts, "that the court of ward or liveries, and all wardſhips, liveries, primer ſeiſins, and ouſterlemains, values and forfeitures of marriages, by reaſon of any tenure of the king or others, be totally taken away. And that all fines for alienations, tenures by homage, knights-ſervice, and eſcuage, and alſo aids for marrying the daughter or knighting the ſon, and all tenures of the king *in capite*, be likewiſe taken away. And that all ſorts of tenures, held of the king or others, be turned into free and common ſocage; ſave only tenures in frankalmoign, copyholds, and the honorary ſervices (without the ſlaviſh part) of grand-ſerjeanty." A ſtatute which was a greater acquiſition to the civil property of this kingdom than even *magna charta* itſelf: ſince that only pruned the luxuriances that had grown out of the military tenures, and thereby preſerved them in vigour; but the ſtatute of king Charles extirpated the whole, and demoliſhed both root and branches.

KNIGHTS *Errant*. During the prevalence of chivalry, the ardour of redreſſing wrongs ſeized many knights ſo powerfully, that, attended by eſquires, they wandered about in ſearch of objects whoſe misfortunes and miſery required their aſſiſtance and ſuccour. And as ladies engaged more particularly their attention, the relief of unfortunate damſels was the achievement they moſt courted. This was the riſe of knights-errant, whoſe adventures produced romance. Theſe were originally told as they happened. But the love of the marvellous came to interfere; fancy was indulged in her wildeſt exaggerations; and poetry gave her charms to the moſt monſtrous fictions, and to ſcenes the moſt unnatural and gigantic. See KNIGHT.

KNIGHT-*Bachelor*. See BACHELOR.

KNIGHT-*Baronet*. See BARONET.

KNIGHTS *of the Shire*, or *Knights of Parliament*, are two gentlemen of worth, choſen on the king's writ in *comitatu*, by ſuch of the freeholders of every county as can expend 40*s*. *per annum*, to repreſent ſuch county in parliament. Theſe, when every man who held a knight's fee *in capite* of the crown was cuſtomarily conſtrained to be a knight, were of neceſſity to be *milites gladio cincti*, for ſo the writ runs to this day; but now cuſtom admits eſquires to be choſen to this office. They muſt have at leaſt 500*l*. *per annum*; and their expences are to be defrayed by the county, though this be ſeldom now required.

KNIGHT-*Marſhal*, an officer in the king's houſehold, who has juriſdiction and cognizance of any tranſgreſſion within the king's houſehold and verge; as alſo of contracts made there, whereof one of the houſe is party.

KNIGHTS, in a ſhip, two ſhort thick pieces of wood, commonly carved like a man's head having four ſhivers in each, three for the halyards, and one for the top to run in: one of them ſtands faſt bolted on the beams abaft the fore maſt, and is therefore called the *fore knight*; and the other, ſtanding abaft the main-maſt, is called the *main-knight*.

KNIGHTHOOD a military order or honour, or a mark or degree of ancient nobility, or reward of perſonal virtue and merit. There are four kinds of knighthood; military, regular, honorary, and ſocial.

Military KNIGHTHOOD, is that of the ancient knights, who acquired it by high feats of arms. They are called *milites* in ancient charters and titles, by which they were diſtinguiſhed from mere bachelors, &c. Theſe knights were girt with a ſword, and a pair of gilt ſpurs; whence they were called *equites aurati*. Knighthood is not hereditary, but acquired. It does not come into the world with a man like nobility; nor can it be revoked. The ſons of kings, and kings themſelves, with all other ſovereigns, heretofore had knighthood conferred on them as a mark of honour. They were uſually knighted at their baptiſm or marriage, at their coronation, before or after a battle, &c.

Regular KNIGHTHOOD, is applied to all military orders which profeſs to wear ſome particular habit, to bear arms againſt the infidels, to ſuccour and aſſiſt pilgrims in their paſſage to the Holy Land, and to ſerve in hoſpitals where they ſhould be received; ſuch were the knights-templars, and ſuch ſtill are the knights of Malta, &c.

Honorary KNIGHTHOOD, is that which princes confer on other princes, and even on their own great miniſters and favourites; ſuch are knights of the Garter, Bath, St. Patrick, Nova Scotia, Thiſtle, &c. See theſe articles; and for a repreſentation of their different inſignia, ſee plate 7. Vol. IV.

Social KNIGHTHOOD, is that which is not fixed nor confirmed by any formal inſtitution, nor regulated by any laſting

ſtatutes; of which kind there have many orders been erected on occaſion of factions, of tilts and tournaments, maſquerades, and the like.

The abbot Bernardo Juſtiniani, at the beginning of his Hiſtory of Knighthood, gives us a complete catalogue of the ſeveral orders: according to this computation, they are in number 92. Favin has given us two volumes of them, under the title of *Theatre d'Honneur & de Chevalerie*. Menenius has publiſhed *Deliciæ Equeſtrium Ordinum*, and Andr. Mendo has written *De Ordinibus Militaribus*. Beloi has traced their original; and Geliot, in his Armorial Index, has given us their inſtitutions. To theſe may be added, Father Meneſtrier *de la Chevalerie Ancienne & Moderne*, Michieli's *Treſor Militaire*, Caramuel's *Theologia Regolare*, Miræus's *Origines Equeſtrium ſive Militarium Ordinum*: but above all Juſtinian's *Hiſtorie Chronologiche dell' Origine de gl'Ordine Militari, e di tutte le Religione Convalerc che*: the edition which is fulleſt is that of Venice in 1692, in two vols. fol.

KNIGHTLOW Hill, or Cross, which gives name to a hamlet in Warwickſhire, ſtands in the road from Coventry to London, at the entrance of Dunſmore-Heath. About 40 towns in this hamlet, which are ſpecified by Dugdale, are obliged, on the forfeiture of 30s. and a white bull, to pay a certain rent to the lord of the hamlet, called *wroth-money*, or *ſwarf-penny*; which muſt be depoſited every Martinmas-day in the morning at this croſs before ſun-riſe; when the party paying it muſt go thrice about the croſs, and ſay the wroth-money, and then lay it in the hole of the ſaid croſs before good witneſs.

KNIGHTON, a well built town of Radnorſhire in South Wales, 155 miles from London. It is pleaſantly ſituated on an elevation riſing from a ſmall river, which divided this part of Wales from Shropſhire. It carries on a conſiderable trade, and has a market and a fair.

KNIGHTSBRIDGE, a village of Middleſex, and the firſt village from London in the great weſtern road. It lies in the pariſhes of St. Margaret's Weſtminſter, and St. George by Hanover-ſquare; and has a chapel, which is nevertheleſs independent. At the entrance of it from London ſtands that noble infirmary for ſick and wounded, called *St. George's Hoſpital*, erected and maintained by the contributions of our nobility and gentry, of whom there are no leſs than 300 governors. In the centre of this village there is a fabric lately erected, where is carried on one of the moſt conſiderable manufactures in England for painting floor-cloths, &c.

KNOCTOPHER, a borough and market town of Ireland in the county of Kilkenny and province of Leinſter, 63 miles from Dublin. It returns two members to parliament; patronage in the families of Langriſhe and Ponſonby.

KNOLL, a term uſed in many parts of the kingdom for the top of a ſmall hill, or for the hill itſelf.

KNOLLES (Richard), was born in Northamptonſhire, about the middle of the 16th century, and educated at Oxford, after which he was appointed maſter of the free-ſchool at Sandwich in Kent. He compoſed *Grammaticæ Latinæ, Græcæ, et Hebraicæ, compendium, cum radicibus*, London 1606; and ſent a great number of well-grounded ſcholars to the univerſities. He alſo ſpent 12 years in compiling a hiſtory of the Turks; which was firſt printed in 1610, and by which he has perpetuated his name. In the later editions it is called, *The general hiſtory of the Turks, from the firſt beginning of that nation to the riſing of the Ottoman family*, &c. He died in 1610, and this hiſtory has been ſince continued by ſeveral hands: the beſt continuation is that by Paul Ricaut conſul at Smyrna, folio, London 1680. Knolles wrote alſo, "The lives and conqueſts of the Ottoman kings and emperors to the year 1610;" which was not printed till after his death in 1621, to which time it was continued by another hand; and laſtly, "A brief diſcourſe of the greatneſs of the Turkiſh empire, and wherein the greatneſs of the ſtrength thereof conſiſteth, &c."

KNOT, a part of a tree, from which ſhoot out branches, roots, or even fruit. The uſe of the knots is, to ſtrengthen the ſtem; they ſerve alſo as ſearces, to filtrate, purify, and refine the juices raiſed up for the nouriſhment of the plant.

Knot *of a rope*, a tye, or complication of a rope, cord or ſtring, or of the ends of two together. There are divers ſorts of knots uſed for different purpoſes, which may be explained by ſhewing the figures of them open, or undrawn, thus. 1. Fig. 1, plate 2, is a *Thumb knot*. This is the ſimpleſt of all. It is uſed to tye at the end of a rope, to prevent its opening out: it is alſo uſed by taylors, &c. at the end of their thread. Fig. 2, a *Loop knot*. Uſed to join pieces of rope, &c. together. Fig. 3, a *Draw knot*, which is the ſame as the laſt; only one end or both return the ſame way back, as *a b c d*. By drawing at *a*, the part *b c d* comes through, and the knot is looſed. Fig. 4, a *Ring knot*. This ſerves alſo to join pieces of cord, &c. together. Fig. 5, is another knot for tying cords together. This is uſed when any cord is often to be looſed. Fig 6, a *Running knot*, to draw any thing cloſe. By pulling at the end *a*, the cord is drawn through the loop *b*, and the part *c d* is drawn cloſe about a beam; &c. Fig. 7, is another knot, to tye any thing to a poſt. And here the end may be put through as often as you pleaſe. Fig. 8, a *Very ſmall knot*. A thumb knot is firſt made at the end of each piece, and then the end of the other is paſſed through it. Thus the cord *a c* runs through the loop *d*, and *b d* through *c*; and then drawn cloſe by pulling at *a* and *b*. If the ends *e* and *f* be drawn, the knot will be looſed again. Fig. 9, a *Fiſher's knot*, or *Water knot*. This is the ſame as the 4th, only the ends are to be put twice through the ring, which in the former was but once; and then drawn cloſe. Fig. 10, a *Meſhing knot*, for nets; and is to be drawn cloſe. Fig. 11, a *Barber's knot*, or a knot for cawls of wigs; and is to be drawn cloſe. Fig. 12, a *Bowline knot*. When this is drawn cloſe, it makes a loop that will not ſlip, as fig. 7; and ſerves to hitch over any thing. Fig. 13, a *Wale knot*, which is made with the three ſtrands of a rope, ſo that it cannot ſlip. When the rope is put through a hole, this knot keeps it from ſlipping through. When the three ſtrands are wrought round once or twice more, after the ſame manner, it is called *crowning*. By this means the knot is made larger and ſtronger. A thumb knot, fig. 1, may be applied to the ſame uſe as this.

Knots *of the log-line*, at ſea. See the article Log.

Knot, in ornithology. See Tringa.

Knot-*graſs*, or *Biſtort*. See Polygonum.

Knot (Edward), born in the county of Northumberland, entered among the Jeſuits at the age of 26, being already in prieſt's orders. This happened in the year 1606. He taught a long time at Rome in the Engliſh college; and was afterwards appointed ſub-provincial of the college of England, and was ſent provincial thither. He was twice honoured with that employment. He was preſent as provincial at the general aſſembly of the order of the Jeſuits held at Rome in 1646, and was choſen definitor. He died in 1696. He publiſhed ſeveral pieces; among the reſt, Mercy and Truth, or Charity maintained by the Catholics; againſt Dr. Potter, who had charged the church of Rome with wanting charity, becauſe ſhe aſſerts that a man cannot be ſaved in the Proteſtant communion.

KNOTTESFORD, a town of Cheſhire, near the Merſey, 184 miles from London, is divided into the upper and lower towns by a rivulet called *Bicken*. In the former is the church; and in the latter is a chapel of eaſe, the market and town-houſe. It has a market and three fairs.

KNOTTINGLEY, a town in the weſt riding of Yorkſhire, on the Aire near Ferrybridge, is noted for its merchandize in

lime. The ſtones of which it is made are dug up plentifully at Elmet, and here burnt; from whence it is conveyed at certain ſeaſons in great quantities to Wakefield, Sandal, and Standbridge, for ſale, and ſo carried into the weſtern parts of the county for manure.

KNOUT, the name of a puniſhment inflicted in Ruſſia, with a kind of whip called *knout*, and made of a long ſtrap of leather prepared for this purpoſe. With this whip the executioners dexterouſly carry off a ſlip of ſkin from the neck to the bottom of the back laid bare to the waiſt, and, repeating their blows, in a little while rend away all the ſkin off the back in parallel ſtrips. In the common knout the criminal receives the laſhes ſuſpended on the back of one of the executioners: but in the great knout, which is generally uſed on the ſame occaſions as racking on the wheel in France, the criminal is raiſed into the air by means of a pully fixed to the gallows, and a cord faſtened to the two wriſts tied together; a piece of wood is placed between his two legs alſo tied together; and another of a crucial form under his breaſt. Sometimes his hands are tied behind over his back; and when he is pulled up in this poſition, his ſhoulders are diſlocated. The executioners can make this puniſhment more or leſs cruel; and it is ſaid are ſo dexterous, that when a criminal is condemned to die, they can make him expire at pleaſure either by one or ſeveral laſhes.

KNOWLEDGE, is defined by Mr. Locke to be the perception of the connection and agreement or diſagreement and repugnancy of our ideas. See METAPHYSICS and LOGIC.

KNOX (JOHN), the hero of the reformation in Scotland, was born in 1505, at Gifford near Haddington in Eaſt Lothian; and educated at the univerſity of St. Andrew's, where he took a degree in arts, and commenced teacher very early in life. At this time the new religion of Martin Luther was but little known in Scotland; Mr. Knox therefore at firſt was a zealous Roman-catholic: but attending the ſermons of a certain black friar, named *Guialliam*, he began to waver in his opinions; and afterwards converſing with the famous Wiſhart, who in 1544 came to Scotland with the commiſſioners ſent by Henry VIII. he renounced the Romiſh religion, and became a zealous reformer. Being appointed tutor to the ſons of the lairds of Ormiſtoun and Langniddery, he began to inſtruct them in the principles of the Proteſtant religion; and on that account was ſo violently perſecuted by the biſhop of St. Andrew's, that with his two pupils he was obliged in the year 1547 to take ſhelter in the caſtle of that place. But the caſtle was beſieged and taken by 21 French galleys. He continued a priſoner on board a galley two years, namely, till the latter end of the year 1549; when being ſet at liberty, he landed in England, and, having obtained a licence, was appointed preacher, firſt at Berwick, and afterwards at Newcaſtle. Strype conjectures that in 1552 he was appointed chaplain to Edward VI. He certainly obtained an annual penſion of 40 l. and was offered the living of All-hallows in London; which he refuſed, not chooſing to conform to the liturgy.

Soon after the acceſſion of queen Mary, he retired to Geneva; whence, at the command of John Calvin, he removed to Francfort, where he preached to the exiles: but a difference ariſing on account of his refuſing to read the Engliſh liturgy, he went back to Geneva; and from thence in 1555 returned to Scotland, where the reformation had made conſiderable progreſs during his abſence. He now travelled from place to place, preaching and exhorting the people with unremitting zeal and reſolution. About this time (1556), he wrote a letter to the queen-regent, earneſtly entreating her to hear the Proteſtant doctrine; which letter ſhe treated with contempt. In the ſame year the Engliſh Calviniſts at Geneva invited Mr. Knox to reſide among them. He accepted their invitation. Immediately after his departure from Scotland, the biſhop ſummoned him to appear, and, he not appearing, condemned him to death for hereſy, and burnt his effigy at the croſs of Edinburgh.

Our reformer continued abroad till the year 1559, during which time he publiſhed his "Firſt blaſt againſt the monſtrous regiment of women." Being now returned to Scotland, he reſumed the great work of reformation with his uſual ardour, and was appointed miniſter at Edinburgh. In 1561 queen Mary arrived from France. She, it is well known, was bigoted to the religion in which ſhe had been educated; and on that account was expoſed to continual inſults from her reformed ſubjects. Mr. Knox himſelf frequently inſulted her from the pulpit; and when admitted to her preſence, regardleſs of her ſex, her beauty, and her high rank, behaved to her with a moſt unjuſtifiable freedom. In the year 1571 our reformer was obliged to leave Edinburgh, on account of the confuſion and danger from the oppoſition to the earl of Lenox, then regent; but he returned the following year, and reſumed his paſtoral functions. He died at Edinburgh in November 1572, and was buried in the church-yard of St. Giles's in that city.—His Hiſtory of the Reformation was printed with his other works at Edinburgh in 1584, 1586, 1644, 1732. He publiſhed many other pieces; and ſeveral more are preſerved in Calderwood's Hiſtory of the Church of Scotland. He left alſo a conſiderable number of manuſcripts, which in 1732 were in the poſſeſſion of Mr. Woodrow, miniſter of Eaſtwood.

As to his character, it is eaſily underſtood, notwithſtanding the extreme diſſimilitude of the two portraits drawn by Popiſh and Calviniſtical pencils. According to the firſt, he was a devil; in the ideas of the latter, an angel. He was certainly neither. The following character is drawn by Dr. Robertſon: "Zeal, intrepidity, diſintereſtedneſs, were virtues that he poſſeſſed in an eminent degree. He was acquainted too with the learning cultivated in that age; and excelled in that ſpecies of eloquence which is calculated to rouſe and to inflame. His maxims, however, were often too ſevere, and the impetuoſity of his temper exceſſive. Rigid and uncomplying, he ſhowed no indulgence to the infirmities of others. Regardleſs of the diſtinctions of rank and character, he uttered his admonitions with an acrimony and vehemence more apt to irritate than to reclaim; and this often betrayed him into indecent expreſſions, with reſpect to queen Mary's perſon and conduct. Thoſe very qualities, however, which now render his character leſs amiable, fitted him to be the inſtrument of Providence for advancing the reformation among a fierce people, and enabled him to face dangers, and to ſurmount oppoſition, from which a perſon of a more gentle ſpirit would have been apt to ſhrink back. By an unwearied application to ſtudy and to buſineſs, as well as by the frequency and fervour of his public diſcourſes, he had worn out a conſtitution naturally ſtrong. During a lingering illneſs, he diſcovered the utmoſt fortitude: and met the approach of death with a magnanimity inſeparable from his character. He was conſtantly employed in acts of devotion, and comforted himſelf with thoſe proſpects of immortality, which not only preſerve good men from deſponding, but fill them with exultation in their laſt moments. The earl of Morton, who was preſent at his funeral, pronounced his eulogium in a few words, the more honourable for Knox, as they came from one whom he had often cenſured with peculiar ſeverity; "Here lies he who never feared the face of man."

KNOXIA, in botany: a genus of the monogynia order, belonging to the tetrandria claſs of plants; and in the natural method ranking under the 47th order, *Stellatæ*. The corolla is monopetalous, and funnel-ſhaped; there are two furrowed ſeeds; the calyx has one leaf larger than the reſt.

KNUTZEN (MATTHIAS), a native of Holſtein, the only

perſon on record who openly profeſſed and taught atheiſm. It is ſaid he had about 1000 diſciples in different parts of Germany. They were called *Conſcienciaries*, becauſe they aſſerted there is no other God, no other religion, no other lawful magiſtracy, but conſcience, which teaches every man the three fundamental principles of the law of nature:—To hurt nobody, to live honeſtly, and to give every one his due. Several copies of a letter of his from Rome were ſpread abroad, containing the ſubſtance of his ſyſtem. It is to be found entire in the laſt edition of Micrælius.

KOEDOE. See CAPRA.

KOEI-TCHEOU, a province of China, and one of the ſmalleſt in the kingdom. On the ſouth it has Quang-ſi, on the eaſt Hou-quang, on the north Se-tchuen, and Yun-nan on the weſt. The whole country is almoſt a deſert, and covered with inacceſſible mountains: it may juſtly be called the *Siberia* of China. The people who inhabit it are mountaineers, accuſtomed to independence, and who ſeem to form a ſeparate nation: they are no leſs ferocious than the ſavage animals among which they live.—The mandarins and governors who are ſent to this province are ſometimes diſgraced noblemen, whom the emperor does not think proper to diſcard entirely, either on account of their alliances, or the ſervices which they have rendered to the ſtate: numerous garriſons are entruſted to their charge, to over-awe the inhabitants of the country; but theſe troops are found inſufficient, and the court deſpairs of being ever able thoroughly to ſubdue theſe untractable mountaineers.—Frequent attempts have been made to reduce them to obedience, and new forts have from time to time been erected in their country; but the people, who are not ignorant of thoſe deſigns, keep themſelves ſhut up among their mountains, and ſeldom iſſue forth but to deſtroy the Chineſe works or ravage their lands.—Neither ſilk-ſtuffs nor cotton-cloths are manufactured in this province; but it produces a certain herb much reſembling our hemp, the cloth made of which is uſed for ſummer dreſſes. Mines of gold, ſilver, quickſilver, and copper, are found here; of the laſt metal, thoſe ſmall pieces of money are made which are in common circulation throughout the empire.—Koei-tcheou contains 10 cities of the firſt claſs, and 38 of the ſecond and third.

KOEMPFER (ENGELBERT), was born in 1651 at Lemgow in Weſtphalia. After ſtudying in ſeveral towns, he went to Dantzick, where he gave the firſt public ſpecimen of his proficiency by a diſſertation *De majeſtatis diviſione*. He then went to Thorn; and from thence to the univerſity of Cracow, where he took his degree of doctor in philoſophy; after which he went to Koningſberg in Pruſſia, and ſtaid there four years. He next travelled into Sweden, where he ſoon began to make a figure, and was appointed ſecretary of the embaſſy to the ſophi of Perſia. He ſet out from Stockholm with the preſents for that emperor; and went through Aaland, Finland, and Ingermanland, to Narva, where he met M. Fabricius the ambaſſador, who had been ordered to take Moſcow in his way. The ambaſſador having ended his negotiations at the Ruſſian court, ſet out for Perſia. During their ſtay, two years, at Iſpahan, Dr. Kœmpfer, whoſe curious and inquiſitive diſpoſition ſuffered nothing to eſcape him unobſerved, made all the advantages poſſible of ſo long an abode in the capital of the Perſian empire. The ambaſſador, towards the cloſe of 1685, preparing to return into Europe, Dr. Kœmpfer choſe rather to enter into the ſervice of the Dutch Eaſt India company, in quality of chief ſurgeon to the fleet, then cruiſing in the Perſian Gulph. He went aboard the fleet, which, after touching at many Dutch ſettlements, came to Batavia in September 1689. Dr. Kœmpfer here applied himſelf chiefly to natural hiſtory. Hence he ſet out for Japan, in quality of phyſician to the embaſſy which the Dutch Eaſt India company ſends once a year to the Japaneſe court. He quitted Japan to return to Europe in 1692. In 1694 he took his degree of doctor of phyſic at Leyden; on which occaſion he communicated, in what are called *Inaugural Theſes*, ten very ſingular and curious obſervations made by him in foreign countries. He intended to digeſt his memoirs into proper order; but was prevented, by being made phyſician to the count de Lippe. He died in 1716. His principal works are, 1. *Amœnitates Exoticæ*, in 4to; a work which includes many curious and uſeful particulars in relation to the civil and natural hiſtory of the countries through which he paſſed. 2. *Herbarium Ultra-Gangeticum*. 3. The hiſtory of Japan, in German, which is very curious and much eſteemed; and for which the public is indebted to the late Sir Hans Sloane, who purchaſed for a conſiderable ſum of money all our author's curioſities, both natural and artificial, as likewiſe all his drawings and manuſcript memoirs, and prevailed with the late learned Dr. Scheuchzer to tranſlate the Japaneſe hiſtory into Engliſh.

KOENIG (SAMUEL), a learned philoſopher and mathematician, was profeſſor of philoſophy at Franeker, and afterwards at the Hague, where he became librarian to the Stadtholder, and died there in 1757. He wrote ſeveral works which are eſteemed.

KOENIGIA, in botany; a genus of the trigynia order, belonging to the triandria claſs of plants. The calyx is triphyllous; there is no corolla; and but one ovate and naked ſeed.

KONGSBERG, a town of Norway, belonging to Denmark, and celebrated for its ſilver mines, whoſe produce has been conſiderably exaggerated by moſt of the travellers that have publiſhed on this ſubject. The town, which ſtretches on both ſides the river Lowe, contains about 1000 houſes, and including the miners 6000 inhabitants. The mines, which lie about two miles from the town, were firſt diſcovered and worked during the reign of Chriſtian IV.; and of their preſent ſtate the following account is given by Mr. Coxe, in his "*Travels into Poland*," &c. vol. v. There are 36 mines now working; the deepeſt whereof, called *Segen-Gottes in der North*, is 652 feet perpendicular. The matrix of the ore is the ſaxum of Linnæus. The ſilver is extracted according to the uſual proceſs, either by ſmelting the ore with lead or by pounding. The pure ſilver is occaſionally found in ſmall grains and in ſmall pieces of different ſizes, ſeldom weighing more than four or five pounds. Sometimes, indeed, but extremely rare, maſſes of a conſiderable bulk have been diſcovered; and one in particular which weighed 409 marks, and was worth 3000 rix-dollars, or 600l. This piece is ſtill preſerved in the cabinet of curioſities at Copenhagen. Formerly theſe mines produced annually 350,000 rix-dollars, or 70,000l.; and in 1769, even 79,000l.; at preſent they ſeldom yield only from 50,000l. to 54,000l. Formerly above 4000 men were neceſſary for working the mines, ſmelting and preparing the ore; but a few years ago 2400 miners were removed to the cobalt works lately eſtabliſhed at Foſſum and to other mines, and the number is now reduced to 2500. By theſe and other reductions, the expence, which was before eſtimated at 5,760l. *per* month, now amounts to only 4,400l. or about 52, 800l. *per annum*. Yet even with this diminution the expences generally equal, and ſometimes exceed, the profits. Government, therefore, draws no other advantage from theſe mines, than by giving employment to ſo many perſons, who would be otherwiſe incapable of gaining their livelihood, and by receiving a certain quantity of ſpecie, which is much wanted in the preſent exhauſted ſtate of the finances in Denmark. For ſuch is the deficiency of ſpecie, that even at Kongſberg itſelf change for a bank note is with difficulty obtained. The miners are paid in ſmall bank notes, and the whole expences are defrayed in paper currency. The value of 13,000 rix-dollars, or 2,600l. in block ſilver, is annually ſent to Copenhagen; the remainder of the ore is coined in the mint of Kongſberg, and

ransferred to Copenhagen. The largeſt piece of money now ſtruck at Kongſberg is only eight ſkillings or four pence.

KONIG (George Matthias), a learned German, born at Altorf in Franconia in 1616. He became profeſſor of poetry and of the Greek tongue there, and librarian to the univerſity; in which laſt office he ſucceeded his father. He gave ſeveral public ſpecimens of his learning; but is principally known for a Biographical Dictionary, intitled, *Bibliotheca vetus et nova*, 4to, Altorf, 1674: which, though it is very defective, is uſeful to biographers. He died in 1699.

Konig (Emanuel), a learned phyſician of Baſil, born in that city in 1658, whoſe medicinal works were ſo eſteemed in Switzerland, that he was conſidered as a ſecond Avicenna. He died at Baſil in 1731.

KONINGSBERG, a town of Poland, and capital of Regal Pruſſia, with a magnificent palace, in which is a hall 274 feet long and 59 broad without pillars to ſupport it, and a handſome library. It is about five miles in circumference; and including the garriſon of 7000 men contains 60,000 inhabitants. The town-houſe, the exchange, and the cathedral church, are all very fine ſtructures. The tower of the caſtle is exceeding high; and has 284 ſteps to go to the top, from whence there is a very diſtant proſpect. There are 18 churches in all; of which 14 belong to the Lutherans, three to the Calviniſts, and one to the Papiſts. It ſtands on the Pregel, a navigable river which flows from the north-weſtern provinces of Poland, and here falls into the eaſtern extremity of the Friſche Haf, an inlet of the Baltic. No ſhips drawing more than ſeven feet water can paſs the bar and come up to the town; ſo that the large veſſels anchor at Pillau, a ſmall town on the Baltic, which is the port of Koningſberg; and the merchandiſe is ſent in ſmaller veſſels to this place. Its trade is very conſiderable.—Koningſberg contains an univerſity founded by Albert of Brandenburgh. According to the original endowment there were 40 profeſſors; but their number is now reduced to 16. Each profeſſor receives a ſalary of about 50l. *per annum*, which may be increaſed by private lectures. In 1775, the univerſity contained 800 ſtudents, of whom 200 are lodged and boarded at the expence of the crown. There are three public libraries in the town, the royal or univerſity library, the town library, and the *Wallenrodt library*, ſo called becauſe it was given by Martien von Wallenrodt, in 1650. E. lon. 21. 35. N. lat. 54. 43.

KORAN, or Alcoran. See Alcoran and Mahometanism.

KOREKI, the country of the Koriacs. See the next article.

KORIACS, a people inhabiting the northern part of Kamtchatka, and all the coaſt of the Eaſtern Ocean from thence to the Anadir.—They are divided into the Rein-deer or Wandering Koriacs, and the Fixed Koriacs. The former lead an erratic life, in the tract bounded by the Penſchinſka ſea to the ſouth-eaſt, the river Kowyma to the weſt, and the river Anadir to the north. They wander from place to place with their rein-deer, in ſearch of the moſs, the food of thoſe animals, which are their only wealth. They are ſqualid, cruel, and warlike; the terror of the Fixed Koriacs as much as the Tſchutſki are of them. They never frequent the ſea, nor live on fiſh. Their habitations are jourts, or places half ſunk in the earth; and they never uſe balagans or ſummer-houſes elevated on poſts like the Kamtchatkans. They are in their perſons lean, and very ſhort; have ſmall heads and black hair, which they ſhave frequently: their faces are oval; their noſe is ſhort; their eyes are ſmall; their mouth is large; and their beard black and pointed, but often eradicated.—The Fixed Koriacs are likewiſe ſhort; but rather taller than the others, and ſtrongly made: the Anadir is alſo their boundary to the north, the ocean to the eaſt, and the Kamtchatkans to the ſouth. They have few rein-deer, which they uſe in their ſledges; but neither of the tribes of Koriacs are civilized enough to apply them to the purpoſes of the dairy. Each ſpeak a different dialect of the ſame language: but the Fixed in moſt things reſemble the Kamtchatkans; and, like them, live almoſt entirely on fiſh. They are timid to a high degree, and behave to their wandering brethren with the utmoſt ſubmiſſion; who call them by a name which ſignifies *their ſlaves*. Theſe poor people ſeem to have no alternative; for, by reaſon of the ſcarcity of rein-deer, they depend on theſe tyrants for the eſſential article of clothing.—Theſe two nations Mr. Pennant ſuppoſes, from their features, to be the offſpring of Tartars, which have ſpread to the eaſt, and degenerated in ſize and ſtrength by the rigour of the climate, and often by ſcarcity of food.

KOS, in Jewiſh antiquity, a meaſure of capacity, containing about four cubic inches: this was the cup of bleſſing out of which they drank when they gave thanks after ſolemn meals, like that of the paſſover.

KOTTERUS (Christopher), was one of the three fanatics whoſe viſions were publiſhed at Amſterdam in 1657, with the title of *Lux in tenebris*. He lived at Sprotta in Sileſia, and his viſions began in 1616. He fancied he ſaw an angel under the form of a man, who commanded him to go and declare to the magiſtrates, that, unleſs the people repented, the wrath of God would make dreadful havock. The elector palatine, whom the Proteſtants had declared king of Bohemia, was introduced in theſe viſions. Kotterus waited on him at Breſlaw in December 1620, and informed him of his commiſſion. He went to ſeveral other places, and at laſt to the court of Brandenburg. As moſt of theſe predictions promiſed felicity to the elector palatine, and unhappineſs to his imperial majeſty, the emperor's fiſcal in Sileſia and Luſatia got him ſeized, ſet on the pillory, and baniſhed the emperor's dominions. Upon this he went to Luſatia, and there lived unmoleſted till his death, which happened in 1647.

KOU-CHU, a Chineſe ſhrub, which bears a great reſemblance to the fig-tree both in the make of its branches and the form of its leaves. From its root ſeveral twigs or ſhoots generally ſpring up, which form a kind of buſh; but ſometimes it conſiſts of only one ſhoot. The wood of the branches of the kouchu is ſoft and ſpongy, and covered with bark like that of the fig-tree. Its leaves are deeply indented, and their colour and the texture of their fibres are exactly the ſame as thoſe of the fig-tree; but they are larger and thicker, and much rougher to the touch. This tree yields a kind of milky juice, which the Chineſe uſe for laying on gold-leaf in gilding. They make one or more inciſions in the trunk, into which they inſert the edges of a ſhell, or ſomething elſe of the ſame kind, to receive the ſap. When they have extracted a ſufficiency, they uſe it with a ſmall bruſh, and delineate whatever figures they intend for the decoration of their work. They then lay on the gold-leaf, which is ſo ſtrongly attracted by this liquor, that it never comes off.

KOUANIN, in the Chineſe language, the name of a tutelary deity of women. The Chineſe make great numbers of the figures of this deity in white porcelain, and ſend them to all parts of the world, as well as keep them in their own houſes. The figure repreſents a woman with a child in her arms. The women who have no children pay a ſort of adoration to theſe images, and ſuppoſe the deity they repreſent to have power to make them fruitful. The ſtatue always repreſents a handſome woman very modeſtly attired.

KOUC, or Konck (Peter), an excellent painter in the 16th century, was born at Aloſt, and was the diſciple of Bernard Van Orley, who lived with Raphael. He went to Rome; and, by ſtudying the beautiful pieces which he found there, formed an excellent taſte, and became a very correct deſigner. On his return to his own country, he undertook the office of direct-

ing the execution of ſome tapeſtry-work after the deſigns of Raphael. He was afterwards perſuaded by ſome merchants of Bruſſels to undertake a voyage to Conſtantinople; but when he came there, finding that the Turks were not allowed by their religion to draw any figure, and that there was nothing for him to do but to draw deſigns for tapeſtry, he ſpent his time in deſigning the particular proſpects in the neighbourhood of Conſtantinople, and the manner of the Turks living; of which he has left many wooden cuts, that alone ſuffice to give an idea of his merit. After his return from Conſtantinople he ſettled at Antwerp, where he drew ſeveral pictures for the emperor Charles V. He was alſo a good architect; and, in the latter part of his life, wrote A Treatiſe of Sculpture, Geometry, and Perſpective; and tranſlated Vitruvius and Serliv into the Flemiſh tongue. He died in 1550.

KOULI-KHAN (THAMAS), or *Schah Nadir*, was not the ſon of a ſhepherd, as the authors of the Engliſh Biographical Dictionary aſſert; his father being chief of a branch of the tribe of Affchars, and governor of a fortreſs erected by that people againſt the Turks. Upon his father's death, his uncle uſurped his government, under the pretext of taking care of it during the minority of Kouli-Khan; or, more properly, young Nadir. Diſguſt at this affront made him commence adventurer. He entered into the ſervice of Beglerberg, governor of Muſchada, in the Khoraſan; who, diſcovering in him ſtrong marks of a military genius, promoted him to the command of a regiment of cavalry. In 1720, the Uſbec Tartars having made an irruption into the Khoraſan with 10,000 men, Beglerberg, whoſe whole force conſiſted only of 4000 horſe and 2000 infantry, called a council of war, in which it was declared imprudent to face the enemy with ſuch an inferior force: but Kouli-Khan propoſed to march againſt the enemy, and engaged to conduct the expedition, and to be anſwerable for the ſucceſs of it. He was accordingly made general; defeated the Tartars, and took their commander priſoner. Hoſſein Beglerberg received him at his return with marks of diſtinction; but growing jealous of his riſing fame, inſtead of obtaining him the rank of lieutenant-general of the Khoraſan, as he had promiſed, obtained it for another; which ſo exaſperated Kouli-Khan, that he publicly complained of the governor's ingratitude and perfidy; who thereupon broke him, and ordered him to be puniſhed with the baſtinado ſo ſeverely, that the nails of his great toes fell off. This affront occaſioned his flight, and his joining a banditti of robbers (not his ſtealing his father's or his neighbour's ſheep). The reſt of his adventures are too numerous to be inſerted in this work. In 1729 he was made general of Perſia by Schah Thamas, and permitted to take his name *Thamas*, and that of *Kbuli*, which ſignifies *ſlave*: his title therefore was, *The ſlave of Thamas*; but he was ennobled by the addition of Khan. In 1736, he fomented a revolt againſt his maſter, for having made an ignominious peace with the Turks; and having the army at his command, he procured his depoſition, and his own advancement to the throne. In 1739 he conquered the Mogul empire; and from this time growing as cruel as he was ambitious, he at length met with the uſual fate of tyrants, being aſſaſſinated by one of his generals, in league with his nephew and ſucceſſor, in 1747, aged ſixty.

KOUMISS, a ſort of wine made in Tartary, where it is uſed by the natives as their common beverage during the ſeaſon of it, and often ſerves them inſtead of all other food. It is ſaid to be ſo nouriſhing and ſalutary, that the Baſchkir Tartars, who towards the end of winter are much emaciated, no ſooner return in ſummer to the uſe of koumiſs, than they become ſtrong and fat. The author of "A hiſtorical deſcription of all the nations which compoſe the Ruſſian empire," ſays, ſpeaking of koumiſs, *Elle eſt fort nouriſſante, et peut tenir lieu de tout autre aliment. Les Baſchkirs s'en trouvent très bien, elle les rend bienportans et gais; elle leur donne de l'embonpoint, et de bonnes couleurs.* From the Tartars it has been borrowed by the Ruſſians, who uſe it medicinally. It is made with fermented mare's milk, according to the following recipe communicated by Dr. Grieve in the Edin. Phil. Tranſ. vol. i. p. 181, as he obtained it from a Ruſſian nobleman, who went into that part of Tartary where it is made, for the ſake of uſing it medicinally.

"Take of freſh mare's milk, of one day, any quantity; add to it a ſixth part of water, and pour the mixture into a wooden veſſel; uſe then, as a ferment, an eighth part of the ſoureſt cow's milk that can be got; but at any future preparation, a ſmall portion of old koumiſs will better anſwer the purpoſe of ſouring; cover the veſſel with a thick cloth, and ſet it in a place of moderate warmth; leave it at reſt 24 hours, at the end of which time the milk will have become ſour, and a thick ſubſtance will be gathered on the top; then with a ſtick made at the lower end in the manner of a churn-ſtaff, beat it till the thick ſubſtance above mentioned be blended intimately with the ſubjacent fluid. In this ſituation leave it again at reſt for 24 hours more; after which pour it into a higher and narrower veſſel, reſembling a churn, where the agitation muſt be repeated as before, till the liquor appear to be perfectly homogeneous; and in this ſtate it is called *koumiſs*, of which the taſte ought to be a pleaſant mixture of ſweet and ſour. Agitation muſt be employed every time before it be uſed."—To this detail of the proceſs the nobleman ſubjoined, that in order to obtain milk in ſufficient quantity, the Tartars have a cuſtom of ſeparating the foal from the mare during the day, and allowing it to ſuck during the night: and when the milk is to be taken from the mare, which is generally about five times a day, they always produce the foal, on the ſuppoſition that ſhe yields her milk more copiouſly when it is preſent.

To the above method of making koumiſs, our author has added ſome particulars taken from other communications with which he was favoured by Tartars themſelves. According to the account of a Tartar who lived to the ſouth-eaſt of Orenbourg, the proportion of milk and ſouring ought to be the ſame as above; only, to prevent changing the veſſel, the milk may be put at once into a pretty high and narrow veſſel; and in order to accelerate the fermentation, ſome warm milk may be added to it, and, if neceſſary, more ſouring.—From a Tartar whom the Doctor met with at the fair of Macarieff upon the Volga, and from whom he purchaſed one of the leathern bags which are uſed by the Kalmucks for the preparation and carriage of their koumiſs, he learned that the proceſs may be much ſhortened by heating the milk before the ſouring be added to it, and as ſoon as the parts begin to ſeparate, and a thick ſubſtance to riſe to the top, by agitating it every hour or oftener. In this way he made ſome in the Doctor's preſence in the ſpace of 12 hours. Our author learned alſo, that it was common among ſome Tartars to prepare it in one day during ſummer, and that with only two or three agitations; but that in winter, when, from a deficiency of mare's milk, they are obliged to add a great proportion of that of cows, more agitation and more time are neceſſary; and though it is commonly uſed within a few days after the preparation, yet when well ſecured in cloſe veſſels, and kept in a cold place, that it may be preſerved for three months, or even more, without any injury to its qualities. He was told further, that the acid fermentation might be produced by ſour milk as above, by a ſour paſte of rye-flour, by the rennet of a lamb's ſtomach, or, what is more common, by a portion of old koumiſs; and that in ſome places they ſaved much time, by adding the new milk to a quantity of that already fermented; on being mixed with which it very ſoon undergoes the vinous change.

It was according to the proceſs firſt mentioned, however,

that all the koumiſs which the Doctor employed in medicine was prepared.—It has been found ſerviceable in hectics and in nervous complaints; and our author relates ſome very ſtriking caſes which the uſe of it had completely cured. All thoſe who drank it, our author informs us, agreed in ſaying, that during its uſe they had little appetite for food; that they drank it in very large quantities, not only without diſguſt, but with pleaſure; that it rendered their veins turgid without producing languor; that, on the contrary, they ſoon acquired from it an uncommon degree of ſprightlineſs and vivacity; that even in caſes of ſome exceſs it was not followed by indigeſtion, head-ach, or any of the ſymptoms which uſually attend the abuſe of other fermented liquors.

The utility, however, of this preparation as a medicine, ſuppoſing it completely aſcertained, would among us, as our author obſerves, be greatly circumſcribed by the ſcarcity of mare's milk in this country. "Hence (ſays he) inquiries will naturally be made, whether other ſpecies of milk admit of a ſimilar vinous fermentation, and what proportion of ſpirit they contain. As theſe have never been the object, however, of my attention, I will here give the ſubſtance of what I have been able to learn from others reſpecting that which is the moſt common, the milk of cows.

"Dr. Pallas, in the work above quoted, ſays, that cow's milk is alſo ſuſceptible of the vinous fermentation, and that the Tartars prepare a wine from it in winter, when mare's milk fails them; that the wine prepared from cow's milk they call *airen*; but that they always prefer koumiſs when it can be got, as it is more agreeable, and contains a greater quantity of ſpirit; that koumiſs on diſtillation yields of a weak ſpirit one third, but that airen yields only two ninth parts of its whole quantity, which ſpirit they call *arika*.

"This account is confirmed by Oſeretſkowſky, a Ruſſian, who accompanied Lepechin and other academicians in their travels through Siberla and Tartary. He publiſhed lately a diſſertation on the ardent ſpirit to be obtained from cow's milk.

"From his experiments it appears, that cow's milk may be fermented with, or even without, ſouring, provided ſufficient time and agitation be employed; that no ſpirit could be produced from any one of its conſtituent parts taken ſeparately, nor from any two of them, unleſs inaſmuch as they were mixed with ſome part of the third; that the milk with all its parts in their natural proportion was the moſt productive of it; that the cloſer it was kept, or, which is the ſame thing, the more difficultly the fixed air is allowed to eſcape during the fermentation (care being taken, however, that we do not endanger the burſting of the veſſel), the more ſpirit is obtained. He alſo informs us, that it had a ſourer ſmell before than after agitation; that the quantity of ſpirit was increaſed, by allowing the fermented liquor to repoſe for ſome time before diſtillation; that from ſix pints of milk, fermented in a cloſe veſſel, and thus ſet to repoſe, he obtained three ounces of ardent ſpirit, of which one was conſumed in burning; but that from the ſame quantity of the ſame milk fermented in an open veſſel he could ſcarcely obtain an ounce."

KRAKEN, in zoology, a moſt amazing large ſea animal, ſaid to be ſeemingly of a crab-like form; the credit of whoſe exiſtence reſts upon the evidence produced by biſhop Pontoppidan, in his Natural hiſtory of Norway. As a full grown kraken has never been ſeen in all its parts and dimenſions, an accurate ſurvey of which muſt employ ſome time, and not a little motion, it is impoſſible to give a complete deſcription of one. Nevertheleſs, we ſhall ſubmit the probability of its exiſtence on the beſt information our author could collect, which ſeems to have fixed his own belief of it; though at the ſame time he acknowledges the account is very defective, and ſuppoſes a farther information concerning the creature may be reſerved for poſterity.

Our fiſhermen, ſays the author, unanimouſly and invariably affirm, that when they are ſeveral miles from the land, particularly in the hot ſummer days, and by their diſtance, and the bearings of ſome points of land, expect from eighty to a hundred fathoms depth, and do not find but from twenty to thirty; and more eſpecially if they find a more than uſual plenty of cod and ling, they judge that the kraken is at the bottom; but if they find by their lines that the water in the ſame place ſtill ſhallows on them, they know he is riſing to the ſurface, and row off with the greateſt expedition till they come into the uſual ſoundings of the place; when lying on their oars, in a few minutes the monſter emerges, and ſhows himſelf ſufficiently, though his whole body does not appear. Its back or upper part, which ſeems an Engliſh mile and a half in circumference (ſome have affirmed more), looks at firſt like a number of ſmall iſlands, ſurrounded with ſomething that floats like ſea-weeds; at laſt ſeveral bright points of horns appear, which grow thicker the higher they emerge, and ſometimes ſtand up as high and large as the maſts of middle-ſized veſſels. In a ſhort time it ſlowly ſinks, which is thought as dangerous as its riſing; as it cauſes ſuch a ſwell and whirlpool as draws every thing down with it, like that of Maleſtrom. The biſhop juſtly regrets the omiſſion of probably the only opportunity that ever has or may be preſented, of ſurveying it alive, or ſeeing it entire when dead. This, he informs us, once did occur, on the credit of the reverend Mr. Friis, miniſter at Nordland, and vicar of the college for promoting Chriſtian knowledge; who informed him that in 1680, a kraken (perhaps a young and careleſs one, as they generally keep ſeveral leagues from land) came into the waters that run between the rocks and cliffs near Alſtahoug; where, in turning about, ſome of its long horns caught hold of ſome adjoining trees, which it might eaſily have torn up, but that it was alſo entangled in ſome clifts of the rocks, whence it could not extricate itſelf, but putrefied on the ſpot. Our author has heard of no perſon deſtroyed by this monſter, but relates a report of the danger of two fiſhermen who came upon a part of the water full of the creature's thick ſlimy excrements (which he voids for ſome months, as he feeds for ſome other); they immediately ſtrove to row off, but were not quick enough in turning to ſave the boat from one of the kraken's horns, which ſo cruſhed the head of it that it was with difficulty they ſaved their lives on the wreck, though the weather was perfectly calm; the monſter never appearing at other times. His excrement is ſaid to be attractive of other fiſh on which he feeds; which expedient was probably neceſſary, on account of his ſlow unwieldy motion, to his ſubſiſtence; as this ſlow motion again may be neceſſary to the ſecurity of ſhips of the greateſt force and burden, which muſt be overwhelmed on encountering ſuch an immenſe animal, if his velocity was equal to his weight; the Norwegians ſuppoſing, that if his arms, on which he moves, and with which he takes his food, were to lay hold of the largeſt man of war, they would pull it down to the bottom.

In confirmation of the reality of this animal, our learned author cites Debes's deſcription of Faroe, for the exiſtence of certain iſlands which ſuddenly appear and as ſuddenly vaniſh. Many ſeafaring people, he adds, give accounts of ſuch, particularly in the north ſea; which their ſuperſtition has either attributed to the deluſion of the devil, or conſidered as inhabited by evil ſpirits. But our honeſt hiſtorian, who is not for wronging the devil himſelf, ſuppoſes ſuch miſtaken iſlands to be nothing but the kraken, called by ſome the *ſoe trolden*, or *ſea miſchief*; in which opinion he was greatly confirmed by the following quotation of Dr. Hierne, a learned Swede, from baron Grippenhielm; and which is certainly a very remarkable paſſage, viz. "Among the rocks about Stockholm, there is

ſometimes ſeen a tract of land, which at other times diſappears, and is ſeen again in another place. Buræus has placed it as an iſland in his map. The peaſants, who call it *gummars ore*, ſay, that it is not always ſeen, and that it lies out in the open ſea, but I could never find it. One Sunday, when I was out amongſt the rocks ſounding the coaſt, it happened, that in one place I ſaw ſomething like three points of land in the ſea, which ſurpriſed me a little, and I thought I had inadvertently paſſed them over before. Upon this I called to a peaſant, to enquire for gummars ore; but when he came, we could ſee nothing of it: upon which the peaſant ſaid all was well, and that this prognoſticated a ſtorm or a great quantity of fiſh." To which our author ſubjoins, "Who cannot diſcover that this gummars ore, with its points and prognoſtications of fiſh, was the kraken, miſtaken by Buræus for an iſland, who may keep himſelf about that ſpot where he riſes?" He takes the kraken, doubtleſs, from his numerous *tentaculi*, which ſerve him as feet, to be of the polype kind; and the contemplation of its enormous bulk led him to adapt a paſſage from Eccleſiaſticus, xliii. 31, 32. to it. Whether by it may be intended the dragon that is in the ſea, mentioned Iſaiah xxvii. 1. we refer to the conjecture of the reader. After paying but a juſt reſpect to the moral character, the reverend function, and diligent inveſtigations of our author, we muſt admit the poſſibility of its exiſtence, as it implies no contradiction; though it ſeems to encounter a general prepoſſeſſion of the whale's being the largeſt animal on or in our globe; and the eradication of any long prepoſſeſſion is attended with ſomething irkſome to us. But were we to ſuppoſe a ſalmon or a ſturgeon the largeſt fiſh any number of perſons had ſeen or heard of, and the whale had diſcovered himſelf as ſeldom, and but in part, as the kraken, it is eaſy to conceive that the exiſtence of the whale had been as indigeſtible to ſuch perſons then as that of the kraken may be to others now. Some may incline to think ſuch an extenſive monſter would encroach on the ſymmetry of nature, and be over proportionate to the ſize of the globe itſelf; as a little retroſpection will inform us, that the breadth of what is ſeen of him, ſuppoſing him nearly round, muſt be full 2600 feet (if more oval, or crab-like, full 2000), and his thickneſs, which may rather be called *altitude*, at leaſt three hundred; our author declaring he has choſen the leaſt circumference mentioned of this animal for the greater certainty. Theſe immenſe dimenſions, nevertheleſs, we apprehend will not argue concluſively againſt the exiſtence of the animal, though conſiderably againſt a numerous increaſe or propagation of it. In fact, the great ſcarcity of the kraken, his confinement to the north ſea, and perhaps to equal latitudes in the ſouth; the ſmall number propagated by the whale, who is viviparous; and by the largeſt land animals, of whom the elephant is ſaid to go near two years with young; all induce us to conclude from analogy, that this creature is not numerous; which coincides with a paſſage in a manuſcript aſcribed to Svere king of Norway, as it is cited by Ol. Wormius, in his Muſeum, p. 280, in Latin, which we ſhall exactly tranſlate. "There remains one kind, which they call *hafgufe*, whoſe magnitude is unknown, as it is ſeldom ſeen. Thoſe who affirm they have ſeen its body, declare, it is more like an iſland than a beaſt, and that its carcaſe was never found; whence ſome imagine there are but two of the kind in nature." Whether the vaniſhing iſland Lemair, of which captain Rodney went in ſearch, was a kraken, we ſubmit to the fancy of our readers. In fine, if the exiſtence of the creature is admitted, it will ſeem a fair inference, that he is the ſcarceſt as well as largeſt in our world; and that if there are larger in the univerſe, they probably inhabit ſome ſphere or planet more extended than our own. Such we have no pretence to limit; and that fiction can deviſe a much greater than this is evident, from the cock of Mahomet, and the whale in the Bava Bathra of the Talmud, which were intended to be credited; and to either of which our kraken is a very ſhrimp in dimenſions.

KRANTZIUS (Albertus), a native of Hamburgh, and famous hiſtorian, who travelled over ſeveral parts of Europe, and was made rector of the univerſity of Roſtoch in 1482. He went from thence to Hamburgh in 1508, where he was elected dean of the chapter in the cathedral. He did many good ſervices to that church and city; and was ſo famed for his abilities and prudence, that John king of Denmark and Frederic duke of Holſtein did not ſcruple to make him umpire in a diſpute they had with the Ditmarſi. He wrote ſeveral good hiſtorical works; the moſt conſiderable of which is an eccleſiaſtical hiſtory of Saxony, intitled *Metropolis*, in folio; the beſt edition is that of Francfort. He died in 1517.

KRAUT, or Crout. See Crout.

KUBESHA. See Lesguis.

KUHNIUS (Joachim), a learned German critic, was born at Gripſwalde in Pomerania, in 1647. He was in 1669 made principal of the college at Oetingen in Suabia: in 1676, he was elected Greek profeſſor in the principal college at Straſburg; and after acquitting himſelf with honour for ten years in this capacity, was made Greek and Hebrew profeſſor in the ſame univerſity. His uncommon ſkill in the Greek language drew a great number of ſcholars about him from very diſtant places; and he publiſhed ſome claſſic authors with very learned notes both explanatory and critical. He died in 1697.

KUNCKEL (John), a celebrated Saxon chemiſt, born in the duchy of Sleſwick, in 1630. He became chemiſt to the elector of Saxony, the elector of Brandenburgh, and Charles II. king of Sweden, who gave him the title of *counſellor in metals*, and letters of nobility, with the ſurname of *Louwenſtein*. He employed 50 years in chemiſtry; in which, by the help of the furnace of a glaſs-houſe which he had under his care, he made ſeveral excellent diſcoveries, particularly of the phoſphorus of urine. He died in Sweden in 1702; and left ſeveral works, ſome in German, and others in Latin: among which, that intitled *Obſervationes Chemicæ*, and the "Art of making Glaſs," printed at Paris in 1752, are the moſt eſteemed.

KURIL or Kurilski Isles, extending from N. lat. 51. to 45. which probably once lengthened the peninſula of Kamtchatka before they were convulſed from it, are a ſeries of iſlands running ſouth from the low promontory Lopatka, between which and Shoomſka the moſt northerly is only the diſtance of one league. On the lofty Paramouſer, the ſecond in the chain, is a high-peaked mountain probably volcanic; and on the fourth, called *Araumakutan*, is another volcano. On Uruſs there is another; on Storgu there are two; and on Kunatir, or Kaunachir, there is one. Theſe three make part of the group which paſs under the name of the land of *Jeſo*. Japan abounds with volcanoes; ſo that there is a ſeries of ſpiracles from Kamtchatka to Japan, the laſt great link of this extenſive chain.—The Ruſſians ſoon annexed theſe iſlands to their conqueſts. The ſea abounded with otters, and the land with bears and foxes; and ſome of the iſles ſheltered the ſable: temptations ſufficient for the Ruſſians to invade theſe iſlands; but the rage after the furs of the ſea otters has been ſo great, that they are become extremely ſcarce both here and in Kamtchatka.

KUSTER (Ludolf), a very learned writer in the 18th century, was born at Blomberg in Weſtphalia. When very young, he was upon the recommendation of baron Spanheim appointed tutor to the two ſons of the count de Schwerin, prime miniſter of the king of Pruſſia, who, upon our author's quitting that ſtation, procured him a penſion of 400 livres. He was promiſed a profeſſorſhip in the univerſity of Joachim;

and till this ſhould be vacant, being then but 25, he reſolved to travel. He read lectures at Utrecht; went to England; and from thence to France, where he collated Suidas with three MSS. in the king's library, which furniſhed him with a great many fragments that had never been publiſhed. He was honoured with the degree of doctor by the univerſity of Cambridge, which made him ſeveral advantageous offers to continue there: but he was called to Berlin, where he was inſtalled in the profeſſorſhip promiſed him. Afterward he went to Antwerp; and being brought over to the Catholic religion, he abjured that of the Proteſtants. The king of France rewarded him with a penſion, and ordered him to be admitted ſupernumerary aſſociate of the academy of inſcriptions. But he did not enjoy this new ſettlement long; for he died in 1716, aged 46. He was a great maſter of the Latin tongue, and wrote well in it; but his chief excellence was his ſkill in the Greek language, to which he almoſt entirely devoted himſelf. He wrote many works; the principal of which are, 1. *Hiſtoria critica Homeri.* 2. *Jamblicus de vita Pythagoræ.* 3. An excellent edition of Suidas, in Greek and Latin, three volumes, folio. 4. An edition of Ariſtophanes, in Greek and Latin, folio. 5. A new Greek edition of the New Teſtament, with Dr. Mills's Variations, in folio.

KYPHONISM, Kyphonismus, or *Cyphoniſmus*, an ancient puniſhment which was frequently undergone by the martyrs in the primitive times; wherein the body of the perſon to ſuffer was anointed with honey, and ſo expoſed to the ſun, that the flies and waſps might be tempted to torment him. This was performed in three manners: ſometimes they only tied the patient to a ſtake; ſometimes they hoiſted him up into the air, and ſuſpended him in a baſket; and ſometimes they ſtretched him out on the ground with his hands tied behind him. The word is originally Greek, and comes from κυφων, which ſignifies either the *ſtake* to which the patient was tied, the *collar* fitted to his neck, or an *inſtrument* wherewith they tormented him: the ſcholiaſt on Ariſtophanes ſays, it was a wooden lock or cage; and that it was called ſo from κυπτειν, "to crook or bend," becauſe it kept the tortured in a crooked, bowing poſture: others take the κυφων for a log of wood laid over the criminal's head, to prevent his ſtanding upright: Heſychius deſcribes the κυφων as a piece of wood whereon criminals were ſtretched and tormented. In effect, it is probable the word might ſignify all theſe ſeveral things. It was a generical name, whereof theſe were the ſpecies.

Suidas gives us the fragment of an old law, which puniſhed thoſe who treated the laws with contempt with kyphoniſm for the ſpace of twenty days; after which they were to be precipitated from a rock, dreſſed in women's habit.

L.

LAB LAB

L, A ſemi-vowel, or liquid, making the eleventh letter of the alphabet.

It was derived from the old Hebrew Lamed, or Greek Lambda λ. It is ſounded by intercepting the breath between the top of the tongue and forepart of the palate, with the mouth open; and makes a ſweet ſound, with ſomething of an aſpiration; and therefore the Britons and Spaniards uſually doubled it, or added an *h* to it, in the beginning of words, as in *llan*, or *lhan*, "a temple," ſounding nearly like *fl*, &c. In Engliſh words of one ſyllable it is doubled at the end, as *tell, bell, knell*, &c. but in words of more ſyllables than one it is ſingle at the end, as *evil, general, conſtitutional*, &c. It is placed after moſt of the conſonants in the beginning of words and ſyllables, as *black, glare, ad-le, ea-gle*, &c. but before none. Its ſound is clear in *Abel*, but obſcure in *cble*, &c.

As a numeral letter, L denotes 50; and with a daſh over it, thus, $\bar{L}$, 5000. Uſed as an abbreviature, L ſtands for Lucius; and L. L. S. for a ſeſterce. See Sesterce.

LA, the ſyllable by which Guido denotes the laſt ſound of each hexachord; if it begins in C, it anſwers to our A; if in G, to E; and if in F, to D.

LABADIE (John), a famous French enthuſiaſt, ſon of John Charles Labadie, governor of Bourges and gentleman in ordinary of the bed-chamber to the French king, was born in 1610. He entered young into the Jeſuits' college at Bourdeaux; which, by his own account, he afterwards quitted, but by other accounts was expelled for his peculiar notions, and for hypocriſy. He became a popular preacher; but being repeatedly detected in working upon female devotees with ſpiritual inſtructions for carnal purpoſes, his loſs of character among the Catholics drove him among the Proteſtants. A reformed jeſuit being thought a great acquiſition, he was precipitately accepted as a paſtor at Montauban, where he officiated for eight years; but, attempting the chaſtity of a young lady whom he could not convert to his purpoſe, and quarrelling with the Catholic prieſt about the right of interring a dead body, he was at length baniſhed that place. The ſtory of his affair with the lady, as related by Mr. Bayle, may here be given as a ſpecimen of his miniſtry. Having directed this damſel to the ſpiritual life, which he made to conſiſt in internal recollection and mental prayer, he gave her out a certain point of meditation; and having ſtrongly recommended it to her to apply herſelf entirely for ſome hours to ſuch an important object, he went up to her when he believed her to be at the height of her recollection, and put his hand into her breaſt. She gave him a haſty repulſe, expreſſed a great deal of ſurpriſe at the proceeding, and was even preparing to rebuke him, when he, without being in the leaſt diſconcerted, and with a devout air, prevented her thus: "I ſee plainly, my child, that you are at a great diſtance from perfection; acknowledge your weakneſs with an humble ſpirit; aſk forgiveneſs of God for your having given ſo little attention to the myſteries upon which you ought to have meditated. Had you beſtowed all neceſſary attention upon theſe things, you would not have been ſenſible of what was doing about your breaſt. But you are ſo much attached to ſenſe, ſo little concentered with the Godhead, that you were not a moment in diſcovering that I had touched you. I wanted to try whether your fervency in prayer had raiſed you above the material world, and united you with the Sovereign Being, the living fource of immortality and of a ſpiritual ſtate; and I ſee, to my great grief, that you have made very ſmall progreſs, and that you only creep on the ground. May this, my child, make you aſhamed, and for the future move you to perform the duties of mental prayer better than you have hitherto done!" The young lady, who had as much good ſenſe as virtue, was no leſs provoked at theſe words than at the bold actions of her ghoſtly inſtructor; and could never afterwards bear the name of ſuch an holy father. Labadie being driven out of Montauban, went to ſeek an aſylum at Orange: but not finding himſelf ſo ſafe there as he imagined, he withdrew privately to Geneva, where he impoſed on the people by his devout preaching and carriage; and from thence was invited to Middelburg, where his

ſpirituality made him and his followers conſidered as ſo many ſaints, diſtinguiſhed by the name of *Labadiſts*. They increaſed ſo much, that he excited the attention of the other churches, whoſe authority he diſputed, till he was formally depoſed by the ſynod of Dort. Inſtead of obeying, he procured a tumultuous ſupport from a crowd of his devotees; and at length formed a little ſettlement between Utrecht and Amſterdam, where he erected a printing-preſs, which ſent forth many of his works. Here he was betrayed by ſome deſerters, who expoſed his private life, and informed the public of his familiarities with his female diſciples, under pretence of uniting them more particularly to God; and was finally obliged to retire to Altena in Holſtein, where he died in 1674.

LABADISTS, a ſect of religioniſts in the 17th century, followers of the opinions of John Labadie, of whom an account is given in the preceding article. Some of their opinions were, 1. That God could, and did deceive men. 2. That, in reading the Scriptures, greater attention ſhould be paid to the internal inſpiration of the Holy Spirit than to the words of the text. 3. That baptiſm ought to be deferred till mature age. 4. That the good and the wicked entered equally into the old alliance, provided they deſcended from Abraham; but that the new admitted only ſpiritual men. 5. That the obſervation of Sunday was a matter of indifference. 6. That Chriſt would come and reign 1000 years on earth. 7. That the euchariſt was only a commemoration of the death of Chriſt; and that, though the ſymbols were nothing in themſelves, yet that Chriſt was ſpiritually received by thoſe who partook of them in a due manner. 8. That a contemplative life was a ſtate of grace, and of divine union during this life, the ſummit of perfection. &c. 9. That the man whoſe heart was perfectly content and calm, half enjoys God, has familiar entertainments with him, and ſees all things in him. 10. That this ſtate was to be come at by an entire ſelf-abnegation, by the mortification of the ſenſes and their objects, and by the exerciſe of mental prayer.

LABARUM, the banner or ſtandard borne before the Roman emperors in the wars. The *labarum* conſiſted of a long lance, with a ſtaff a-top, croſſing it at right angles; from which hung a rich ſtreamer, of a purple colour, adorned with precious ſtones. Till the time of Conſtantine it had an eagle painted on it; but that emperor, in lieu thereof, added a croſs with a cipher expreſſing the name of *Jeſus*. This ſtandard the Romans took from the Germans, Dacæ, Sarmatæ, Pannonians, &c. whom they had overcome. The name *labarum* was not known before the time of Conſtantine; but the ſtandard itſelf, in the form we have deſcribed it, abating the ſymbols of Chriſtianity, was uſed by all the preceding emperors. Some derive the word from *labor*, as if this finiſhed their labours; ſome from ευλαβεια, "reverence, piety;" others from λαμβανειν, "to take;" and others from λαφυρα, "ſpoils."

LABAT (John Baptist), a celebrated traveller, of the order of St. Dominic, was born at Paris, taught philoſophy at Nancy, and in 1693 went to America in quality of a miſſionary. At his return to France in 1705, he was ſent to the chapter of his order at Bologna to give an account of his miſſion, and ſtaid ſeveral years in Italy. He died at Paris in 1738. His principal works are, 1. A new voyage to the American iſlands, 6 vols. 12mo. 2. Travels in Spain and Italy, 8 vols. 12mo. 3. A new account of the weſtern parts of Africa, 5 vols. 12mo.: father Labat was not in Africa, and therefore was not a witneſs of what he relates in that work. He alſo publiſhed the *Chevalier des Marchais's voyage to Guinea*, in 4 vols. 12mo.; and *An hiſtorical account of the weſtern parts of Æthiopia*, tranſlated from the Italian of father Cavazzi, 5 vols. 12mo.

LABBE (Philip), born at Bourges in France, in 1607; profeſſed philoſophy, divinity, and the languages, with great applauſe; and died in 1667, aged 70. He was a laborious writer, and a good critic; and wrote, 1. *Nova Bibliotheca MS. librorum*, in two volumes folio. 2. *De Byzantinæ hiſtoriæ Scriptoribus*. 3. *Galeni vita*. 4. *Bibliotheca bibliothecarum*. 5. *Concordantia chronologica*, &c. He began the laſt edition of "The councils," and died while the 9th volume was printing; they were finiſhed in 17 volumes by father Coſſart.

LABDANUM, or Ladanum, in the materia medica, a reſinous juice, which exſudes from a tree of the ciſtus kind. It is ſaid to have been formerly collected from the beards of goats who brouſed the leaves of the ciſtus: at preſent, a kind of rake, with ſeveral ſtraps or thongs of ſkins fixed to it, is drawn lightly over the ſhrub, ſo as to take up the unctuous juice, which is afterwards ſcraped off with knives. It is rarely met with pure, even in the places which produce it; the duſt, blown upon the plant by the wind, mingling with the tenacious juice: the inhabitants are alſo ſaid to mix with it a certain black ſand. In the ſhops two ſorts are met with. The beſt (which is very rare) is in dark-coloured almoſt black maſſes, of the conſiſtence of a ſoft plaſter, which grows ſtill ſofter upon being handled; of a very agreeable ſmell, and of a light pungent bitteriſh taſte. The other ſort is harder, not ſo dark coloured, in long rolls coiled up: this is of a much weaker ſmell than the firſt, and has a large admixture of a fine ſand, which in the ladanum examined by the French academy made up three-fourths of the maſs.

In medicine it is uſed externally, to diſcuſs tumors; internally, it is more rarely uſed, but is greatly extolled by ſome againſt catarrhs and in dyſenteries. Rectified ſpirit of wine almoſt entirely diſſolves pure ladanum, leaving only a ſmall portion of gummy matter which has no taſte or ſmell: and hence this reſin may be thus excellently purified for internal purpoſes. It is an uſeful ingredient in the ſtomachic plaſter, which is now indeed ſtyled the *emplaſtrum ladani*.

LABEL, a long, thin, braſs rule, with a ſmall ſight at one end, and a centre-hole at the other; commonly uſed with a tangent-line on the edge of a circumferentor, to take altitudes, &c.

Label, in law, is a narrow ſlip of paper, or parchment, affixed to a deed or writing, in order to hold the appending ſeal.—Any paper annexed by way of addition or explication, to any will or teſtament, is alſo called a label or codicil.

Label, in heraldry, a fillet uſually placed in the middle along the chief of the coat, without touching its extremities. Its breadth ought to be a ninth part of the chief. It is adorned with pendants; and when there are above three of theſe, the number muſt be ſpecified in blazoning. It is uſed on the arms of eldeſt ſons while the father is alive, to diſtinguiſh them from the younger; and is eſteemed the moſt honourable of all differences. See Heraldry.

LABIAL letters, thoſe pronounced chiefly by means of the lips.

LABIATED flowers, monopetalous flowers, conſiſting of a narrow tube with a wide mouth, divided into two or more ſegments.

LABIAU, a ſmall town of Ducal Pruſſia, in a circle of the ſame name, ſeated at the mouth of the river Deime, with a ſtrong caſtle, two ſides of which are ſurrounded with water, and the other defended by a wall and ditch. E. long. 19. 56 N. lat. 55. 17.

LABORATORY, or Elaboratory, the chemiſts, workhouſe, or the place where they perform their operations, where the furnaces are built, their veſſels kept, &c. and in general the term *laboratory* is applied to any place where phyſical experiments in pharmacy, chemiſtry, pyrotechny, &c. are performed.

As laboratories muſt be of very different kinds, according to the nature of the operations to be performed in them, it is impoſſible that any directions can be given which will anſwer for every one. Where the purpoſes are merely experimental, a ſingle furnace or two of the portable kind will be ſufficient. It is ſcarce needful to add, that ſhelves are neceſſary for holding veſſels with the products of the different operations; and that it is abſolutely neceſſary, to avoid confuſion and diſorder, as by theſe means the products of the operations might be loſt or miſtaken for one another. Mortars, filters, levigating ſtones, &c. muſt alſo be procured: but from a knowledge of the methods of performing the different chemical operations will eaſily be derived the knowledge of a proper place to perform them in; for which ſee the articles CHEMISTRY, METALLURGY, and FURNACE.

LABORATORY, in military affairs, ſignifies that place where all ſorts of fire-works are prepared, both for actual ſervice and for pleaſure, viz. quick-matches, fuzes, port-fires, grape-ſhot, caſe-ſhot, carcaſſes, hand-grenades, cartridges, ſhells filled, and fuzes fixed, wads, &c. &c.

LABOUR, in general, denotes a cloſe application to work or buſineſs.—Among ſeamen a ſhip is ſaid to be in labour when ſhe rolls and tumbles very much, either a-hull, under ſail, or at anchor.—It is alſo ſpoken of a woman in travail or child-birth; ſee MIDWIFERY.

LABOURER, generally ſignifies one that does the moſt ſlaviſh and leſs artful part of a laborious work, as that of huſbandry, maſonry, &c.

LABOUREUR (JOHN LE), almoner to the king of France, and prior of Juvigne, was born at Montmorency near Paris in 1623. At the age of eighteen he diſtinguiſhed himſelf by publiſhing "A collection of the monuments of illuſtrious perſons buried in the church of the Celeſtines at Paris, with their elogies, genealogies, arms, and mottoes," 4to. He afterwards publiſhed an excellent edition of The Memoirs of Michael de Caſtelnau, with ſeveral other genealogical hiſtories; and died in 1675. He had a brother, *Louis le Laboureur*, bailiff of Montmorency, author of ſeveral pieces of poetry; and an uncle, *Dom. Claude le Laboureur*, provoſt of the abbey of L'iſle Barbe, of which abbey he wrote a hiſtory, and publiſhed notes and corrections upon the breviary of Lyons, with ſome other things.

LABRADOR, a country on the eaſt ſide of Hudſon's Bay, in North-America. The climate, in only lat. 57° N. is exceſſively cold during winter. Wine freezes in a ſolid maſs; brandy coagulates; and the very breath falls on the blankets of a bed, in the form of a hoar-froſt. The ice begins to diſappear in May; and about the middle of June commences hot weather, which, at times, is ſo violent, as to ſcorch the faces of the hunters. Mock ſuns and halos are not unfrequent: they are very bright, and richly tinged with all the colours of the rainbow. The ſun riſes and ſets with a large cone of yelloviſh light; and the night is enlivened by the aurora borealis, which ſpreads many different lights and colours over the whole ſky. The animals are mooſedeers, ſtags, reindeers, bears, tigers, buffaloes, wolves, foxes, beavers, otters, lynxes, martens, ſquirrels, ermines, wild cats, and hares. The feathered kinds are geeſe, buſtards, ducks, partridges, and all kinds of wild fowls. The fiſh are whales, morſes, ſeals, codfiſh, and a white fiſh preferable to herrings; and in their rivers and freſh waters are pike, perch, carp, and trout. In ſummer, there is here, as in other places, a variety in the colour of the ſeveral animals: when that ſeaſon is over, which holds only for three months, they all aſſume the livery of winter, and every ſort of beaſts, and moſt of their fowls, are of the colour of the ſnow: every thing animate and inanimate is white. But one of the moſt ſtriking things, that draws the moſt inattentive to an admiration of the wiſdom and goodneſs of Providence, is, that the dogs and cats from Great Britain, that have been carried to Hudſon's Bay, on the approach of winter have changed their appearance, and acquired a much longer, ſofter, and thicker coat of hair than they originally had. See NEW-BRITAIN, ESQUIMAUX, and HUDSON'S BAY.

LABRADORE STONE, a curious ſpecies of felt-ſpar, which exhibits all the colours of a peacock's tail. See the article FELT-*Spar*.

LABRUM, in antiquity, a great tub which ſtood at the entrance of the temples, containing water for the prieſts to waſh themſelves in previous to their ſacrifices. It was alſo the name of a bathing-tub uſed in the baths of the ancients.

LABRUS, in ichthyology, a genus of fiſhes belonging to the order of thoracici. The characters are as follow: The covers of the gills ſcaly; the branchioſtegous rays unequal in number; teeth conic, long, and blunt at their ends; one tuberculated bone in the bottom of the throat; two above, oppoſite to the other; one dorſal fin reaching the whole length of the back; a ſlender ſkin extending beyond each ray, with a rounded tail. There are 41 ſpecies of this genus, which vary from each other, even thoſe of the ſame ſpecies, almoſt infinitely in colour; ſome of them being of a dirty red mixed with a certain duſkineſs; others moſt beautifully ſtriped, eſpecially about the head, with the richeſt colours, ſuch as blue, red, and yellow. Care muſt therefore be taken not to multiply the ſpecies from theſe accidental teints, but to attend to the form, which never varies. Mr. Pennant mentions his having ſeen a ſpecies of labrus taken about the Giant's Cauſeway in Ireland, of a moſt beautiful vivid green, ſpotted with ſcarlet; and others at Bandooran in the county of Sligo of a pale green. To this genus belongs the fiſh called by the Engliſh the *old-wife*.

LABURNUM, in botany. See CYTISUS.

LABYRINTH, among the ancients, was a large intricate edifice cut out into various aiſles and meanders running into each other, ſo as to render it difficult to get out of it. There is mention made of ſeveral of thoſe edifices among the ancients; but the moſt celebrated are the Egyptian and the Cretan labyrinths.. That of Egypt, according to Pliny, was the oldeſt of all the known labyrinths, and was ſubſiſting in his time after having ſtood 3600 years. He ſays it was built by king Peteſucus, or Tithoes; but Herodotus makes it the work of ſeveral kings: it ſtood on the banks of the lake Mœris, and conſiſted of twelve large contiguous palaces, containing 3000 chambers, 1500 of which were under ground.—Strabo, Diodorus Siculus, Pliny, and Mela, ſpeak of this monument with the ſame admiration as Herodotus: but not one of them tells us that it was conſtructed to bewilder thoſe who attempted to go over it; though it is manifeſt that, without a guide, they would be in danger of loſing their way.

It was this danger, no doubt, which introduced a new term into the Greek language. The word *labyrinth*, taken in the literal ſenſe, ſignifies a circumſcribed ſpace, interſected by a number of paſſages, ſome of which croſs each other in every direction like thoſe in quarries and mines, and others make larger or ſmaller circuits round the place from which they depart like the ſpiral lines we ſee on certain ſhells. In the figurative ſenſe, it was applied to obſcure and captious queſtions, to indirect and ambiguous anſwers, and to thoſe diſcuſſions which, after long digreſſions, bring us back to the point from which we ſet out.

The Cretan labyrinth is the moſt famed in hiſtory or fable; having been rendered particularly remarkable by the ſtory of the Minotaur, and of Theſeus, who found his way through all its windings by means of Ariadne's clue. In Pl. 25. Vol. IV. is exhibited a ſuppoſed plan of it, copied after a draught given by Meurſius, taken from an ancient ſtone.—But what was the real nature of this labyrinth, merits a more particular enquiry.

Diodorus Siculus relates as a conjecture, and Pliny as a cer-

tain fact, that Dædalus conſtructed this labyrinth on the model of that of Egypt, though on a leſs ſcale. They add, that it was formed by the command of Minos, who kept the Minotaur ſhut up in it; and that in their time it no longer exiſted, having been either deſtroyed by time, or purpoſely demoliſhed. Diodorus Siculus and Pliny, therefore, conſidered this labyrinth as a large edifice; while other writers repreſent it ſimply as a cavern hollowed in the rock, and full of winding paſſages. The two former authors, and the writers laſt mentioned, have tranſmitted to us two different traditions: it remains for us to chooſe that which is moſt probable.

If the labyrinth of Crete had been conſtructed by Dædalus under Minos, whence is it that we find no mention of it, neither in Homer, who more than once ſpeaks of that prince and of Crete; nor in Herodotus, who deſcribes that of Egypt, after having ſaid that the monuments of the Egyptians are much ſuperior to thoſe of the Greeks; nor in the more ancient geographers; nor in any of the writers of the ages when Greece flouriſhed?

This work was attributed to Dædalus, whoſe name is alone ſufficient to diſcredit a tradition. In fact, his name, like that of Hercules, had become the reſource of ignorance, whenever it turned its eyes on the early ages. All great labours, all works which required more ſtrength than ingenuity, were attributed to Hercules; and all thoſe which had a relation to the arts, and required a certain degree of intelligence in the execution, were aſcribed to Dædalus.

The opinion of Diodorus and Pliny ſuppoſes, that in their time no traces of the labyrinth exiſted in Crete, and that even the date of its deſtruction had been forgotten. Yet it is ſaid to have been viſited by the diſciples of Apollonius of Tyana, who was cotemporary with thoſe two authors. The Cretans, therefore, then believed that they poſſeſſed the labyrinth.

"I would requeſt the reader (continues the Abbe Barthelemi, "Travels of Anacharſis," vi. 441.) to attend to the following paſſage in Strabo. At Napulia, near the ancient Argos (ſays that judicious writer), are ſtill to be ſeen vaſt caverns, in which are conſtructed labyrinths that are believed to be the work of the Cyclops: the meaning of which is, that the labours of men had opened in the rock paſſages which croſſed and returned upon themſelves, as is done in quarries. Such, if I am not miſtaken, is the idea we ought to form of the labyrinth of Crete.

"Were there ſeveral labyrinths in that iſland? Ancient authors ſpeak only of one, which the greater part place at Cnoſſus; and ſome, though the number is but ſmall, at Gortyna.

"Belon and Tournefort have given us the deſcription of a cavern ſituated at the foot of mount Ida, on the ſouth ſide of the mountain, at a ſmall diſtance from Gortyna. This was only a quarry according to the former, and the ancient labyrinth according to the latter; whoſe opinion I have followed, and abridged his account. Thoſe who have added critical notes to his work, beſides this labyrinth, admit a ſecond at Cnoſſus, and adduce as the principal ſupport of this opinion the coins of that city, which repreſent the plan of it, according as the artiſts conceived it. For on ſome of theſe it appears of a ſquare form, on others round: on ſome it is only ſketched out; on others it has, in the middle of it, the head of the Minotaur. In the Memoirs of the Academy of Belles Lettres, I have given an engraving of one which appears to me to be of about the 5th century before Chriſt; and on which we ſee on one ſide the figure of the Minotaur, and on the other a rude plan of the labyrinth. It is therefore certain, that at that time the Cnoſſians believed they were in poſſeſſion of that celebrated cavern; and it alſo appears that the Gortynians did not pretend to conteſt their claim, ſince they have never given the figure of it on their money.

"The place where I ſuppoſe the labyrinth of Crete to have been ſituated, according to Tournefort, is but one league diſtant from Gortyna; and, according to Strabo, it was diſtant from Cnoſſus ſix or ſeven leagues. All we can conclude from this is, that the territory of the latter city extended to very near the former.

"What was the uſe of the caverns to which the name of labyrinth was given? I imagine that they were firſt excavated in part by nature; that in ſome places ſtones were extracted from them for building cities; and that, in more ancient times, they ſerved for a habitation or aſylum to the inhabitants of a diſtrict expoſed to frequent incurſions. In the journey of Anacharſis through Phocis, I have ſpoken of two great caverns of Parnaſſus, in which the neighbouring people took refuge; in the one at the time of the deluge of Deucalion, and in the other at the invaſion of Xerxes. I here add, that, according to Diodorus Siculus, the moſt ancient Cretans dwelt in the caves of Mount Ida. The people, when inquiries were made on the ſpot, ſaid that their labyrinth was originally only a priſon. It may have been put to this uſe; but it is difficult to believe that, to prevent the eſcape of a few unhappy wretches, ſuch immenſe labours would have been undertaken."

LABYRINTH *of the Ear*. See ANATOMY.

LAC, MILK, among phyſicians. See MILK.

LAC, *Gum*. See LACCA.

LACARRY (GILES), a learned Jeſuit of the 17th century, was born in the diocefe of Caſtres, in Languedoc, in 1605. He taught philoſophy, theology, and the holy Scriptures in his ſociety; was rector of the college of Cahors; and became well ſkilled in hiſtory. He wrote many works; the principal of which are, 1. *Hiſt. Galliarum ſub Præfectis Prætorii Galliarum*, 4to. a work which is much eſteemed, and extends from the reign of Conſtantine to that of Juſtinian. 2. *Hiſtoria Romana a Julio Cæſare ad Conſtantinum Magnum, per numiſmata & marmora antiqua*, an excellent work. 3. *Epitome hiſtoriæ Reg. Franciæ, ex Dionyſio Petavio excerpta*, alſo much eſteemed. 4. An edition of Velleius Paterculus, with learned notes.

LACCA, LAC, or *Gum Lac*, is a kind of wax, of which a ſpecies of inſects form cells upon trees, like honeycombs. See the article COCCUS, ſpec. 5. In theſe cells remain ſome of the dead inſects, which give a red colour to the whole ſubſtance of the lac. That called *ſtick-lac* is the wax adhering to ſome of the ſmall branches of the tree, and which is unprepared. This lac, when ſeparated from the adhering ſticks, and groſsly powdered, and deprived of its colour by digeſtion with menſtruums, for the ſake of the dyes and other purpoſes, is called *ſeed-lac*; when the ſtick-lac is freed from impurities by melting it over a gentle fire, and formed into cakes, it is called *lump-lac*; and laſtly, that called *ſhell-lac* is the cells liqueſied, ſtrained, and formed into thin tranſparent laminæ in the following manner: Separate the cells from the branches, break them into ſmall pieces, throw them into a tub of water for one day, waſh off the red water and dry the cells, and with them fill a cylindrical tube of cotton cloth two feet long, and one or two inches in diameter; tie both ends, turn the bag above a charcoal fire; as the lac liqueſies twiſt the bag; and when a ſufficient quantity has tranſuded the pores of the cloth, lay it upon a ſmooth junk of the plantain-tree (MUSA *Paradiſiaca*, *Linnæi*), and with a ſtrip of the plantain-leaf draw it into a thin lamella; take it off while flexible, for in a minute it will be hard and brittle. The value of ſhell-lac is according to its tranſparency.

The lac inſect is one of the moſt uſeful of that tribe yet diſcovered, particularly to the natives of the countries where it is found. They conſume a great quantity of ſhell-lac in making ornamental rings, painted and gilded in various taſtes, to decorate the arms of the ladies; and it is formed into beads, ſpiral and linked chains for necklaces, and other female ornaments.

The following are recipes for various purpoſes to which this ſubſtance is applied by them.

1. For ſealing-wax. Take a ſtick, and heat one end of it upon a charcoal fire; put upon it a few leaves of the ſhell-lac ſoftened above the fire; keep alternately heating and adding more ſhell-lac until you have got a maſs of three or four pounds of liquefied ſhell-lac upon the end of your ſtick (in which manner lump lac is formed from ſeed-lac). Knead this upon a wetted board with three ounces of levigated cinnabar; form it into cylindrical pieces; and to give them a poliſh, rub them while hot with a cotton cloth.

2. For japanning. Take a lump of ſhell-lac, prepared in the manner of ſealing-wax, with whatever colour you pleaſe; fix it upon the end of a ſtick, heat the poliſhed wood over a charcoal fire, and rub it over with the half melted lac, and poliſh by rubbing it even with a piece of folded plantain-leaf held in the hand; heating the lacquer and adding more lac as occaſion requires. Their figures are formed by lac, charged with various colours in the ſame manner.

3. For varniſh. In ornamenting their images and religious houſes, &c. they make uſe of very thin beat lead, which they cover with various varniſhes, made of lac charged with colours. The preparation of them is kept a ſecret. The leaf of lead is laid upon a ſmooth iron heated by fire below while they ſpread the varniſh upon it.

4. For grindſtones. Take of river ſand three parts, of ſeed-lac waſhed one part, mix them over the fire in a pot, and form the maſs into the ſhape of a grindſtone, having a ſquare hole in the centre; fix it on an axis with liquefied lac, heat the ſtone moderately, and by turning the axis it may eaſily be formed into an exact orbicular ſhape. Poliſhing grindſtones are made only of ſuch ſand as will paſs eaſily through fine muſlin, in the proportion of two parts ſand to one of lac. This ſand is found at Raginaul. It is compoſed of ſmall angular cryſtalline particles tinged red with iron, two parts to one of black magnetic ſand. The ſtone-cutters, inſtead of ſand, uſe the powder of a very hard granite called *corun*. Theſe grindſtones cut very faſt. When they want to increaſe their power, they throw ſand upon them, or let them occaſionally touch the edge of a vitrified brick. The ſame compoſition is formed upon ſticks, for cutting ſtones, ſhells, &c. by the hand.

5. For painting. Take one gallon of the red liquid from the firſt waſhing for ſhell-lac, ſtrain it through a cloth, and let it boil for a ſhort time, then add half an ounce of ſoap earth (foſſil alkali); boil an hour more, and add three ounces of powdered load (bark of a tree); boil a ſhort time, let it ſtand all night, and ſtrain next day. Evaporate three quarts of milk without cream to two quarts upon a ſlow fire, curdle it with ſour milk, and let it ſtand for a day or two; then mix it with the red liquid above mentioned; ſtrain them through a cloth, add to the mixture one ounce and an half of alum, and the juice of eight or ten lemons: mix the whole, and throw it into a cloth bag ſtrainer. The blood of the inſect forms a coagulum with the caſeous part of the milk, and remains in the bag, while a limpid acid water drains from it. The coagulum is dried in the ſhade, and is uſed as a red colour in painting and colouring.

6. For dyeing. Take one gallon of the red liquid prepared as before without milk, to which add three ounces of alum. Boil three or four ounces of tamarinds in a gallon of water, and ſtrain the liquor. Mix equal parts of the red liquid and tamarind water over a briſk fire. In this mixture dip and wring the ſilk alternately until it has received a proper quantity of the dye. To increaſe the colour, increaſe the proportion of the red liquid, and let the ſilk boil a few minutes in the mixture. To make the ſilk hold the colour, they boil a handful of the bark called *load* in water, ſtrain the decoction, and add cold water to it; dip the dried ſilk into this liquor ſeveral times, and then dry it. Cotton cloths are dyed in this manner; but the dye is not ſo laſting as in ſilk.

The lac colour is preſerved by the natives upon flakes of cotton dipped repeatedly into a ſtrong ſolution of the lac inſect in water, and then dried.

Among us lac is alſo uſed in various arts; being employed in the preparation of ſpirit-varniſhes, for the making of ſealing-wax, and as a colouring material for dyeing ſcarlet; ſee VARNISH, WAX, &c. It is unſoluble in water; and difficultly ſoluble in ſpirit of wine, which for that purpoſe muſt be well dephlegmated. According to Neumann, 16 ounces of ſeed-lac, diſtilled in an open fire, yielded nine ounces and ſix drams of a butter or thick oil, one ounce ſix drams of a watery liquor, neither acid nor alkaline, and a reſiduum weighing two ounces and a half. The colour given by lac is leſs beautiful, but more durable, than that given by cochineal. To render the colouring matter of the lac diffuſible in water, ſo as to be applied to the ſtuffs to be dyed, Mr. Hellot directs the following proceſs: Let ſome powdered gum-lac be digeſted during two hours in a decoction of comfry-root, by which a fine crimſon colour is given to the water, and the gum is rendered pale or ſtraw-coloured. To this tincture, poured off clear, let a ſolution of alum be added; and when the colouring matter has ſubſided, let it be ſeparated from the clear liquor and dried. It will weigh about one fifth of the quantity of lac employed. This dried fecula is to be diſſolved or diffuſed in warm water, and ſome ſolution of tin is to be added to it, by which it acquires a vivid ſcarlet colour. This liquor is to be added to a ſolution of tartar in boiling water; and thus the dye is prepared.

The method of obtaining the fine red lac uſed by painters from this ſubſtance, is by the following ſimple proceſs. Boil the ſtick-lac in water, filter the decoction, and evaporate the clear liquor to a dryneſs over a gentle fire. The occaſion of this eaſy ſeparation is, that the beautiful red colour here ſeparated, adheres only ſlightly to the outſides of the ſticks broke off the trees along with the gum-lac, and readily communicates itſelf to boiling water. Some of this ſticking matter alſo adhering to the gum itſelf, it is proper to boil the whole together; for the gum does not at all prejudice the colour, nor diſſolve in boiling water: ſo that after this operation the gum is as fit for making ſealing-wax as before, and for all other uſes which do not require its colour.

Lac is likewiſe employed for medicinal purpoſes. The ſtick-lac is the ſort uſed. It is of great eſteem in Germany, and other countries, for laxity and ſpongineſs of the gums proceeding from cold or a ſcorbutic habit: for this uſe the lac is boiled in water, with the addition of a little alum, which promotes its ſolution; or a tincture is made from it with rectified ſpirit. This tincture is recommended alſo internally in the fluor albus, and in rheumatic and ſcorbutic diſorders: it has a grateful ſmell, and not unpleaſant, bitteriſh, aſtringent taſte.

The gum-lac has been alſo uſed as an electric, inſtead of glaſs, for electrical machines. See LACQUER, LAKE, and VARNISH.

Artificial LACCA, or *Lacque*, is alſo a name given to a coloured ſubſtance drawn from ſeveral flowers; as the yellow from the flower of the juniper, the red from the poppy, and the blue from the iris or violet. The tinctures of theſe flowers are extracted by digeſting them ſeveral times in aqua vitæ, or by boiling them over a ſtove fire in a lixivium of pot-aſhes and alum.

An artificial lacca is alſo made of Braſil wood, boiled in a lixivium of the branches of the vine, adding a little cochineal, turmeric, calcined alum, and arſenic, incorporated with the bones of the cuttle-fiſh pulverized and made up into little cakes and dried. If it be to be very red, they add the juice of lemon to it; to make it brown, they add oil of tartar. Dove-coloured

or columbine lacca is made with Braſil of Fernambuc, ſteeped in diſtilled vinegar for the ſpace of a month, and mixed with alum incorporated in cuttle-fiſh bone. For other proceſſes, ſee COLOUR-*Making*.

LACE, in commerce, a work compoſed of many threads of gold, ſilver, or ſilk, interwoven the one with the other, and worked upon a pillow with ſpindles according to the pattern deſigned. The open-work is formed with pins, which are placed and diſplaced as the ſpindles are moved. The importation of gold and ſilver lace is prohibited.

*Method of cleaning Gold-*LACE *and Embroidery when tarniſhed.*—For this purpoſe alkaline liquors are by no means to be uſed; for while they clean the gold, they corrode the ſilk, and change or diſcharge its colour. Soap alſo alters the ſhade, and even the ſpecies of certain colours. But ſpirit of wine may be uſed without any danger of its injuring either the colour or quality of the ſubject; and in many caſes proves as effectual, for reſtoring the luſtre of the gold, as the corroſive detergents. A rich brocade, flowered with a variety of colours, after being diſagreeably tarniſhed, had the luſtre of the gold perfectly reſtored by waſhing it with a ſoft bruſh dipt in warm ſpirit of wine; and ſome of the colours of the ſilk, which were likewiſe ſoiled, became at the ſame time remarkably bright and lively. Spirit of wine ſeems to be the only material adapted to this intention, and probably the boaſted ſecret of certain artiſts is no other than this ſpirit diſguiſed. Among liquids, Dr. Lewis ſays, he does not know of any other that is of ſufficient activity to diſcharge the foul matter, without being hurtful to the ſilk: as to powders, however fine, and however cautiouſly uſed, they ſcratch and wear the gold, which here is only ſuperficial and of extreme tenuity.

But though ſpirit of wine is the moſt innocent material that can be employed for this purpoſe, it is not in all caſes proper. The golden covering may be in ſome parts worn off; or the baſe metal, with which it had been iniquitouſly alloyed, may be corroded by the air, ſo as to leave the particles of the gold diſunited; while the ſilver underneath, tarniſhed to a yellow hue, may continue a tolerable colour to the whole: in which caſes it is apparent, that the removal of the tarniſh would be prejudicial to the colour, and make the lace or embroidery leſs like gold than it was before. A piece of old tarniſhed gold-lace, cleaned by ſpirit of wine, was deprived, with its tarniſh, of the greateſt part of its golden hue, and looked now almoſt like ſilver-lace.

Method of ſeparating the Gold and Silver from LACE *without burning it.* Cut the lace in pieces, and (having ſeparated the thread from it by which it was ſewed to the garment) tie it up in a linen cloth, and boil it in ſoap-ley, diluted with water, till you perceive it is diminiſhed in bulk; which will take up but a little time, unleſs the quantity of lace be very conſiderable. Then take out the cloth, and waſh it ſeveral times in cold water, ſqueezing it pretty hard with your foot, or beating it with a mallet, to clear it of the ſoap-ley; then untie the cloth, and you will have the metallic part of the lace pure, and nowhere altered in colour or diminiſhed in weight.

This method is abundantly more convenient and leſs troubleſome than the common way of burning; and as a ſmall quantity of the ley will be ſufficient, the expence will be trifling, eſpecially as the ſame ley may be uſed ſeveral times, if cleared of the ſilky calcination. It may be done in either an iron or copper veſſel. The ley may be had at the ſoap-boiler's, or it may be made of pearl-aſh and quick-lime boiled together in a ſufficient quantity of water. The reaſon of this ſudden change in the lace will be evident to thoſe who are acquainted with chemiſtry: for ſilk, on which all our laces are wove, is an animal ſubſtance, and all animal ſubſtances are ſoluble in alkalies, eſpecially when rendered more cauſtic by the addition of quick-lime; but the linen you tie it in, being a vegetable, will remain unaltered.

*Blond-*LACE, a lace made of fine linen thread or ſilk, much in the ſame manner as that of gold and ſilver. The pattern of the lace is fixed upon a large round pillow; and pins being ſtuck into the holes or openings in the patterns, the threads are interwoven by means of a number of bobbins made of bone or ivory, each of which contains a ſmall quantity of fine thread, in ſuch a manner as to make the lace exactly reſemble the pattern. There are ſeveral towns in England, and particularly in Buckinghamſhire, that carry on this manufacture; but vaſt quantities of the fineſt lace have been imported from Flanders.

LACEDÆMON (fab. hiſt.), a ſon of Jupiter and Taygeta the daughter of Atlas, who married Sparta the daughter of Europa, by whom he had Amyclas and Eurydice the wife of Acriſius. He was the firſt who introduced the worſhip of the Graces in Laconia, and who firſt built them a temple. From Lacedæmon and his wife, the capital of Laconia was called *Lacedæmon* and *Sparta*.

LACEDÆMON, a noble city of Peloponneſus, called alſo *Sparta*; theſe names differing in this, that the latter is the proper and ancient name of the city, the former of the country, which afterwards came to be applied to the city (Strabo, Stephanus). See SPARTA. The preſent city is called *Miſitra*, ſituated in E. lon. 23. 0. N. lat. 36. 55.

LACERNA, a thick coarſe ſort of military garment worn by the ancients. The lacerna was a kind of cloak of woollen, only uſed by the men; who wore it over the toga, and, when that was not on, over the tunica. It was at firſt very ſhort, but growing popular in the Roman army, it was ſoon lengthened.

The lacerna was ſcarce known in Rome till the time of the civil wars, and the triumvirate; then indeed it came into faſhion; for the ſoldiers being then frequently in the city, or at the city gates, the ſight became familiar to the citizens, and they fell into the uſe of it; inſomuch that it became the common dreſs of the knights and ſenators, till the time of Valentinian and Theodoſius, when the ſenators were prohibited the wearing of it in the city.

The *lacerna* appears to have been much the ſame with the *chlamys* and *birrus*. Martial mentions lacernæ of ten thouſand ſeſterces price.

LACERTA, the *Lizard*, in Aſtronomy, a conſtellation of the northern hemiſphere, including, according to Hevelius, ten ſtars, and in the Britiſh catalogue ſixteen.

LACERTA, the Lizard, in zoology. See BASILISCUS.

LACHES, from the French *laſcher*, i. e. *laxare*, or *laſche*, *ignavus*, in the Engliſh law ſignifies ſlackneſs or negligence, as it appears in Littleton, where *laches of entry* is a neglect of the heir to enter. And probably it may be an old Engliſh word: for where we ſay there is *laches* of entry, it is all one as if it were ſaid there is a *lack* of entry; and in this ſignification it is uſed. No *laches* ſhall be adjudged in the heir within age; and regularly, *laches* ſhall not bar infants or femme coverts for not entry or claim, to avoid deſcents; but *laches* ſhall be accounted in them for non-performance of a condition annexed to the ſtate of the land.

LACHESIS, in mythology, one of the Parcæ. Her name is derived from λαχειν, *to meaſure out by lot*. She preſided over futurity, and was repreſented as ſpinning the thread of life, or, according to others, holding the ſpindle. She generally appeared covered with a garment variegated with ſtars, and holding ſpindles in her hand.

LACHISH, (anc. geog.) a city ſouthward of the tribe of Judah. Euſebius and St. Jerom tell us, that in their time there was a village called *Lachiſh*, ſeven miles from Eleutheropolis, ſouthward. Sennacherib beſieged Lachiſh, but did not

take it. From thence it was that he ſent Rabſhakeh againſt Jeruſalem. Here king Amaziah was ſlain by his rebel ſubjects.

LACHNEA, in botany: a genus of the monogynia order, belonging to the octandria claſs of plants; and in the natural method ranking under the 31ſt order, *Vepreculæ*. There is no calyx; the corolla is quadrifid, with the limb unequal; there is one ſeed a little reſembling a berry.

LACHRYMAL, in anatomy, an appellation given to ſeveral parts of the eye. See ANATOMY.

LACHRYMATORY, in antiquity, a veſſel wherein were collected the tears of a deceaſed perſon's friends, and preſerved along with the aſhes and urn. They were ſmall glaſs or earthen bottles, chiefly in the form of phials. At the Roman funerals, the friends of the deceaſed, or the *præficæ*, women hired for that purpoſe, uſed to fill them with their tears, and depoſit them very carefully with the aſhes in teſtimony of their ſorrow, imagining the manes of the deceaſed were thereby greatly comforted. Many ſpecimens of them are preſerved in the cabinets of the curious, particularly in the Britiſh Muſeum.

LACINIUM (anc. geog.), a noble promontory of the Brutii in Italy, the ſouth boundary of the Sinus Tarentinus and the Adriatic; all to the ſouth of it being deemed the Ionian ſea: it was famous for a rich temple of Juno, ſurnamed *Lacinia*, with a pillar of ſolid gold ſtanding in it; which Hannibal intending to carry off, was, according to Cicero, diſſuaded by a dream. Now *Capo delle Colonne*, from the columns of Juno's temple, ſtill ſtanding on the north-eaſt coaſt of the Calabria ultra.

LACK OF RUPEES, is 100,000 rupees; which, ſuppoſing them ſtandard, or ſiccas, at 2s. 6d. amounts to 12,500l. ſterling.

LACONIA, or LACONICA, a country on the ſouthern parts of Peloponneſus, having Argos and Arcadia on the north, Meſſenia on the weſt, the Mediterranean on the ſouth, and the bay of Argos at the eaſt. Its extent from north to ſouth was about 50 miles. It was watered by the river Eurotas. The capital was called Sparta, or Lacedæmon. The brevity with which the Laconians always expreſſed themſelves is now become proverbial; and by the epithet of *laconic* we underſtand whatever is conciſe, and is not loaded with unneceſſary words.

LACONICUM (whence our term *laconic*), a ſhort pithy ſententious ſpeech, ſuch as the Lacedæmonians were remarkable for: their way of delivering themſelves was very conciſe, and much to the purpoſe. See the preceding article.

LACQUERS, are varniſhes applied upon tin, braſs, and other metals, to preſerve them from tarniſhing, and to improve their colour. The baſis of lacquers is a ſolution of the reſinous ſubſtance called *ſeed-lac* in ſpirit of wine. The ſpirit ought to be very much dephlegmated, in order to diſſolve much of the lac. For this purpoſe, ſome authors direct dry potaſh to be thrown into the ſpirit. This alkali attracts the water, with which it forms a liquid that ſubſides diſtinctly from the ſpirit at the bottom of the veſſel. From this liquid the ſpirit may be ſeparated by decantation. By this method the ſpirit is much dephlegmated; but, at the ſame time, it becomes impregnated with part of the alkali, which depraves its colour, and communicates a property to the lacquer of imbibing moiſture from the air. Theſe inconveniences may be prevented by diſtilling the ſpirit; or, if the artiſt has not an opportunity of performing that proceſs, he may cleanſe the ſpirit in a great meaſure from the alkali, by adding to it ſome calcined alum; the acid of which uniting with the alkali remaining in the ſpirit, forms with it a vitriolated tartar, which, not being ſoluble in ſpirit of wine, falls to the bottom together with the earth of the decompoſed alum. To a pint of the dephlegmated and purified ſpirit, about three ounces of powdered ſhell-lac are to be added; and the mixture to be digeſted during the ſame day with a moderate heat. The liquor ought then to be poured off, ſtrained, and cleared by ſettling. This clear liquor is now fit to receive the required colour from certain reſinous colouring ſubſtances, the principal of which are gamboge and annotto; the former of which gives a yellow, and the latter an orange colour. In order to give a golden colour, two parts of gamboge are added to one of annotto; but theſe colouring ſubſtances may be ſeparately diſſolved in the tincture of lac, and the colour required may be adjuſted by mixing the two ſolutions in different proportions. When ſilver leaf or tin is to be lacquered, a larger quantity of the colouring materials is requiſite than when the lacquer is intended to be laid on braſs.

LACTATIO, LACTATION, among medical writers, denotes the *giving ſuck*. The mother's breaſt, if poſſible, ſhould be allowed the child, at leaſt during the firſt month; for thus the child is more peculiarly benefited by what it ſucks, and the mother is preſerved from more real inconveniences than the falſely delicate imagine they would ſuffer by compliance herewith: but if by reaſon of an infirm conſtitution, or other cauſes, the mother cannot ſuckle her child, let dry nurſing under the mother's eye be purſued.

When women loſe their appetite by giving ſuck, both the children and themſelves are thereby injured; wet nurſes are to be preferred, who, during the time they give the breaſt, have rather an increaſed appetite, and digeſt more quickly; the former are apt to waſte away, and ſometimes die conſumptive. In ſhort, thoſe nurſes with whom lactation may for a while agree, ſhould wean the child as ſoon as their appetite leſſens, their ſtrength ſeems to fail, or a tendency to hyſteric ſymptoms is manifeſt.

When the new-born child is to be brought up by the mother's breaſt, apply it thereto in ten or twelve hours after delivery; thus the milk is ſooner and more eaſily ſupplied, and there is leſs hazard of a fever than when the child is not put to it before the milk begins to flow of itſelf.

If the mother does not ſuckle her child, her breaſts ſhould be ſo kept warm with flannels, or with a hare-ſkin, that a conſtant perſpiration may be ſupported; thus there rarely will ariſe much inconvenience from the milk.

The child, notwithſtanding all our care in dry nurſing, ſometimes pines if a breaſt is not allowed. In this caſe a wet nurſe ſhould be provided, if poſſible one that hath not been long delivered of a child. She ſhould be young, of a healthy habit, and an active diſpoſition, a mild temper, and whoſe breaſts are well filled with milk. If the milk is good, it is ſweetiſh to the taſte, and totally free from ſaltneſs; to the eye it appears thin, and of a blueiſh caſt. That the woman hath her menſes, if in other reſpects objections are not made, this need not be any; and as to the cuſtom with many, of abſtaining from venery while they continue to ſuckle a child, it is ſo far without reaſon to ſupport it, that the truth is, a rigorous chaſtity is as hurtful, and often more pernicious than an immoderate uſe of venery. Amongſt the vulgar errors, is that of red-haired women being improper for wet nurſes.

If the menſes do not appear during the firſt months, but after ſix or eight months ſuckling they begin to deſcend, the child ſhould be weaned.

Wet nurſes ſhould eat at leaſt one hearty meal of animal food every day; with this a proper quantity of vegetables ſhould be mixed. Thin broth or milk is proper for their breakfaſts and their ſuppers; and if the ſtrength ſhould ſeem to fail a little, a draught of good ale ſhould now and then be allowed: but ſpirituous liquors muſt in general be forborne; not but a ſpoonful of rum may be allowed in a quart of milk

and water (that is, a pint of each), which is a proper common drink.

Though it is well obſerved by Dr. Hunter, that the far greater number of thoſe women who have cancers in the breaſt or womb are old maids, and thoſe who refuſe to give ſuck to their children; yet it is the unhappineſs of ſome willing mothers not to be able: for inſtance, thoſe with tender conſtitutions, and who are ſubject to nervous diſorders; thoſe who do not eat a ſufficient quantity of ſolid food, nor enjoy the benefit of exerciſe and air: if children are kept at their breaſts, they either die whilſt young, or are weak and ſickly after childhood is paſt, and ſo on through remaining life.

LACTANTIUS (Lucius Cœlius Firmianus), a celebrated author at the beginning of the 4th century, was, according to Baronius, an African; but, according to others, was born at Fermo in the marquiſate of Ancona, from whence it is imagined he was called *Firmianus*. He ſtudied rhetoric under Arnobius, and was afterwards a profeſſor of that ſcience in Africa and Nicomedia, where he was ſo admired, that the emperor Conſtantine choſe him preceptor to his ſon Criſpus Cæſar. Lactantius was ſo far from ſeeking the pleaſures and riches of the court, that he lived there in poverty, and, according to Euſebius, frequently wanted neceſſaries. His works are written in elegant Latin; the principal of which are, 1. *De ira divina*. 2. *De operibus Dei*, in which he treats of the creation of man, and of divine providence. 3. Divine Inſtitutions, in ſeven books. This is the moſt conſiderable of all his works: he there undertakes to prove the truth of the Chriſtian religion, and to refute all the difficulties that had been raiſed againſt it; and he ſolidly, and with great ſtrength, attacks the illuſions of paganiſm. His ſtyle is pure, clear, and natural, and his expreſſions noble and elegant, on which account he has been called the *Cicero of the Chriſtians*. There is alſo attributed to him a treatiſe *De morte perſecutorum*; but ſeveral of the learned doubt its being written by Lactantius. The moſt copious edition of Lactantius's works is that of Paris in 1748, 2 vols. 4to.

LACTEALS, or Lacteal Veſſels, a kind of long ſlender tubes for the conveyance of the chyle from the inteſtines to the common reſervatory. See Anatomy.

LACTIFEROUS, an appellation given to plants abounding with a milky juice, as the ſow-thiſtle and the like. The name of *lactiferous*, or *lacteſcent*, is given to all thoſe plants which abound with a thick-coloured juice, without regarding whether it is white or not. Moſt lactiferous plants are poiſonous, except thoſe with compound flowers, which are generally of an innocent quality.

Of the poiſonous lacteſcent plants the moſt remarkable are ſumach, agaric, maple, burning thorny plant, caſſada, celandine, puccoon, prickly poppy, and the plants of the natural order *contortæ*, as ſwallow-wort, apocynum, cynauchum, and cerbera. The bell-ſhaped flowers are partly noxious, as cardinal flower; partly innocent, as campanula.

Among the lacteſcent plants with compound flowers that are innocent in their quality, may be mentioned dandelion, picris, hyoſeris, wild lettuce, gum-ſuccory, hawk-weed, baſtard hawk weed, hypocharis, goat's-beard, and moſt ſpecies of lettuce: we ſay moſt ſpecies, becauſe the prickly ſpecies of that genus are ſaid to be of a very virulent and poiſonous nature; though Mr. Lightfoot denies this, and affirms that they are a ſafe and gentle opiate, and that a ſyrup made from the leaves and ſtalks is preferable to the common diacodium.

LACTUCA, in botany: a genus of the polygamia æqualis order, belonging to the ſyngeneſia claſs of plants: and in the natural method ranking under the 49th order, *Compoſitæ*. The receptacle is naked; the calyx imbricated, cylindrical, with a membranaceous margin; the pappus is ſimple, ſtipated, or ſtalked. There are ſeveral ſpecies, moſt of which are plants of no uſe, and never cultivated but in botanic gardens for variety. Thoſe commonly cultivated in the kitchen-garden for uſe, are, 1. The common or garden lettuce. 2. Cabbage lettuce. 3. Sileſia lettuce. 4. Dutch brown lettuce. 5. Aleppo lettuce. 6. Imperial lettuce. 7. Green capuchin lettuce. 8. Verſailles or upright white Cos lettuce. 9. Black Cos. 10. Red Cos. 11. Red capuchin lettuce. 12. Roman lettuce. 13. Prince lettuce. 14. Royal lettuce. 15. Egyptian Cos lettuce.

The firſt of theſe ſorts is very common in all gardens, and is commonly ſown for cutting very young, to mix with other ſalad herbs in ſpring; and the ſecond, or cabbage lettuce, is only this mended by culture. It may be ſown at all times of the year, but in the hot months requires to be ſown in ſhady borders. The cabbage lettuce may alſo be ſown at different ſeaſons, to have a continuation of it through the ſummer. The firſt crop ſhould be ſown in February, in an open ſituation; the others at three weeks diſtance; but the later ones under covert, but not under the drippings of trees. The Sileſia, imperial, royal, black, white, and upright Cos lettuces, may be firſt ſown in the latter end of February or the beginning of March, on a warm light ſoil, and in an open ſituation: when the plants are come up, they muſt be thinned to 15 inches diſtance every way; they will then require no further care than the keeping them clear of weeds; and the black Cos, as it grows large, ſhould have its leaves tied together to whiten the inner part. Succeeding crops of theſe ſhould be ſown in April, May, and June; and toward the latter end of Auguſt they may be ſown for a winter crop, to be preſerved under glaſſes, or in a bed arched over with hoops and covered with mats. The moſt valuable of all the Engliſh lettuces are the white Cos or the Verſailles, the Sileſia, and the black Cos. The brown Dutch and the green capuchin are very hardy, and may be ſown late under walls, where they will ſtand the winter, and be valuable when no others are to be had. The red capuchin, Roman, and prince lettuce, are very early kinds, and are ſown for variety; as are alſo the Aleppo ones for the beauty of their ſpotted leaves.

The ſeveral ſorts of garden lettuces are very wholeſome, emollient, cooling ſalad herbs, eaſy of digeſtion, and ſomewhat looſening the belly. Moſt writers ſuppoſe that they have a narcotic quality; and indeed in many caſes they contribute to procure reſt; this they effect by abating heat, and relaxing the fibres. The ſeeds are in the number of the four leſſer cold ſeeds.

The viroſa, or ſtrong-ſcented wild lettuce, which is indigenous in Britain, and grows in ſome places in conſiderable abundance, differs very eſſentially in its qualities from the garden lettuce. Although it has not been introduced into any of the modern pharmacopœias, yet it has of late been highly extolled for ſome purpoſes in medicine. It ſmells ſtrongly of opium, and reſembles it in ſome of its effects; and its narcotic power, like that of the poppy heads, reſides in its milky juice. An extract from the expreſſed juice is recommended in ſmall doſes in dropſy. In dropſies of long ſtanding, proceeding from viſceral obſtructions, it has been given to the extent of half an ounce a-day. It is ſaid to agree with the ſtomach, to quench thirſt, to be gently laxative, powerfully diuretic, and ſomewhat diaphoretic. Plentiful dilution is allowed during its operation. Dr. Collin of Vienna aſſerts, that out of 24 dropſical patients, all but one were cured by this medicine.

LACUNÆ, among anatomiſts, certain excretory canals in the genital parts of women.

LACUNAR, in architecture, an arched roof or ceiling, more eſpecially the planking or flooring above porticos or piazzas.

LACYDES, a Greek philoſopher, born at Cyrene, was the diſciple of Arceſilaus, and his ſucceſſor in the academy. He taught in a garden given him by Attalus king of Pergamus; but that prince ſending for him to court, he replied, "That the pictures of kings ſhould be viewed at a diſtance." He imitated his maſter in the pleaſure he took in doing good without caring to have it known: he had a gooſe which followed him every where by night as well as by day; and when ſhe died, he made a funeral for her, which was as magnificent as if it had been for a ſon or a brother. He taught the ſame doctrine as Arceſilaus; and pretended that we ought to determine nothing, but always to ſuſpend our opinion. He died 212 B. C.

LADDER, a frame made with a number of ſteps, by means of which people may aſcend, as on a ſtair, to places otherwiſe inacceſſible.

Scaling LADDERS, in the military art, are uſed in ſcaling when a place is to be taken by ſurpriſe. They are made ſeveral ways: here we make them of flat ſtaves, ſo that they may move about their pins, and ſhut like a parallel ruler, for conveniently carrying them: the French make them of ſeveral pieces, ſo as to be joined together, and to be made of any neceſſary length: ſometimes they are made of ſingle ropes, knotted at proper diſtances, with iron hooks at each end, one to faſten them upon the wall above, and the other in the ground; and ſometimes they are made with two ropes, and ſtaves between them, to keep the ropes at a proper diſtance, and to tread upon. When they are uſed in the action of ſcaling walls, they ought to be rather too long than too ſhort, and to be given in charge only to the ſtouteſt of the detachment. The ſoldiers ſhould carry theſe ladders with the left arm paſſed through the ſecond ſtep, taking care to hold them upright cloſe to their ſides, and very ſhort below, to prevent any accident in leaping into the ditch.

The firſt rank of each diviſion, provided with ladders, ſhould ſet out with the reſt at the ſignal, marching reſolutely with their firelocks ſlung, to jump into the ditch: when they are arrived, they ſhould apply their ladders againſt the parapet, obſerving to place them towards the ſalient angles rather than the middle of the curtain, becauſe the enemy have leſs force there. Care muſt be taken to place the ladders within a foot of each other, and not to give them too much or too little ſlope, ſo that they may not be overturned or broke with the weight of the ſoldiers mounting upon them.

The ladders being applied, they who have carried them, and they who come after, ſhould mount up, and ruſh upon the enemy ſword in hand: if he who goes firſt happens to be overturned, the next ſhould take care not to be thrown down by his comrade; but, on the contrary, immediately mount himſelf, ſo as not to give the enemy time to load his piece.

As the ſoldiers who mount firſt may be eaſily tumbled over, and their fall may cauſe the attack to fail, it would perhaps be right to protect their breaſts with the fore-parts of cuiraſſes; becauſe, if they can penetrate, the reſt may eaſily follow.

The ſucceſs of an attack by ſcaling is infallible, if they mount the four ſides at once, and take care to ſhower a number of grenades amongſt the enemy, eſpecially when ſupported by ſome grenadiers and picquets, who ſhare the attention and fire of the enemy.

LADEN, in the ſea language, the ſtate of a ſhip when ſhe is charged with a weight or quantity of any ſort of merchandiſes, or other materials, equal to her tonnage or burden. If the cargo with which ſhe is laden is extremely heavy, her burden is determined by the weight of the goods; and if it is light, ſhe carries as much as ſhe can *ſtow*, to be fit for the purpoſes of navigation. As a ton in meaſure is generally eſtimated at 2000 lb. in weight, a veſſel of 200 tons ought accordingly to carry a weight equal to 400,000 lb. when the matter of which the cargo is compoſed is ſpecifically heavier than the water in which ſhe floats; or, in other words, when the cargo is ſo heavy that ſhe cannot float high enough with ſo great a quantity of it as her hold will contain.

LADEN *in Bulk*, the ſtate of being freighted with a cargo which is neither in caſks, boxes, bales, nor caſes, but lies looſe in the hold, being defended from the moiſture or wet of the hold by a number of mats and a quantity of *dunage*. Such are uſually the cargoes of corn, ſalt, or ſuch materials.

LADENBURG, a town of Germany in the Palatinate of the Rhine, ſeated on the river Neckar, in E. lon. 8. 42, N. lat. 49. 27. It belongs to the biſhopric of Worms, and the elector Palatine.

LADOGA, a town of the Ruſſian empire, ſeated on a great lake of the ſame name, which has a communication with the gulf of Finland, by the river Nieva; and it abounds in fiſh, particularly ſalmon. E. lon. 33. 29. N. lat. 60. 0.

LADOGNA, or LACEDOGNA, a town of Italy, in the kingdom of Naples, and in the Capitanata, with a biſhop's ſee. E. long. 15. 12. N. lat. 41. 16.

LADON (anc. geog.), a river of Arcadia falling into the ALPHEUS. The metamorphoſis of Daphne into a laurel, and of Syrinx into a reed, happened near its banks.

LADRONE or MARIAN Iſlands, a cluſter of twelve iſlands lying in the Pacific Ocean, in about 145° of eaſt longitude, and between the 11th and 21ſt degree of north latitude. They were firſt diſcovered by Magellan, who ſailed round the world through the ſtraits which bear his name. He gave them the name of *Ladrone Iſlands*, or the *Iſlands of Thieves*, from the thieviſh diſpoſition of the inhabitants. At the time theſe iſlands were diſcovered by the Europeans, the natives were totally unacquainted with any other country beſides their own; and having no traditionary accounts of their own origin, they imagined that the author of their race was formed of a piece of the rock of Funa, one of their ſmalleſt iſlands. Many things looked upon by us as abſolutely neceſſary to our exiſtence, were utterly unknown to theſe people. They had no animals of any ſort: and would not even have had any idea of them, had it not been for the birds; and even of them they had but one ſpecies, ſomewhat like the turtle-dove, which they never killed for eating, but only tamed them, and taught them to ſpeak. They were much aſtoniſhed on ſeeing a horſe which a Spaniſh captain left among them in 1673, and could not for a long time be ſatisfied with admiring him. But what is moſt ſurpriſing and incredible in their hiſtory is, that they were utterly unacquainted with the element of fire, till Magellan, provoked by their repeated thefts, burned one of their villages. When they ſaw their wooden houſes blazing, they firſt thought that the fire was a beaſt which fed upon the wood; and ſome of them who came too near being burned, the reſt ſtood at a diſtance, leſt they ſhould be devoured or poiſoned by the breathings of this terrible animal.

The inhabitants of the Ladrones are olive-coloured, but not of ſuch a deep dye as thoſe of the Philippine iſlands: their ſtature is good, and their limbs well proportioned. Though their food conſiſts entirely of fiſh, fruits, and roots, yet they are ſo fat, that to ſtrangers they appear ſwelled, but this does not render them leſs nimble and active. They often live to 100 years or more, yet retain the health and vigour of men of 50. The men go ſtark naked, but the women are covered. They are not ill-looked, and take great care of their beauty, though their ideas on that ſubject are very different from ours. They love black teeth and white hair. Hence one of their principal occupations is to keep their teeth black by the help of certain herbs, and to whiten their hair, ſprinkling upon it a certain water for this purpoſe. The women have their hair

very long; but the men generally ſhave it cloſe, except a ſingle lock on the crown of the head, after the manner of the Japaneſe. Their language much reſembles that of the people called *Tagales* in the Philippine iſlands. It is agreeable to the ear, with a ſoft and eaſy pronunciation. One of its chief graces conſiſts in the facility of tranſpoſing words, and even all the ſyllables of one word; and thus furniſhing a variety of double meanings, with which theſe people are greatly delighted. Though plunged in the deepeſt ignorance, and deſtitute of every thing valued by the reſt of mankind, no nation ever ſhowed more preſumption, or a greater conceit of themſelves, than theſe iſlanders, looking on their own nation as the only wiſe, ſenſible, and poliſhed one in the world, and beholding every other people with the greateſt contempt. Though they are ignorant of the arts and ſciences, yet, like every other nation, they have their fables which ſerve them for hiſtory, and ſome poems which they greatly admire. A poet is with them a character of the firſt eminence, and greatly reſpected.

We neither know at what time nor from what place the Ladrone iſlands were firſt peopled. As Japan lies within ſix or ſeven days ſail of them, ſome have been induced to believe, that the firſt inhabitants of the Ladrones came from Japan. But from their greater reſemblance to the inhabitants of the Philippine iſlands than to the Japaneſe, it is more probable that they came from the former than the latter. Formerly moſt of the iſlands were inhabited; and about 90 years ago, the three principal iſlands, Guam, Tinian, and Rota, are ſaid to have contained 50,000 people; but ſince that time, Tinian hath been entirely depopulated, and only 200 or 300 Indians left at Rota to cultivate rice for the iſland of Guam, which alone is inhabited by Europeans, and where the Spaniards have a governor and a garriſon: here alſo the annual Manilla ſhip touches for refreſhments in her paſſage from Acapulco to the Philippines. The iſland of Tinian afforded an aſylum to commodore Anſon in 1742; and the maſterly manner in which the author of that voyage paints the natural beauties of the country, hath given a degree of eſtimation not only to this iſland, but to all the reſt, which they had not before. Commodore Byron, in 1765, continued nine weeks at Tinian, and anchored in the very ſpot where the Centurion lay; but gives a much leſs favourable account of this climate and country than the former navigator. The water, he ſays, is brackiſh, and full of worms; many of his men were ſeized with fevers, occaſioned by the intenſe heat; the thermometer, which was kept on board the ſhip, generally ſtood at 86°, which is but 10 or 11 degrees leſs than the heat of the blood at the heart; and had the inſtrument been aſhore, he imagines it would have ſtood much higher than it did. It was with the greateſt difficulty that they could penetrate through the woods; and when they had fortunately killed a bull, and with prodigious labour dragged it through the foreſts to the beach, it ſtunk, and was full of fly blows by the time it reached the ſhip. The poultry was ill-taſted; and within an hour after it was killed, the fleſh became as green as graſs, and ſwarmed with maggots. The wild hogs were very fierce; and ſo large, that a carcaſe frequently weighed 200 pounds. Cotton and indigo were found on the iſland. Captain Wallis continued here a month in 1767, but makes no ſuch complaints.

LADY, a title derived from two Saxon words, which ſignify *bread-giver*, which words have in time been contracted into the preſent appellation. It properly belongs only to the daughters of earls, and all of higher rank; but cuſtom has made it a word of complaiſance for the wives of knights and gentlemen. As to the original application of this expreſſion, it may be obſerved, that heretofore it was the faſhion for thoſe families, whom God had bleſſed with affluence, to live conſtantly at their mannion-houſes in the country, and that once a-week, or oftener, the lady of the manor diſtributed to her poor neighbours, *with her own hands*, a certain quantity of bread: but the practice, which gave riſe to this title, is now as little known as the meaning of it: however, it may be from that hoſpitable cuſtom, that to this day the ladies in this kingdom alone ſerve the meat at their own table.

LADY's *Bedſtraw*. See GALLIUM.

LADY's *Mantle*. See ALCHEMILLA.

LADY's *Smock*. See CARDAMINE.

LADY's *Slipper*. See CYPRIPEDIUM.

LADY's *Traces*. See OPHRYS.

LADY-*Day*, in law, the 25th of March, being the annunciation of the Holy Virgin. See ANNUNCIATION.

LÆLIUS (CAIUS), a Roman conſul and great orator, ſurnamed the *Wiſe*, diſtinguiſhed himſelf in Spain in the war againſt Viriathus the Spaniſh general. He is highly praiſed by Cicero, who gives an admirable deſcription of the intimate friendſhip which ſubſiſted between Lælius and Scipio Africanus the younger. His eloquence, his modeſty, and his abilities, acquired him a great reputation; and he is thought to have aſſiſted Terence in his comedies. He died about 126 B. C.

LÆNA, in antiquity, was a gown worn by the Roman augurs, and peculiar to their office. In this gown they covered their heads when they made their obſervations on the flight of birds, &c. See AUGUR.

LAER. See BAMBOCCIO.

LÆSTRYGONES, the moſt ancient inhabitants of Sicily. Some ſuppoſe them to be the ſame as the people of Leontium, and to have been neighbours to the Cyclops. They fed on human fleſh; and when Ulyſſes came on their coaſts, they ſunk his ſhips and devoured his companions. They were of a gigantic ſtature, according to Homer's deſcription. A colony of them, as ſome ſuppoſe, paſſed over into Italy with Lamus at their head, where they built the town of Formiæ, whence the epithet of *Læſtrygonia* is often uſed for that of *Formiana*.

LAET (JOHN DE), a writer in the 17th century, born at Antwerp, was director of the Weſt India company. He acquired great ſkill in the languages, in hiſtory, and geography; and had the management of Elzevir's edition of A Deſcription of moſt Kingdoms in the World, printed in Latin. He wrote in French, A Deſcription of the Eaſt Indies, and other works; and died in 1649.

LAETIA, in botany; a genus of the monogynia order, belonging to the polyandria claſs of plants; and in the natural method ranking with thoſe of which the order is doubtful. The corolla is pentapetalous, or none; the calyx is pentaphyllous; the fruit unilocular and trigonal; the ſeeds have a pulpy arillus or coat. There are two ſpecies, both natives of America. One of them, the apetala, or gum-wood, Dr. Wright informs us, is very common in the woodlands and copſes of Jamaica, where it riſes to a conſiderable height and thickneſs. The trunks are ſmooth and white; the leaves are three inches long, a little ſerrated, and ſomewhat hairy. The ſtamina are yellow, without petals: the fruit is as large as a plum; and when ripe, opens and ſhows a number of ſmall ſeeds in a reddiſh pulp. Pieces of the trunk or branches, ſuſpended in the heat of the ſun, diſcharge a clear turpentine or balſam, which concretes into a white reſin, and which ſeems to be the ſame as gum ſandarach. Pounce is there made of it; and our author is of opinion, that it might be uſeful in medicine like other gums of the ſame nature.

LÆVINUS (TORRENTINUS), commonly called *Vander Bekin*, or *Torrentin*, was a native of Ghent, and bred in the univerſity of Louvain. He afterwards made the tour of Italy, where his virtues obtained him the friendſhip of the moſt illuſtrious perſonages of his time. On his return to the Low Countries, he was made canon of Liege, and vicar-general to Erneſt

de Baviere, biſhop of that ſee. At length, having executed a ſucceſsful embaſſy to Philip II. of Spain, he was rewarded with the biſhopric of Antwerp; from whence he was tranſlated to the metropolitan church of Mechlin, and died there in 1595. He founded a college of Jeſuits at Louvain, to which he left his library, medals, and curioſities. He wrote ſeveral poems that procured him the character of being, after Horace, the prince of the lyric poets.

LÆVIUS, a Latin poet. It is not well known when he lived, but probably he was more ancient than Cicero. He wrote a poem entitled *Erotopægnia*, i. e. *love games*. Aulus Gellius quotes two lines of it. Apuleius alſo quotes ſix lines from the ſame poet; but he does not tell from what work he borrowed them. Lævius had alſo compoſed a poem entitled *The Centaurs*, which Feſtus quotes under the title of *Petrarum*.

LAGAN, or LAGON. See FLOTSON.

LAGEMAN *(lagammannus)*, *homo habens legem*, or *homo legalis, ſeu legitimus*; ſuch as we call now "good men of the jury." The word is frequently uſed in Domeſday, and the laws of Edward the Confeſſor, cap. 38.

LAGEN *(lagena)*, in ancient time, was a meaſure of wine, containing ſix ſextarii: whence probably is derived our *flagon*. The lieutenant of the tower has the privilege to take *unam lagenam vini ante malum & retro*, of all wine ſhips that come upon the Thames; and Sir Peter Leiceſter, in his Antiquities of Cheſhire, interprets *lagena vini*, "a bottle of wine."

LAGERSTROEMIA, in botany; a genus of the monogynia order, belonging to the polyandria claſs of plants. The corolla is hexapetalous, and curled; the calyx ſexfid, and campanulated; there are many ſtamina, and of theſe the ſix exterior ones thicker than the reſt, and longer than the petals.

LAGNY, a town of France, in the department of Seine and Marne and late province of the Iſle of France, with a late famous Benedictine abbey. It is ſeated on the Marne, 15 miles E. of Paris. Lon. 2. 45. E. Lat. 48. 50. N.

LAGOECIA, in botany; a genus of the monogynia order, belonging to the pentandria claſs of plants. The involucrum is univerſal and partial; the petals bifid; the ſeeds ſolitary, inferior.

LAGOON ISLAND, one of the new diſcovered iſlands in the South Sea, lying in S. lat. 18. 47. W. lon. 139. 28. It is of an oval form, with a lake in the middle, which occupies much the greateſt part of it. The whole iſland is covered with trees of different growth. It is inhabited by a race of Indians, tall, of a copper colour, with long black hair. Their weapons are poles or ſpikes, which are twice as long as themſelves. Their habitations were ſeen under ſome clumps of palm-trees, which formed very beautiful groves. This iſland was diſcovered by captain Cook in April 1769.

LAGOPUS, in ornithology. See TETRAO.

LAGOS, a ſea-port town of Portugal, in the province of Algarva, with a caſtle near the ſea, where there is a good harbour, and where the Engliſh fleets bound to the Straits uſually take in freſh water. W. long. 8. 5. N. lat. 36. 45.

LAGUNA, or *San Chriſtoval de Laguna*, a conſiderable town in the iſland of Teneriff, near a lake of the ſame name, on the declivity of a hill. It has very handſome buildings, and a fine ſquare. W. long. 16. 24. N. lat. 28. 30.

LAGUNES OF VENICE, are marſhes or lakes in Italy on which Venice is ſeated. They communicate with the ſea, and are the ſecurity of the city. There are about ſixty iſlands in theſe Lagunes, which together make a biſhop's ſee. Eurano is the moſt conſiderable, next to thoſe on which Venice ſtands.

LAGURUS, in botany: a genus of the digynia order, belonging to the triandria claſs of plants; and in the natural method ranking under the fourth order, *Gramina*. The calyx is bivalved, with a villous awn; the exterior petal of the corolla terminated by two awns, with a third on its back retorted.

LAHOLM, a ſea-port town of Sweden, in the province of Gothland, and territory of Holland, ſeated near the Baltic Sea, with a caſtle and a harbour, in E. long. 13. 13. N. lat. 56. 35.

LAHOR, a large town of Aſia, in Indoſtan, and capital of a province of the ſame name, and one of the moſt conſiderable in the Mogul's dominions. It is of a vaſt circumference, and contains a great number of moſques, public baths, caravanſeras, and pagods. It was the reſidence of the Great Mogul; but ſince the removal of the court, the fine palace is going to decay. There is a magnificent walk of ſhady trees, which runs from this to Agra, that is upwards of 300 miles. Here they have manufactures of cotton cloths and ſtuffs of all kinds, and they make very curious carpets. Eaſt long. 75. 55. North lat. 31. 40.

LAINEZ (JAMES), a Spaniard, companion of Ignatius of Loyola, ſecond general of the Jeſuits, and a man of a more daring and political character. Having procured from pope Paul IV. the perpetual generalſhip of the new order of Jeſuits, after the death of Ignatius, he got the following privileges ratified by that pontiff, which ſhow that he was in fact the founder of the worſt part of their inſtitution: 1. The right of making all ſorts of contracts (without the privity of the community) veſted in the generals and their delegates. 2. That of giving authenticity to all comments and explanations of their conſtitutions. 3. The power of making new, and altering the old: this opened the door to their bloody political tenets, not to be attributed to Loyola. 4. That of having priſons independent of the ſecular authority, in which they put to death refractory brethren. Lainez died in 1565, aged 53.

LAIRESSE (GERARD), an eminent Flemiſh painter, born at Liege in 1640. He received the principal part of his inſtruction from his father Reniere de Laireſſe, though he is alſo accounted a diſciple of Bartolet. He firſt ſettled at Utrecht, where he lived in diſtreſſed circumſtances; but an accidental recommendation carrying him to Amſterdam, he ſoon exchanged want and obſcurity for affluence and reputation. He was a perfect maſter of hiſtory; his deſigns are diſtinguiſhed by the grandeur of the compoſition; and the back grounds, wherever the ſubjects required it, are rich in architecture, which is an uncommon circumſtance in that country. He had the unhappineſs to loſe his ſight ſeveral years before his death, which happened in 1711; ſo that the treatiſe on deſign and colouring, which paſſes under his name, was not wrote by him, but collected from his obſervations after he was blind, and publiſhed after his death. He had three ſons, two of whom were painters; and alſo three brothers, Erneſt, James, and John: Erneſt and John painted animals, and James was a flower-painter. He engraved a good deal in aquafortis: his works conſiſt of 256 plates, above half of which were done with his own hand. He wrote an excellent book on the art, which has been tranſlated into Engliſh, and printed at London both in 4to and 8vo.

LAIS, a celebrated courtezan, daughter of Timandra, the miſtreſs of Alcibiades, born at Hyccara in Sicily. She was carried away from her native Greece, when Nicias the Athenian general invaded Sicily. She firſt began to ſell her favours at Corinth for 10,000 drams, and the immenſe number of princes, noblemen, philoſophers, orators, and plebeians which courted her embraces, ſhow how much commendation is owed to her perſonal charms. The expences which attended her pleaſures, gave riſe to the proverb of *Non cuivis homini contingit adire Corinthum*. Even Demoſthenes himſelf viſited Corinth for the ſake of Lais; but when he was informed by the courtezan, that admittance to her bed was to be bought at the

enormous ſum of about 200*l.* Engliſh money, the orator departed, and obſerved that he would not buy repentance at ſo dear a price. The charms which had attracted Demoſthenes to Corinth, had no influence upon Xenocrates. When Lais ſaw the philoſopher unmoved by her beauty, ſhe viſited his houſe herſelf; but there ſhe had no reaſon to boaſt of the licentiouſneſs or eaſy ſubmiſſion of Xenocrates. Diogenes the cynic was one of her warmeſt admirers; and though filthy in his dreſs and manners, yet he gained her heart and enjoyed her moſt unbounded favours. The ſculptor Mycon alſo ſolicited the favours of Lais, but he met with coldneſs: he, however, attributed the cauſe of his ill reception to the whiteneſs of his hair, and dyed it of a brown colour, but to no purpoſe: "Fool that thou art (ſaid the courtezan) to aſk what I refuſed yeſterday to thy father!" Lais ridiculed the auſterity of philoſophers, and laughed at the weakneſs of thoſe who pretend to have gained a ſuperiority over their paſſions, by obſerving, that the ſages and philoſophers of the age were not above the reſt of mankind, for ſhe found them at her door as often as the reſt of the Athenians. The ſucceſs which her debaucheries met at Corinth encouraged Lais to paſs into Theſſaly, and more particularly to enjoy the company of a favourite youth called Hippoſtratus. She was however diſappointed: the women of the place, jealous of her charms, and apprehenſive of her corrupting the fidelity of their huſbands, aſſaſſinated her in the temple of Venus, about 340 years before the Chriſtian æra. Some ſuppoſe that there were two perſons of this name, a mother and her daughter.

LAITY, the people as diſtinguiſhed from the clergy; (ſee CLERGY). The lay part of his majeſty's ſubjects is divided into three diſtinct ſtates; the civil, the military, and the maritime. See CIVIL, MILITARY, MARITIME.

LAKE, a collection of waters contained in ſome cavity in an inland place, of a large extent, ſurrounded with land, and having no communication with the ocean. Lakes may be divided into four kinds. 1. Such as neither receive nor ſend forth rivers. 2. Such as emit rivers, without receiving any. 3. Such as receive rivers, without emitting any. And, 4. Such as both receive and ſend forth rivers. Of the firſt kind, ſome are temporary and others perennial. Moſt of thoſe that are temporary owe their origin to the rain, and the cavity or depreſſion of the place in which they are lodged: thus in India there are ſeveral ſuch lakes made by the induſtry of the natives, of which ſome are a mile, and ſome two, in circuit; theſe are ſurrounded with a ſtone wall, and being filled in the rainy months, ſupply the inhabitants in dry ſeaſons who live at a great diſtance from ſprings or rivers. There are alſo ſeveral of this kind formed by the inundations of the Nile and the Niger; and in Muſcovy, Finland, and Lapland, there are many lakes formed, partly by the rains, and partly by the melting of the ice and ſnow: but moſt of the perennial lakes, which neither receive nor emit rivers, probably owe their riſe to ſprings at the bottom, by which they are conſtantly ſupplied. The ſecond kind of lakes, which emit without receiving rivers, is very numerous. Many rivers flow from theſe as out of ciſterns; where their ſprings being ſituated low within a hollow place, firſt fill the cavity and make it a lake, which not being capacious enough to hold all the water, it overflows and forms a river: of this kind is the Wolga, at the head of the river Wolga; the lake Odium, at the head of the Tanais; the Adac, from whence one branch of the river Tigris flows: the Ozero, or White lake, in Muſcovy, is the ſource of the river Shakſna; the great lake Chaamay, which emits four very large rivers, which water the countries of Siam, Pegu, &c. *viz.* the Menan, the Aſa, the Caipoumo, and the Laquia, &c. The third ſpecies of lakes, which receive rivers but emit none, apparently owe their origin to thoſe rivers which, in their progreſs from their ſource, falling into ſome extenſive cavity, are collected together, and form a lake of ſuch dimenſions as may loſe as much by exhalation as it continually receives from theſe ſources: of this kind is that great lake improperly called the *Caſpian Sea*; the lake Aſphaltites, alſo called the *Dead Sea*; the lake of Geneva, and ſeveral others. Of the fourth ſpecies, which both receive and emit rivers, we reckon three kinds, as the quantity they emit is greater, equal or leſs, than they receive. If it be greater, it is plain that they muſt be ſupplied by ſprings at the bottom; if leſs, the ſurplus of the water is probably ſpent in exhalations; and if it be equal, their ſprings juſt ſupply what is evaporated by the ſun.

Lakes are alſo divided into thoſe of freſh water and thoſe of ſalt. Dr. Halley is of opinion, that all great perennial lakes are ſaline, either in a greater or leſs degree; and that this ſaltneſs increaſes with time: and on this foundation he propoſes a method for determining the age of the world.

Large lakes anſwer the moſt valuable purpoſes in the northern regions, the warm vapours that ariſe from them moderating the pinching cold of thoſe climates; and what is ſtill a greater advantage, when they are placed in warmer climates at a great diſtance from the ſea, the exhalations raiſed from them by the ſun cauſe the countries that border upon them to be refreſhed with frequent ſhowers, and conſequently prevent their being barren deſerts.

LAKE, or *Laque*, a preparation of different ſubſtances into a kind of magiſtery for the uſe of painters: one of the fineſt and firſt invented of which was that of *gum-lacca* or *lacque*; from which all the reſt, as made by the ſame proceſs, are called by the common name *lacques*. See LACCA.

The method of preparing theſe, in general, may be known by the example of that of the curcuma-root of the ſhops, called *turmeric-root*; the proceſs for the making of which is this: Take a pound of turmeric-root in fine powder, three pints of water, and an ounce of ſalt of tartar; put all into a glazed earthen veſſel, and let them boil together over a clear gentle fire, till the water appears highly impregnated with the root, and will ſtain a paper to a beautiful yellow. Filter this liquor, and gradually add to it a ſtrong ſolution of roch alum in water, till the yellow matter is all curdled together, and precipitated; after this, pour the whole into a filter of paper, and the water will run off and leave the yellow matter behind. It is to be waſhed many times with freſh water, till the water comes off inſipid, and then is obtained the beautiful yellow called *lacque of turmeric*, and uſed in painting.

In this manner may a lake be made of any of the tingeing ſubſtances that are of a ſomewhat ſtrong texture, as madder, logwood, &c. but it will not ſucceed in the more tender ſpecies, as the flowers of roſes, violets, &c. as it deſtroys the nice arrangement of parts in thoſe ſubjects on which the colour depends.

A yellow lake for painting is to be made from broom-flowers in the following manner: Make a ley of pot-aſhes and lime reaſonably ſtrong; in this boil, at a gentle fire, freſh broom-flowers, till they are white, the ley having extracted all their colour; then take out the flowers, and put the ley to boil in earthen veſſels over the fire; add as much alum as the liquor will diſſolve; then empty this ley into a veſſel of clean water, and it will give a yellow colour at the bottom. Let all ſettle, and decant off the clear liquor. Waſh this powder, which is found at the bottom, with more water, till all the ſalts of the ley are waſhed off; then ſeparate the yellow matter, and dry it in the ſhade. It proves a very valuable yellow.

Lake is at preſent ſeldom prepared from any other ſubſtance than ſcarlet rags, cochineal, and Braſil-wood. The beſt of

what is commonly ſold is made from the colour extracted from ſcarlet rags, and depoſited on the cuttle bone; and this may be prepared in the following manner: Diſſolve a pound of the beſt pearl-aſhes in two quarts of water, and filter the liquor through paper; add to this ſolution two more quarts of water and a pound of clean ſcarlet ſhreds, and boil them in a pewter boiler till the ſhreds have loſt their ſcarlet colour; take out the ſhreds and preſs them, and put the coloured water yielded by them to the other: in the ſame ſolution boil another pound of the ſhreds, proceeding in the ſame manner; and likewiſe a third and fourth pound. Whilſt this is doing, diſſolve a pound and a half of cuttle-fiſh bone in a pound of ſtrong aquafortis in a glaſs receiver; adding more of the bone if it appear to produce any ebullition in the aquafortis; and pour this ſtrained ſolution gradually into the other; but if any ebullition be occaſioned, more of the cuttle-fiſh bone muſt be diſſolved as before, and added till no ebullition appears in the mixture. The crimſon ſediment depoſited by the liquor thus prepared is the lake: pour off the water; and ſtir the lake in two gallons of hard ſpring water, and mix the ſediment in two gallons of freſh water; let this method be repeated four or five times. If no hard water can be procured, or the lake appears too purple, half an ounce of alum ſhould be added to each quantity of water before it be uſed. Having thus ſufficiently freed the lake from the ſalts, drain off the water through a filter, covered with a worn linen cloth. When it has been drained to a proper dryneſs, let it be dropped through a proper funnel on clean boards, and the drops will become ſmall cones or pyramids, in which form the lake muſt be ſuffered to dry, and the preparation is completed.

Lake may be prepared from cochineal, by gently boiling two ounces of cochineal in a quart of water; filtering the ſolution through paper, and adding two ounces of pearl aſhes diſſolved in half a pint of warm water and filtered through paper. Make a ſolution of cuttle bone as in the former proceſs; and to a pint of it add two ounces of alum diſſolved in half a pint of water. Put this mixture gradually to that of the cochineal and pearl-aſhes, as long as any ebullition appears to ariſe, and proceed as above.—A beautiful lake may be prepared from Braſil wood, by boiling three pounds of it for an hour in a ſolution of three pounds of common ſalt in three gallons of water, and filtering the hot fluid through paper; add to this a ſolution of five pounds of alum in three gallons of water. Diſſolve three pounds of the beſt pearl-aſhes in a gallon and a half of water, and purify it by filtering; put this gradually to the other, till the whole of the colour appear to be precipitated, and the fluid be left clear and colourleſs. But if any appearance of purple be ſeen, add a freſh quantity of the ſolution of alum by degrees, till a ſcarlet hue be produced. Then purſue the directions given in the firſt proceſs with regard to the ſediment. If half a pound of ſeed lac be added to the ſolution of pearl-aſhes, and diſſolved in it before its purification by the filter, and two pounds of the wood, and a proportional quantity of the common ſalt and water be uſed in the coloured ſolution, a lake will be produced that will ſtand well in oil or water, but is not ſo tranſparent in oil as without the ſeed-lac. The lake with Braſil wood may be alſo made by adding half an ounce of annotto to each pound of the wood; but the annotto muſt be diſſolved in the ſolution of pearl-aſhes. There is a kind of beautiful lake brought from China; but as it does not mix well with either water or oil, though it diſſolves entirely in ſpirit of wine, it is not of any uſe in our kinds of painting. This has been erroneouſly called *ſafflower*.

Orange LAKE, is the tingeing part of annotto precipitated together with the earth of alum. This pigment, which is of a bright orange colour and fit for varniſh painting, where there is no fear of flying, and alſo for putting under cryſtal to imitate the vinegar garnet, may be prepared by boiling four ounces of the beſt annotto and one pound of pearl-aſhes half an hour in a gallon of water, and ſtraining the ſolution through paper. Mix gradually with this a ſolution of a pound and a half of alum in another gallon of water; deſiſting when no ebullition attends the commixture. Treat the ſediment in the manner already directed for other kinds of lake, and dry it in ſquare bits or round lozenges.

LAMA, a ſynonyme of the camelus pacos. See CAMELUS.

LAMA, the ſovereign pontiff, or rather god, of the Aſiatic Tartars, inhabiting the country of Barantola. The lama is not only adored by the inhabitants of the country, but alſo by the kings of Tartary, who ſend him rich preſents, and go in pilgrimage to pay him adoration, calling him *lama congiu*, i. e. "god, the everlaſting father of heaven." He is never to be ſeen but in a ſecret place of his palace, amidſt a great number of lamps, ſitting croſs-legged upon a cuſhion, and adorned all over with gold and precious ſtones; where at a diſtance they proſtrate themſelves before him, it not being lawful for any to kiſs even his feet. He is called the *great lama*, or *lama of lamas*; that is, "prieſt of prieſts." The orthodox opinion is, that when the grand lama ſeems to die either of old age or infirmity, his ſoul in fact only quits a crazy habitation to look for another younger or better; and it is diſcovered again in the body of ſome child, by certain tokens known only to the lamas or prieſts, in which order he always appears.

The following account of the ceremonies attending the inauguration of the infant lama in Thibet is extracted from the firſt volume of the *Aſiatic Reſearches*:

The emperor of China appears on this occaſion to have aſſumed a very conſpicuous part in giving teſtimony of his reſpect and zeal for the great religious father of his faith. Early in the year 1784, he diſpatched ambaſſadors from the court of Pekin to Teeſhoo Loomboo, to repreſent their ſovereign in ſupporting the dignity of the high prieſt, and do honour to the occaſion of the aſſumption of his office. Dalia Lama and the viceroy of Laſſa, accompanied by all the court, one of the Chineſe generals ſtationed at Laſſa with a part of the troops under his command, two of the four magiſtrates of the city, the heads of every monaſtery throughout Thibet, and the emperor's ambaſſadors, appeared at Teeſhoo Loomboo, to celebrate this epocha in their theological inſtitutions. The 28th day of the ſeventh moon, correſponding nearly, as their year commences with the vernal equinox, to the middle of October 1784, was choſen as the moſt auſpicious for the ceremony of inauguration: a few days previous to which the lama was conducted from Terpaling, the monaſtery in which he had paſſed his infancy, with every mark of pomp and homage that could be paid by an enthuſiaſtic people. So great a concourſe as aſſembled either from curioſity or devotion was never ſeen before, for not a perſon of any condition in Thibet was abſent who could join the ſuite. The proceſſion was hence neceſſarily conſtrained to move ſo ſlow, that though Terpaling is ſituated at the diſtance of 20 miles only from Teeſhoo Loomboo, three days expired in the performance of this ſhort march. The firſt halt was made at Tſondue; the ſecond at Summaar, about ſix miles off, whence the moſt ſplendid parade was reſerved for the lama's entry on the third day, the account of which is given by a perſon who was preſent in the proceſſion. The road, he ſays, was previouſly prepared by being whitened with a waſh, and having piles of ſtones heaped up with ſmall intervals between on either ſide. The retinue paſſed between a double row of prieſts who formed a ſtreet extending all the way from Summaar to the gates of the palace. Some of the prieſts held lighted rods of a perfumed compoſition that burn like decayed wood, and emit an aromatic ſmoke; the reſt were furniſhed with the different muſical inſtruments they uſe at their dev-

tions, ſuch as the gong, the cymbal, hautboy, trumpets, drums, and ſea-ſhells, which were all ſounded in uniſon with the hymn they chanted. The crowd of ſpectators were kept without the ſtreet, and none admitted on the high road but ſuch as properly belonged to or had a preſcribed place in the proceſſion, which was arranged in the following order:

The van was led by three military commandants or governors of diſtricts at the head of 6000 or 7000 horſemen armed with quivers, bows, and matchlocks. In their rear followed the ambaſſador with his ſuite, carrying his diploma, as is the cuſtom of China, made up in the form of a large tube, and faſtened on his back. Next the Chineſe general advanced with the troops under his command, mounted and accoutred after their way with fire-arms and ſabres; then came a very numerous group bearing the various ſtandards and inſignia of ſtate; next to them moved a full band of wind and other ſonorous inſtruments; after which were led two horſes richly capariſoned, each carrying two large circular ſtoves diſpoſed like panniers acroſs the horſe's back, and filled with burning aromatic woods. Theſe were followed by a ſenior prieſt, called a *lama*, who bore a box containing books of their form of prayer and ſome favourite idols. Next nine ſumptuary horſes were led loaded with the lama's apparel; after which came the prieſts immediately attached to the lama's perſon for the performance of daily offices in the temple, amounting to about 700; following them were two men, each carrying on his ſhoulder a large cylindrical gold inſignium emboſſed with emblematical figures (a gift from the emperor of China). The Duhunniers and Soopoons, who were employed in communicating addreſſes and diſtributing alms, immediately preceded the lama's bier, which was covered with a gaudy canopy, and borne by eight of the 16 Chineſe appointed for this ſervice. On one ſide of the bier attended the regent, on the other the lama's father. It was followed by the heads of the different monaſteries; and as the proceſſion advanced, the prieſts who formed the ſtreet fell in the rear and brought up the ſuite, which moved at an extremely ſlow pace, and about noon was received within the confines of the monaſtery, amidſt an amazing diſplay of colours, the acclamations of the crowd, ſolemn muſic, and the chanting of their prieſts.

The lama being ſafely lodged in the palace, the regent and Soopoon Choomboo went out, as is a cuſtomary compliment paid to viſitors of high rank on their near approach, to meet and conduct Dalai Lama and the viceroy of Laſſa who were on the way to Teeſhoo Loomboo. Their retinues encountered the following morning at the foot of Painom caſtle, and the next day together entered the monaſtery of Teeſhoo Loomboo, in which both Dalai Lama and the viceroy were accommodated during their ſtay.

The following morning, which was the third after Teeſhoo Lama's arrival, he was carried to the great temple, and about noon ſeated upon the throne of his progenitors; at which time the emperor's ambaſſador delivered his diploma, and placed the preſents with which he had been charged at the lama's feet.

The three next enſuing days, Dalai Lama met Teeſhoo Lama in the temple, where they were aſſiſted by all the prieſts in the invocation and public worſhip of their gods. The rites then performed, completed, as we underſtand, the buſineſs of inauguration. During this interval all who were at the capital were entertained at the public expence, and alms were diſtributed without reſerve. In conformity likewiſe to previous notice circulated every where for the ſame ſpace of time, univerſal rejoicings prevailed throughout Thibet. Banners were unfurled on all their fortreſſes, the peaſantry filled up the day with muſic and feſtivity, and the night was celebrated by general illuminations. A long period was afterwards employed in making preſents and public entertainments to the newly inducted lama, who, at the time of his acceſſion to the Muſnud, or, if we may uſe the term, pontificate of Teeſhoo Loomboo, was not three years of age. The ceremony was begun by Dalai Lama, whoſe offerings are ſaid to have amounted to a greater value, and his public entertainments to have been more ſplendid than the reſt. The ſecond day was dedicated to the viceroy of Laſſa. The third to the Chineſe general. Then followed the *cullong* or magiſtrates of Laſſa, and the reſt of the principal perſons who had accompanied Dalai Lama. After which the regent of Teeſhoo Loomboo, and all that were dependent on that government, were ſeverally admitted, according to pre-eminence of rank, to pay their tributes of obeiſance and reſpect. As ſoon as the acknowledgements of all thoſe were received who were admiſſible to the privilege, Teeſhoo Lama made in the ſame order ſuitable returns to each, and the conſummation laſted 40 days.

Many importunities were uſed with Dalai Lama to prolong his ſtay at Teeſhoo Loomboo; but he excuſed himſelf from encumbering the capital any longer with ſo numerous a concourſe of people as attended on his movements; and deeming it expedient to make his abſence as ſhort as poſſible from the ſeat of his authority, at the expiration of 40 days he withdrew with all his ſuite to Laſſa, and the emperor's ambaſſador received his diſmiſſion to return to China, and thus terminated this famous feſtival.

LAMB, in zoology, the young of the ſheep kind. See Ovis.

A male lamb of the firſt year is called a *wedder-hog*, and the female a *ewe-hog*; the ſecond year it is called a *wedder*, and the female a *ſheave*. If a lamb be ſick, mare's milk with water may be given it; and by blowing into the mouth, many have been recovered, after appearing dead. The beſt ſeaſon for weaning them is when they are 16 or 18 weeks old; and about Michaelmas the males ſhould be ſeparated from the females, and ſuch males as are not deſigned for rams, gelded. "Lamb (ſays Dr. Cullen) appears a more fibrous kind of meat, and upon that account is leſs eaſily ſoluble than veal. In Scotland, houſe-lamb is never reared to advantage."

Scythian LAMB, a kind of moſs, which grows about the roots of fern in ſome of the northern parts of Europe and Aſia, and ſometimes aſſumes the form of a quadruped; ſo called from a ſuppoſed reſemblance in ſhape to that animal. It has ſomething like four feet, and its body is covered with a kind of down. Travellers report that it will ſuffer no vegetable to grow within a certain diſtance of its ſeat. Sir Hans Sloane read a memoir upon this plant before the Society; for which ſee their Tranſactions, N° 245. p. 461. Mr. Bell, in his "Account of a Journey from St. Peterſburgh to Iſpahan," informs us that he ſearched in vain for this plant in the neighbourhood of Aſtracan, when at the ſame time the more ſenſible and experienced amongſt the Tartars treated the whole hiſtory as fabulous. See Plate 23. Vol. IV.

LAMBECIUS (PETER), born at Hamburgh in 1628, was one of the moſt learned men of his time. He went very young to ſtudy in foreign countries, at the expence of his uncle the learned Holſtenius. He was choſen profeſſor of hiſtory at Hamburgh in 1652, and rector of the college of that city in 1660. He had taken his degree of doctor of law in France before. He ſuffered a thouſand vexations in his own country; becauſe his enemies charged him with atheiſm, and cenſured his writings bitterly. He married a rich lady, but who was ſo very covetous, that he left her in diſguſt within a fortnight. He went to Vienna, and from thence to Rome, where he publicly profeſſed the Catholic religion. He returned to Vienna in 1662, where he was kindly received by the emperor, who appointed him his ſub-library-keeper, and afterwards his principal librarian, with the title of *counſellor and hiſtoriographer*;

in which employment he continued till his death, and gained a great reputation by the works he publiſhed, viz. 1. *An Eſſay on Aulus Gellius.* 2. *The Antiquities of Hamburg.* 3. *Remarks on Codinus's Antiquities of Conſtantinople*, &c.

LAMBERT of Aſchaffenburg, a Benedictine monk, in the 11th century, wrote ſeveral works; among which is a hiſtory of Germany, from the year 1050 to 1077, which is eſteemed.

Lambert (John), general of the parliament's forces in the civil wars of the laſt century, was of a good family, and for ſome time ſtudied the law in one of the inns of court; but upon the breaking out of the rebellion, went into the parliament-army, where he ſoon roſe to the rank of colonel, and by his conduct and valour performed many eminent ſervices. But when Cromwell ſeemed inclined to aſſume the title of king, Lambert oppoſed it with great vigour, and even refuſed to take the oath required by the aſſembly and council to be faithful to the government; on which Cromwell deprived him of his commiſſion, but granted him a penſion of 2000l. a-year. This was an act of prudence rather than of generoſity; as he well knew, that ſuch genius as Lambert's, rendered deſperate by poverty, was capable of attempting any thing.

Lambert being now diveſted of all employment, retired to Wimbleton-houſe; where turning floriſt, he had the fineſt tulips and gilliflowers that could be got for love or money. Yet amidſt theſe amuſements he ſtill nouriſhed his ambition: for when Richard Cromwell ſucceeded his father, he acted ſo effectually with Fleetwood, Deſborough, Vane, Berry, and others, that the new protector was obliged to ſurrender his authority; and the members of the long-parliament, who had continued ſitting till the 20th of April 1653, when Oliver diſmiſſed them, were reſtored to their ſeats, and Lambert was immediately appointed one of the council of ſtate, and colonel of a regiment of horſe and another of foot. For this ſervice the parliament preſented him 1000l. to buy a jewel; but he diſtributed it among his officers. This being ſoon known to the parliament, they concluded that he intended to ſecure a party in the army. They therefore courteouſly invited him to come to London; but reſolved, as ſoon as he ſhould arrive, to ſecure him from doing any further harm. Lambert, apprehenſive of this, delayed his return, and even refuſed to reſign his commiſſion when it was demanded of him and of eight of the other leading officers; and, marching up to London with his army, diſlodged the parliament by force in October 1659. He was then appointed, by a council of the officers, major-general of the army, and one of the new council for the management of public affairs, and ſent to command the forces in the north. But general Monk marching from Scotland into England to ſupport the parliament, againſt which Lambert had acted with ſuch violence, the latter, being deſerted by his army, was obliged to ſubmit to the parliament, and by their order was committed priſoner to the Tower; whence eſcaping, he ſoon appeared in arms with four troops under his command, but was defeated and taken priſoner by colonel Ingoldſby.

At the reſtoration he was particularly excepted out of the act of indemnity. Being brought to his trial on the 4th of June 1662, for levying war againſt the king, this daring general behaved with more ſubmiſſion than the meaneſt of his fellow-priſoners, and was by his majeſty's favour reprieved at the bar, and confined during his life in the iſland of Guernſey.

Lambert (Anna Thereſa de Marguenat de Courcelles, marchioneſs of), an elegant moral writer, was the only daughter of Stephen Marguenat lord of Courcelles. In 1666 ſhe married Henry de Lambert, who at his death was lieutenant-general of the army; and ſhe afterwards remained a widow with a ſon and a daughter, whom ſhe educated with great care. Her houſe was a kind of academy, to which perſons of diſtinguiſhed abilities regularly reſorted. She died at Paris in 1733, aged 86. Her works, which are written with much taſte, judgment, and delicacy, are printed in two volumes. The advice of a mother to her ſon and daughter are particularly eſteemed.

LAMBIN (Dennis,) an eminent claſſical commentator, was born at Montreuil-ſur-Mer, in Picardy, and acquired great ſkill in polite literature. He lived for a long time at Rome; and at his return to Paris was made royal profeſſor of the Greek language. He died in 1572, aged 56, of pure grief at the death of his friend Ramus, who was murdered at the maſſacre on St. Bartholomew's day. He wrote commentaries on Plautus, Lucretius, Cicero, and Horace, and other works. His commentary on Horace is more particularly eſteemed.

LAMECH, of the race of Cain, was the ſon of Methuſael, and father of Jabal, Jubal, Tubal-cain, and Naamah. Gen. iv. 18, 19, 20, &c. Lamech is celebrated in ſcripture for his polygamy, whereof he is thought to be the firſt author in the world. He married Adah and Zillah. Adah was the mother of Jabal and Jubal; and Zillah of Tubal-cain and Naamah his ſiſter. One day Lamech ſaid to his wives, "Hear me, ye wives of Lamech! I have ſlain a man to my wounding, and a young man to my hurt. If Cain ſhall be avenged ſeven fold, truly Lamech ſeventy and ſeven fold." Theſe words are an unintelligible riddle. The reader may conſult the commentators. There is a tradition among the Hebrews, that Lamech, growing blind, ignorantly killed Cain, believing him to be ſome wild beaſt; and that afterwards he ſlew his own ſon Tubal-cain, who had been the cauſe of this murder, becauſe he had directed him to ſhoot at a certain place in the thickets where he had ſeen ſomething ſtir. Several other ſuppoſitions are produced in order to explain this paſſage concerning Lamech, and all almoſt equally uncertain and abſurd.

Lamech, the ſon of Methuſelah, and father of Noah. He lived a hundred fourſcore and two years before the birth of Noah (Gen. v. 25. 31.); and after that, he lived five hundred and ninety-five years longer: thus the whole time of his life was ſeven hundred ſeventy-ſeven years, being born in the year of the world 874, and dying in the year of the world 1651.

LAMELLÆ, in natural hiſtory, denotes very thin plates, ſuch as the ſcales of fiſhes are compoſed of.

LAMENTATIONS, a canonical book of the Old Teſtament, written by the prophet Jeremiah, according to archbiſhop Uſher and ſome other learned men, who follow the opinion of Joſephus and St. Jerom, on occaſion of Joſiah's death. But this opinion does not ſeem to agree with the ſubject of the book, the Lamentation compoſed by Jeremiah on that occaſion being probably loſt. The fifty-ſecond chapter of the book of Jeremiah was probably added by Ezra, as a preface or introduction to the Lamentations: the two firſt chapters are employed in deſcribing the calamities of the ſiege of Jeruſalem: in the third the author deplores the perſecutions he himſelf had ſuffered: the fourth treats of the deſolation of the city and temple, and the misfortune of Zedekiah: the fifth chapter is a prayer for the Jews in their diſperſion and captivity: and at the cloſe of all he ſpeaks of the cruelty of the Edomites, who had inſulted Jeruſalem in her miſery. All the chapters of this book, except the laſt, are in metre, and digeſted in the order of the alphabet; with this difference, that in the firſt, ſecond, and fourth chapters, the firſt letter of every verſe follows the order of the alphabet; but in the third the ſame initial letter is continued for three verſes together. This order was probably adopted, that the book might be more eaſily learnt and retained. The ſubject of this book is of the moſt moving kind; and the ſtyle throughout lively, pathetic, and affecting. In this kind of writing the prophet Jeremiah

was a great maſter, according to the character which Grotius gives of him, *Mirus in affectibus concitandis.*

LAMIA (anc. geog.), a town of the Phthiotis, a diſtrict of Theſſaly; famous for giving name to the *Bellum Lamiacum*, waged by the Greeks on the Macedonians after Alexander's death.

LAMIACUM Bellum happened after the death of Alexander, when the Greeks, and particularly the Athenians, incited by their orators, reſolved to free Greece from the garriſons of the Macedonians. Leoſthenes was appointed commander of a numerous force, and marched againſt Antipater, who then preſided over Macedonia. Antipater entered Theſſaly at the head of 13,000 foot and 600 horſe, and was beaten by the ſuperior force of the Athenians and of their Greek confederates. Antipater after this blow fled to Lamia, where he reſolved, with all the courage and ſagacity of a careful general, to maintain a ſiege with about 8000 or 9000 men that had eſcaped from the field of battle. Leoſthenes, unable to take the city by ſtorm, began to make a regular ſiege. His operations were delayed by the frequent ſallies of Antipater; and Leoſthenes being killed by the blow of a ſtone which he received, Antipater made his eſcape out of Lamia, and ſoon after, with the aſſiſtance of the army of Craterus brought from Aſia, he gave the Athenians battle near Cranon; and though only 500 of their men were ſlain, yet they became ſo diſpirited, that they ſued for peace from the conqueror. Antipater at laſt with difficulty conſented, provided they raiſed taxes in the uſual manner, received a Macedonian garriſon, defrayed the expences of the war, and, laſtly, delivered into his hands Demoſthenes and Hyperides, the two orators whoſe prevailing eloquence had excited their countrymen againſt him. Theſe diſadvantageous terms were accepted by the Athenians, yet Demoſthenes had time to eſcape and poiſon himſelf. Hyperides was carried before Antipater, who ordered his tongue to be cut out, and afterwards to be put to death.

LAMIÆ, a ſort of demons who had their exiſtence in the imaginations of the heathens, and were ſuppoſed to devour children. Their form was human, reſembling beautiful women. Horace makes mention of them in his Art of Poetry. The name, according to ſome, is derived from *lanio* "to tear;" or, according to others, is a corruption of a Hebrew word ſignifying to devour. They are alſo called *Larvæ* or *Lemures*.

LAMINÆ, in phyſiology, thin plates, or tables, whereof any thing conſiſts: particularly the human ſkull, which are two, the one laid over the other.

LAMINIUM (anc. geog.), a town of the Carpetani in the Hither Spain; at the diſtance of ſeven miles from the head of the Anas or Guadiana: now *Montiel*, a citadel of New Caſtile: and the territory called *Ager Laminitanus*, is now *el Campo de Montiel* (Cluſius).

LAMIUM, Dead *Nettle*, in botany: a genus of the gymnoſpermia order, belonging to the didynamia claſs of plants; and in the natural method ranking under the 42d order, *Verticillatæ*. The upper lip of the corolla is entire, arched, the under lip bilobous; the throat with a dent or tooth on each ſide the margin. There are eight ſpecies, of which only two, viz. the album, white archangel or dead-nettle, and the purpureum or red archangel, deſerve notice. The firſt grows frequently under hedges and in waſte places; the ſecond is very common in gardens and corn-fields. The flowers of the firſt, which appear in April and May, have been particularly celebrated in uterine fluors, and other female weakneſſes, and alſo in diſorders of the lungs; but they appear to be of very weak virtue; and they are at preſent ſo little uſed in Britain as to have now no place in our pharmacopœias. The young leaves of both ſpecies are boiled and eaten in ſome places like greens.

LAMMAS-day, the firſt of Auguſt; ſo called, as ſome will have it, becauſe lambs then grow out of ſeaſon, as being too big. Others derive it from a Saxon word, ſignifying "loaf-maſs," becauſe on that day our forefathers made an offering of bread made with new wheat. On this day the tenants who formerly held lands of the cathedral church in York, were bound by their tenure to bring a lamb alive into the church at high-maſs.

LAMOIGNON (Chretien Francis de), marquis of Baville, and preſident of the parliament of Paris, was born in 1644. His father would not truſt the education of his ſon to another, but took it upon himſelf, and entered into the minuteſt particulars of his firſt ſtudies: the love of letters and a ſolid taſte were the fruits the ſcholar reaped from this valuable education. He learned rhetoric in the Jeſuits' college, made the tour of England and Holland, and returned home the admiration of thoſe meetings regularly held by perſons of the firſt merit at his father's houſe. The ſeveral branches of literature were however only his amuſement: the law was his real employ; and the eloquence of the bar at Paris owes its reformation from bombaſt and affected erudition to the plain and noble pleadings of M. Lamoignon. He was appointed the king's advocate general in 1673; which he diſcharged until 1698, when the preſidentſhip of the parliament was conferred on him. This poſt he held nine years, when he was allowed to reſign in favour of his eldeſt ſon: he was choſen preſident of the royal academy of inſcriptions in 1705. The only work he ſuffered to ſee the light was his *Pleader*, which is a monument of his eloquence and inclination to polite letters. He died in 1709.

LAMP, a veſſel containing oil, with a lighted wick. Lamps were in general uſe among the Jews, Greeks, and Romans. The candleſtick with ſeven branches, placed in the ſanctuary by Moſes, and thoſe which Solomon afterwards prepared for the temple, were cryſtal lamps filled with oil, and fixed upon the branches. The lamps or candleſticks made uſe of by the Jews in their own houſes, were generally put into a very high ſtand on the ground. The lamps ſuppoſed to be uſed by the fooliſh virgins, &c. in the goſpel, were of a different kind.—According to critics and antiquaries, they were a ſort of torches, made of iron or potter's earth, wrapped about with old linen, and moiſtened from time to time with oil. Matth. xxv. 1, 2. The lamps of Gideon's ſoldiers were of the ſame kind. The uſe of wax was not unknown to the Romans, but they generally burnt lamps; hence the proverb *Tempus et oleum perdidi*, "I have loſt my labour." Lamps were ſometimes burnt in honour of the dead, both by Greeks and Romans.

Dr. St. Clair, in the Philoſ. Tranſ. N° 245, gives the deſcription of an improvement on the common lamp. He propoſes that it ſhould be made two or three inches deep, with a pipe coming from the bottom almoſt as high as the top of the veſſel. Let it be filled ſo high with water that it may cover the hole of the pipe at the bottom, that the oil may not get in at the pipe, and ſo be loſt. Then let the oil be poured in ſo as to fill the veſſel almoſt brim-full; and to the veſſel muſt be adapted a cover having as many holes as there are to be wicks. When the veſſel is filled and the wicks lighted, if water falls in by drops at the pipe, it will always keep the oil at the ſame height or very near it; the weight of the water being to that of the oil as $20\frac{3}{11}$ to 19, which in two or three inches makes no great difference. If the water runs faſter than the oil waſtes, it will only run over at the top of the pipe, and what does not run over will come under the oil, and keep it at the ſame height.

From experiments made in order to aſcertain the expence of burning chamber oil in lamps, it appears, that a taper

lamp, with eight threads of cotton in the wick, conſumes in one hour $\frac{3}{1}\frac{2}{0}\frac{5}{0}\frac{}{0}$ oz. of ſpermaceti oil, at 2s. 6d. per gallon; ſo that the expence of burning 12 hours is 4.57 farthings. This lamp gives as good a light as the candles of eight and ten in the pound; it ſeldom wants ſnuffing, and caſts a ſtrong and ſteady light. A taper, chamber, or watch lamp, with four ordinary threads of cotton in the wick, conſumes 0.1664 oz. of ſpermaceti oil in one hour; the oil at 2s. 6d. per gallon, makes the expence of burning 12 hours only 2.34 farthings.

Perpetual LAMPS. The teſtimonies of Pliny, St. Auſtin, and others, have led many to believe that the ancients had the invention of perpetual lamps; and ſome moderns have attempted to find out the ſecret, but hitherto in vain. Indeed it ſeems no eaſy matter to find out either a perpetual wick or a perpetual oil. The curious may read Dr. Plot's conjectures on the ſubject in the Philoſ. Tranſ. N° 166; or in Lowthorp's abridgment, vol. iii. p. 636. But few, we believe, will give themſelves the trouble of ſearching for the ſecret, when they conſider that the credulity of Pliny and of St. Auſtin were ſuch, that their teſtimony does not ſeem a ſufficient inducement to us to believe that a lamp was ever formed to burn 1500 or 1000 years; much leſs is it credible that the ancients had the ſecret of making one burn for ever.

Rolling LAMP. A machine A B, pl. 23. Vol. IV. with two moveable circles D E, F G, within it; whoſe common centre of motion and gravity is at K, where their axes of motion croſs one another. If the lamp K C, made pretty heavy and moveable about its axis H I, and whoſe centre of gravity is at C, be fitted within the inner circle, the common centre of gravity of the whole machine will fall between K and C; and by reaſon of the pivots A, B, D, E, H, I, will be always at liberty to deſcend: hence, though the whole machine be rolled along the ground, or moved in any manner, the flame will always be uppermoſt, and the oil cannot ſpill. It is in this manner they hang the compaſs at ſea; and thus ſhould all the moon-lanterns be made, that are carried before coaches, chaiſes, and the like.

Argand's LAMP. This is a very ingenious contrivance, and the greateſt improvement in lamps that has yet been made. It is the invention of a citizen of Geneva; and the principle on which the ſuperiority of the lamp depends, is the admiſſion of a larger quantity of air to the flame than can be done in the common way. This is accompliſhed by making the wick of a circular form, by which means a current of air ruſhes through the cylinder on which it is placed with great force; and, along with that which has acceſs to the outſide, excites the flame to ſuch a degree that the ſmoke is entirely conſumed. Thus both the light and heat are prodigiouſly increaſed, at the ſame time that there is a very conſiderable ſaving in the expence of oil, the conſumption of the phlogiſton being exceedingly augmented by the quantity of air admitted to the flame; ſo that what in common lamps is diſſipated in ſmoke is here converted into a brilliant flame.

This lamp is now very much in uſe; and is applied not only to the ordinary purpoſes of illumination, but alſo to that of a lamp furnace for chemical operations, in which it is found to exceed every other contrivance yet invented. It conſiſts of two parts, viz. a reſervoir for the oil, and the lamp itſelf. The reſervoir is uſually in the form of a vaſe, and has the lamp proceeding from its ſide. The latter conſiſts of an upright metallic tube about one inch and ſix-tenths in diameter, three inches in length, and open at both ends. Within this is another tube about an inch in diameter, and nearly of an equal length; the ſpace betwixt the two being left clear for the paſſage of the air. The internal tube is cloſed at the bottom, and contains another ſimilar tube about half an inch in diameter, which is ſoldered to the bottom of the ſecond. It is perforated throughout, ſo as to admit a current of air to paſs through it; and the oil is contained in the ſpace betwixt the tube and that which ſurrounds it. A particular kind of cotton cloth is uſed for the wick, the longitudinal threads of which are much thicker than the others, and which nearly fills the ſpace into which the oil flows; and the mechaniſm of the lamp is ſuch, that the wick may be raiſed or depreſſed at pleaſure. When the lamp is lighted, the flame is in the form of a hollow cylinder; and by reaſon of the ſtrong influx of air through the heated metallic tube, becomes extremely bright, the ſmoke being entirely conſumed for the reaſons already mentioned. The heat and light are ſtill farther increaſed, by putting over the whole a glaſs cylinder nearly of the ſize of the exterior tube. By diminiſhing the central aperture, the heat and light are proportionably diminiſhed, and the lamp begins to ſmoke. The acceſs of air both to the external and internal ſurfaces of the flame is indeed ſo very neceſſary, that a ſenſible difference is perceived when the hand is held even at the diſtance of an inch below the lower aperture of the cylinder; and there is alſo a certain length of wick at which the effect of the lamp is ſtrongeſt. If the wick be very ſhort, the flame, though white and brilliant, emits a diſagreeable and pale kind of light; and if very long, the upper part becomes brown, and ſmoke is emitted.

The ſaving of expence in the uſe of this inſtrument for common purpoſes is very conſiderable. By ſome experiments it appears, that the lamp will continue to burn three hours for the value of one penny; and the following was the reſult of the compariſon between the light emitted by it and that of a candle. The latter having been ſuffered to burn ſo long without ſnuffing, that large lumps of coaly matter were formed upon the wick, gave a light at 24 inches diſtance equal to the lamp at at 129 inches; whence it appeared, that the light of the lamp was equal to 28 candles in this ſtate. On ſnuffing the candle, however, its light was ſo much augmented, that it became neceſſary to remove it to the diſtance of 67 inches before its light became equal to that of the lamp at 129 inches; whence it was concluded, that the light of the lamp was ſomewhat leſs than that of four candles freſh ſnuffed. At another trial, in which the lamp was placed at the diſtance of $131\frac{1}{2}$ inches, and a candle at the diſtance of 55 inches, the lights were equal. In theſe experiments the candles made uſe of were $10\frac{3}{4}$ inches long, and $2\frac{6}{10}$ inches in diameter. When the candle was newly ſnuffed, it appeared to have the advantage; but the lamp ſoon got the ſuperiority; and on the whole it was concluded, that the lamp is at leaſt equivalent to half a dozen of tallow candles of ſix in the pound; the expence of the one being only two-pence halfpenny, and the other eight-pence, in ſeven hours.

The beſt method of comparing the two lights together ſeems to be the following. Place the greater light at a conſiderable diſtance from a white paper, the ſmaller one being brought nearer, or removed farther off, as occaſion requires. If an angular body be held before the paper, it will project two ſhadows: theſe two ſhadows can coincide only in part, and their angular extremities will, in all poſitions but one, be at ſome diſtance from each other; and being made to coincide in a certain part of their bulk, they will be bordered by a lighter ſhadow, occaſioned by the excluſion of the light from each of the two luminous bodies reſpectively. Theſe lighter ſhadows, in fact, are ſpaces of the white paper illuminated by the different luminous bodies, and may eaſily be compared together, becauſe at a certain point they actually touch one another. If the ſpace illuminated by the ſmaller light appear brighteſt, the light muſt be removed farther off, but the contrary if it appear more obſcure.

On cutting open one of Argand's wicks longitudinally, and

thus reducing the circular flame to a ſtraight-lined one, the lights appeared quite equal in power; but the circular one had by far the greateſt effect in dazzling the eyes; though when the long flame was made to ſhine on the paper, not by the broad ſide, but in the direction of its length, it appeared more dazzling than the other. On placing this long flame at right angles to the ray of Argand's lamp, it projected no ſhadow; but when its length was placed in the direction of the ray, it gave a ſhadow bordered with two broad, well defined, and bright lines.

The broad-wicked lamp ſeems to have the advantage of the other, as requiring leſs apparatus; and indeed by this contrivance we may at the moſt trifling expence have a lamp capable of giving any degree of light we pleaſe. The only diſadvantage attending either the one or the other is, that they cannot eaſily be carried from one place to another; and in this reſpect it does not ſeem poſſible by any means to bring lamps to an equality with candles.

Lamp-*Black*, among colourmen. See Colour-*Making*. Subſtances painted with lamp-black and oil are found to reſiſt the effects of electricity to a ſurpriſing degree; ſo that in many caſes even lightning itſelf ſeems to have been repelled by them.

LAMPADARY, an officer in the ancient church of Conſtantinople, ſo called from his employment, which was to take care of the lamps, and to carry a taper before the emperor or patriarch when they went to church or in proceſſion.

LAMPAS, in farriery. See Farriery.

LAMPREY. See Petromyzon.

LAMPRIDIUS (Ælius), a Latin hiſtorian, who lived under the emperors Diocleſian and Conſtantine the Great. We have, of his writing, the Lives of four emperors, Antoninus, Commodus, Diadumenus, and Heliogabalus. Some attribute the Life of Alexander Severus to him; but the MS. in the Palatine library aſcribes it to Spartian.

Lampridius (Benedict), of Cremona, a celebrated Latin poet of the 16th century. He taught Greek and Latin at Rome and at Padua, until he was invited to Mantua by Frederic Gonzaga to undertake the tuition of his ſon. We have epigrams and lyric verſes of this writer, both in Greek and Latin, which were printed ſeparately, as well as among the *Deliciæ* of the Italian poets.

LAMPSACUS, or Lampsacum (anc. geog.), a conſiderable city of Myſia; more anciently called *Pityea* (Homer), becauſe abounding in pine-trees, a circumſtance confirmed by Pliny; ſituated at the north end or entrance of the Helleſpont into the Propontis, with a commodious harbour, oppoſite to Callipolis in the Thracian Cherſoneſus. It was aſſigned by Artaxerxes to Themiſtocles, for furniſhing his table with wine, in which the country abounded. It was ſaved from the ruin threatened by Alexander becauſe in the intereſt of Perſia, by the addreſs of Anaximenes the hiſtorian, ſent by his fellow-citizens to avert the king's diſpleaſure; who hearing of it, ſolemnly declared he would do the very reverſe of Anaximenes's requeſt, who therefore begged the king utterly to deſtroy it, which he could not do becauſe of his oath. *Lampſacius* the epithet, denoting *laſcivus*, the character of the people: ſtill called *Lampſacus*. E. lon. 28°. N. lat. 40. 12.

LAMPYRIS, the Fire-fly, a genus of inſects belonging to the coleoptera order; the characters of which are: The antennæ are filiform; the elytra are flexible; the thorax is flat, of a ſemiorbicular form, ſurrounding and concealing the head. The ſegments of the abdomen terminate in papillæ, which are turned up towards the elytra, and partly fold one over the other. The females in general are apterous.

There are 18 ſpecies; of which the moſt remarkable is the noctiluca. See Pl. 23. Vol. IV. The male of this inſect is leſs than the female; its head is ſhaped exactly in the ſame manner, and covered likewiſe by the plate of the thorax, only it appears rather longer than that of the female. Both the head and antennæ are black. The thorax of the male, which is ſmaller and ſhorter than that of the female, has the folds and papillæ on its ſides much leſs remarkable: but the greateſt difference that is found between the two ſexes is, that the male is covered with brown elytra, ſhagreened and marked with two lines longitudinally. The elytra are longer than the abdomen, and under them lie the wings. The two laſt rings of the abdomen are not ſo bright as thoſe of the female, only there appear four luminous points, two upon each of the two laſt rings.

The inſect called *glow-worm*, and which is frequently met with towards evening, in the month of June, in woods and meadows, is the female belonging to this ſpecies. By the ſhining light which it emits, it attracts the male; a wonderful inſtance of the divine providence. It is apparent that their ſhining light depends on a liquor placed at the lower extremity of the inſect, which when in motion, the light is more lively and ſhining, and of a finer green. This light the inſect withdraws at pleaſure, either by unfolding or contracting itſelf. As a proof that the light depends on a phoſphorous matter, you may cruſh the animal, which, though dead and bruiſed, leaves a luminous ſubſtance on the hand, that only loſes its luſtre when dried.—The perfect inſect flies about during the evening in autumn, and frequents the graſſy plantations of juniper trees.

LAMY, or Lami (Bernard), was born at Mons in 1640, and ſtudied there under the fathers of the oratory; with whoſe way of life he was ſo pleaſed, that he went to Paris in 1658, and entered into the inſtitution. He had a great taſte for the ſciences, and ſtudied them all; he entered into the prieſthood in 1667, and taught philoſophy at Saumur and Angiers; which latter place he was obliged to quit by an order procured from court, for adopting the new philoſophy inſtead of that of Ariſtotle. In 1676 he went to Grenoble, where cardinal Camus was then biſhop; who conceived ſuch an eſteem for him, that he retained him near his perſon, and derived conſiderable ſervices from him in the government of his dioceſe. After continuing many years there, he went to reſide at Rouen, where he died in 1715. He wrote ſeveral ſcientifical works, beſides others in divinity.

LANCARIM Spring, the name of a medicated water of Glamorganſhire. It has its name from a town near which it riſes; and has been very long famous in the place for the cure of the king's evil. The body of water is about an ell broad, and runs between two hills covered with wood. About 12 yards from this ſpring the rill falls from a rock of about eight or nine feet high, with a conſiderable noiſe. The ſpring is very clear, and riſes out of a pure white marle. The cures that have been performed there, are proofs of a real power in the water; but there is ſome queſtion whether the water, or its motion and coldneſs, does the good; for the people who come for relief always drink of the ſpring, and bathe the part afterward in the fall below. It is generally ſuppoſed that the lime-ſtone rocks communicate a virtue to it by which it cures internally; but it has been often found, that the holding a limb diſordered with the evil in the ſtrong current of a mill-tail has cured it, and there is the ſame advantage in the fall of this water.

LANCASHIRE, a large maritime province of England, waſhed by the Iriſh ſea on the weſt, bordering on the north with part of Cumberland and Weſtmoreland; bounded on the eaſt by the Weſt Riding of Yorkſhire, and on the weſt by Cheſhire; extending 73 miles in length and 41 in breadth, comprehending 6 hundreds, 63 pariſhes, 27 market-towns,

894 villages, about 43,000 houſes, and about 260,000 inhabitants.

The eaſtern parts of the province are rocky, and in the northern diſtricts we ſee many ſingle mountains remarkably high, ſuch as Ingleborough-hill, Cloughbo-hill, Pendle-hill, and Longridge-hill. Nor is there any want of wood in this country, either for timber or fuel; witneſs Wierſdale foreſt and Bowland foreſt to the northward, and Simon's wood in the ſouthern part of Lancaſhire.

This county is well watered with rivers and lakes. Among the lakes or meres of Lancaſhire, we reckon the Winandermere, and the Kiningſton-mere, which, though neither ſo large nor ſo well ſtored with fiſh, yet affords plenty of excellent char. There was on the ſouth ſide of the Ribble another lake called *Marton*, ſeveral miles in circumference, which is now drained, and converted into paſture ground. In this operation, the workmen found a great quantity of fiſh, together with eight canoes, reſembling thoſe of America, ſuppoſed to have been uſed by the ancient Britiſh fiſhermen. Beſides theſe meres or lakes, this county abounds with moraſſes and moſſes, from which the inhabitants dig excellent peat or turf for fuel, as well as marle for manuring the ground, and trunks of old fir-trees, ſuppoſed to have lain there ſince the general deluge. Some of theſe are ſo impregnated with turpentine, that when divided into ſplinters, they burn like candles, and are uſed for that purpoſe by the common people. There is a great variety of mineral waters in this county, ſome periodical ſprings, and one inſtance of a violent eruption of water at Kirky in Fourneſs. The moſt remarkable chalybeate ſpaws are thoſe of Latham, Wigan, Stockport, Burnley, Bolton, Plumpton, Middleton, Strangeways, Lancaſter, Larbrick, and Chorly. At Ancliff, in the neighbourhood of Wigan, is a fountain called the *Burning Well*, from whence a bituminous vapour exhales, which being ſet on fire by a candle burns like brandy, ſo as to produce a heat that will boil eggs to a hard conſiſtence, while the water itſelf retains its original coldneſs. There is at Barton a fountain of ſalt water, ſo ſtrongly impregnated with the mineral, as to yield ſix times as much as can be extracted from the ſame quantity of ſea-water. At Rogham, in Fourneſs, there is a purging ſaline fountain; and in the neighbourhood of Raſſal, where the ground is frequently overflowed by the ſea, a ſtream deſcends from Hagbur-hills, which in the ſpace of ſeven years is ſaid to convert the marle into a hard freeſtone fit for building. The air of Lancaſhire is pure, healthy, and agreeable, except among the fens and on the ſea ſhore, where the atmoſphere is loaded with putrid exhalations, producing malignant and intermitting fevers, ſcurvy, rheumatiſm, dropſy, and conſumption. The ſoil is various in different parts of the county, poor and rocky on the hills, fat and fertile in the valleys and champaign country. The colour of the peat is white, grey, or black, according to the nature of the compoſition and the degree of putrefaction which the ingredients have undergone. There is a bituminous earth about Ormſkirk, that ſmells like the oil of amber, and indeed yields an oil of the ſame nature, both in its ſcent and medicinal effects, which moreover reduces raw fleſh to the conſiſtence of mummy; this earth burns like a torch, and is uſed as ſuch by the country people. The metals and minerals of this county conſiſt of lead, iron, copper, antimony, black lead, lapis calaminaris, ſpar, green vitriol, alum, ſulphur, pyrites, freeſtone, and pit and cannel-coal.

The level country produces plenty of wheat and barley, and the ſkirts of the hills yield good harveſts of excellent oats: very good hemp is raiſed in divers parts of the province; and the paſture which grows in the valley is ſo peculiarly rich, that the cattle which feed upon it are much larger and fatter than in any other part of England. There is not any part of the world better ſupplied than Lancaſhire with proviſions of all kinds at a very reaſonable rate; ſuch as beef, veal, mutton, lamb, pork, poultry, and game of all ſorts, caught upon the moors, heaths, and commons, in the hilly part of the ſhire. Beſides the ſea-fowl common to the ſhires of England, ſuch as ducks, eaſterlings, teal and plover, many uncommon birds are obſerved on the coaſt of Lancaſhire, the ſea-crow, variegated with blue and black, the puffin, the cormorant, the curlew, the razor-bill, the copped wren, the red-ſhanks, the ſwan, the tropic-bird, the king's-fiſher, &c.

The chief manufactures of this county are woollen and cotton cloths of various kinds, tickings, and cotton velvets, for which Mancheſter is particularly famous. The principal rivers are the Merſey, which parts Cheſhire and this county; and the Ribble, which riſes in Yorkſhire, and enters this county at Clitheroe, running ſouth-weſt by Preſton into the Iriſh ſea. Beſides theſe there are many leſſer ſtreams. The navigation made by his grace the duke of Bridgewater in this county is highly worthy of notice. This was begun ſo lately as about 40 years ago; it bears veſſels of 60 tons burden, and is carried over two rivers, the Merſey and the Irwell. The ſough, or adit, which was neceſſary to be made, in order to drain the water from the coal-mines, is rendered navigable for boats of ſix or ſeven tons burden, and forms a kind of ſubterraneous river, which runs about a mile and a half under ground, and communicates with the canal. This river leads to the head of the mines, is arched over with brick, and is juſt wide enough for the paſſage of the boats: at the mouth of it are two folding doors, which are cloſed as ſoon as you enter, and you then proceed by candle-light, which caſts a livid gloom, ſerving only to make darkneſs viſible. But this diſmal gloom is rendered ſtill more awful by the ſolemn echo of this ſubterraneous water, which returns various and diſcordant ſounds. One while you are ſtruck with the grating noiſe of engines, which by a curious contrivance let down the coals into the boats; then again you hear the ſhock of an exploſion, occaſioned by the blowing up the hard rock, which will not yield to any other force than that of gunpowder; the next minute your ears are ſaluted by the ſongs of merriment from either ſex, who thus beguile their labours in the mine. You have no ſooner reached the head of the works, than a new ſcene opens to your view. There you behold men and women almoſt in the primitive ſtate of nature, toiling in different capacities, by the glimmering of a dim taper; ſome digging coal out of the bowels of the earth; ſome again loading it in little waggons made for the purpoſe; others drawing thoſe waggons to the boats. To perfect this canal, without impeding the public roads, bridges are built over it; and where the earth has been raiſed to preſerve the level, arches are formed under it: but what principally ſtrikes every beholder, is a work raiſed near Barton-bridge, to convey the canal over the river Merſey. This is done by means of three ſtone arches, ſo ſpacious and lofty as to admit veſſels ſailing through them; and indeed nothing can be more ſingular and pleaſing, than to obſerve large veſſels in full ſail under the aqueduct, and at the ſame time the duke of Bridgewater's veſſels ſailing over all, near 50 feet above the navigable river. By this inland navigation communication has been made with the rivers Merſey, Dee, Ribble, Ouſe, Trent, Darwent, Severn, Humber, Thames, Avon, &c. which navigation, including its windings, extends above 500 miles in the counties of Lincoln, Nottingham, York, Lancaſter, Weſtmoreland, Cheſter, Stafford, Warwick, Leiceſter, Oxford, Worceſter, &c.

Lancaſhire was erected into a county-palatine by Edward III. who conferred it as an appendage on his ſon John of Gaunt, thence called *duke of Lancaſter*: but the duchy contained lands that are not in Lancaſhire, and among other de-

meſnes, the palace of the Savoy, and all that diſtrict in London, which indeed belong to it at this day. The revenues of this duchy are adminiſtered by a court which ſits at Weſtminſter, and a chancery-court at Preſton, which has a ſeal diſtinct from that of the county-palatine. The title of *Lancaſter* diſtinguiſhed the poſterity of John of Gaunt from thoſe of his brother, who ſucceeded to the duchy of York, in their long and bloody conteſt for the crown of England.—Lancaſhire ſends two members to parliament for the county; and 12 for the ſix boroughs of Lancaſter, Preſton, Newton, Wigan, Clitheroe, and Liverpool.

LANCASTER, the capital of the county of Lancaſhire in England, is pleaſantly ſituated on the ſouth ſide of the river Lun, over which there is a handſome ſtone bridge. It is an ancient town, and is ſuppoſed to have been the *Longovicum* of the Romans. King John confirmed to the burgeſſes all the liberties he had granted to thoſe of Briſtol; and Edward III. granted that pleas and ſeſſions ſhould be held here, and no where elſe in the county. It is governed by a mayor, recorder, 7 aldermen, 2 bailiffs, 12 capital burgeſſes, 12 common burgeſſes, a town clerk, and 2 ſerjeants at mace. The aſſizes are held in the caſtle, where is alſo the county gaol. It trades to America with hardware and woollen manufactures in veſſels of 70 tons. There is a market on Wedneſday by grant, and another on Saturday by preſcription, beſides one every other Wedneſday throughout the year for cattle; and three fairs, in May, July, and October. The caſtle is not large, but neat and ſtrong. Not very long ago, in digging a cellar, there were found ſeveral Roman utenſils and veſſels for ſacrifices, as alſo the coins of Roman emperors; ſo that it is ſuppoſed there was here a Roman fortreſs. On the top of the caſtle is a ſquare tower, called *John of Gaunt's chair*, whence there is a charming proſpect of the adjacent country, and eſpecially towards the ſea, where is an extenſive view even to the Iſle of Man. There is but one church, a fine Gothic building. It is placed on the ſame elevation, and from ſome points of view forms one group with the caſtle, which gives the mind a moſt magnificent idea of this important place. The late conſiderable additional new ſtreets and a new chapel, with other improvements, give an air of elegance and proſperity to the town; and the new bridge of 5 equal elliptical arches, in all 549 feet in length, adds not a little to the embelliſhments and conveniency of the place. Adjoining to the caſtle, the new gaol is erected on an improved plan. On the ſide of the hill below it, hangs a piece of a Roman wall, called *Wery-wall*. Here is a cuſtom-houſe. By the late inland navigation, it has communication with the rivers Merſey, Dee, Ribble, Ouſe, Trent, Darwent, Severn, Humber, Thames, Avon, &c. which navigation, including its windings, extends above 500 miles in the counties of Lincoln, Nottingham, York, Weſtmoreland, Cheſter, Stafford, Warwick, Leiceſter, Oxford, Worceſter, &c. For its peculiar government, ſee DUCHY-*Court*.

LANCE, LANCEA, a ſpear; an offenſive weapon worn by the ancient cavaliers, in form of a half pike. The lance conſiſted of three parts, the ſhaft or handle, the wings, and the dart. Pliny attributes the invention of lances to the Ætolians. But Varro and Aulus Gellius ſay the word lance is Spaniſh; whence others conclude the uſe of this weapon was borrowed by the people of Italy from the Spaniards. Diodorus Siculus derives it from the Gauliſh, and Feſtus from the Greek λογχη, which ſignifies the ſame.

LANCE, in ichthyology. See AMMODYTES.

LANCEOLATED LEAF. See BOTANY.

LANCEROTA, one of the Canary iſlands, ſubject to Spain, and ſituated in W. long. 13. 5. N. lat. 28. 40. It is about 32 miles in length and 22 in breadth. The ancient inhabitants were negroes, very ſtrong, active, and ſwift of foot. There is a ridge of hills runs quite through it, on which are fed a good number of ſheep and goats. They have but few black cattle, ſtill fewer camels, and a very few ſmall horſes. The valleys are dry and ſandy, yet they produce a ſmall quantity of wheat and barley. This iſland was firſt diſcovered in 1417. In 1596 it was taken by the Engliſh under the command of the earl of Cumberland; after which it was better fortified than before. There is in this iſland a city called alſo *Lancerota*, which, at the time the earl of Cumberland was there, conſiſted only of about 100 houſes, all poor buildings, generally of one ſtory, and covered with reeds or ſtraw laid upon a few rafters, and over all a coat of dirt hardened by the ſun. There was alſo a church which had no windows in it, and was ſupplied with light only by the door.

LANCET, a chirurgical inſtrument, ſharp-pointed and two edged, chiefly uſed for opening veins in the operation of phlebotomy or bleeding; alſo for laying open abſceſſes, tumors, &c.

LANCH, or LAUNCH, a peculiar ſort of long-boat, uſed by the French, Spaniſh, and Italian ſhipping, and in general by thoſe of other European nations when employed in voyaging in the Mediterranean ſea. A lanch is proportionably longer, lower, and more flat-bottomed than the long-boat; it is by conſequence leſs fit for ſailing, but better calculated for rowing and approaching a flat ſhore. Its principal ſuperiority to the long-boat, however, conſiſts in being by its conſtruction much fitter to under run the cable; which is a very neceſſary employment in the harbours of the Levant ſea, where the cables of different ſhips are faſtened acroſs each other, and frequently render this exerciſe extremely neceſſary.

LANCH, is alſo the movement by which a ſhip or boat deſcends from the ſhore, either when ſhe is at firſt built, or at any time afterwards. To facilitate the operation of lanching, and prevent any interruption therein, the ſhip is ſupported by two ſtrong platforms, laid with a gradual inclination to the water, on the oppoſite ſides of her keel, to which they are parallel. Upon the ſurface of this declivity are placed two correſponding ranges of planks, which compoſe the baſe of a frame called the *cradle*, whoſe upper part envelops the ſhip's bottom, whereto it is ſecurely attached. Thus the lower ſurface of the cradle, conforming exactly to that of the frame below, lies flat upon it lengthwiſe, under the oppoſite ſides of the ſhip's bottom; and as the former is intended to ſlide downwards upon the latter, carrying the ſhip along with it, the planes or faces of both are well daubed with ſoap and tallow.

The neceſſary preparations for the lanch being made, all the blocks and wedges, by which the ſhip was formerly ſupported, are driven out from under her keel, till her whole weight gradually ſubſides upon the platforms above deſcribed, which are accordingly called the *ways*. The ſhores and ſtanchions, by which ſhe is retained upon the ſtocks till the period approaches for lanching, are at length cut away, and the ſcrews applied to move her if neceſſary. The motion uſually begins on the inſtant when the ſhores are cut, and the ſhip ſlides downward along the ways, which are generally prolonged under the ſurface of the water, to a ſufficient depth to float her as ſoon as ſhe arrives at the fartheſt end thereof.

When a ſhip is to be lanched, the enſign, jack, and pendant, are always hoiſted, the laſt being diſplayed from a ſtaff erected in the middle of the ſhip.

Ships of the firſt rate are commonly conſtructed in dry docks, and afterwards floated out, by throwing open the flood-gates, and ſuffering the tide to enter, as ſoon as they are finiſhed.

LANCIANO, a conſiderable town of Italy, in the kingdom of Naples, and in the Hither Abruzzo, with an archbiſhop's ſee; famous for its fairs, which are held in July and

Auguſt. It is ſeated on the river Feltrino near that of Sangor. E. lon. 15. 5. N. lat. 42. 12.

LANCISI (John Marca), an eminent Italian phyſician, was born at Rome in 1654. From his earlieſt years he had a turn to natural hiſtory; and ſtudied botany, chemiſtry, anatomy, and medicine, with great vigour. In 1688 pope Innocent XI. appointed him his phyſician and private chamberlain, notwithſtanding his youth; and cardinal Altieri Camerlinga made him his vicar for the inſtallation of doctors in phyſic, which pope Clement XI. gave him as long as he lived, as well as continued to him the appointments conferred on him by his predeceſſor. He died in 1720, after giving his fine library of more than 20,000 volumes to the hoſpital of the Holy Ghoſt for the uſe of the public. This noble benefaction was opened in 1716, in the preſence of the pope and moſt of the cardinals. He wrote many works which are eſteemed, the principal of which were collected together, and printed at Geneva in 1718, in two volumes quarto.

LANCRET (Nicholas), a French painter, born at Paris in 1690. He was the diſciple of Watteau and Gillot, and painted converſations. He was indefatigable in his profeſſion, executed with great truth after nature, grouped his figures well, and handled a light pencil. He died in 1743.

LANCRINCK (Prosper Henry), a painter of conſiderable note, born in 1628, and educated in the ſchool at Antwerp. He ſtudied principally after Titian and Salvator Roſa; and met with encouragement in England ſuitable to his merit. His landſcapes ſhow a good invention, good colouring, and harmony: they are chiefly of rough rude country, with broken ground and uncommon ſcenery. He gave way too much to pleaſure, and died in 1692.

LAND, in a general ſenſe, denotes *terra firma*, as diſtinguiſhed from *ſea*. In a limited ſenſe it denotes arable ground. See Husbandry.

Draining-Land. The draining of land is a very great improvement to it; for though meadows and paſtures, which are capable of being overflowed, produce a greater quantity of herbage than dry land, yet where the wet lies too long upon the ground, the graſs will be ſour and extremely coarſe; and when there is not care taken in time to drain this land, it will produce little graſs, and ſoon be over-run with ruſhes and flags, ſo as to be of ſmall value.

The beſt method for draining of theſe lands is, to cut ſeveral drains acroſs the land, in thoſe places where the water is ſubject to lodge; and from theſe croſs drains to make a convenient number of other drains, to carry off the water to either ponds or rivers in the lower parts of the lands. Theſe drains need not be made very large, unleſs the ground be very low, and ſo ſituated as not to be near any river to which the water may be conveyed; in which caſe there ſhould be large ditches dug at proper diſtances in the loweſt part of the ground, to contain the water, and the earth which comes out of the ditches ſhould be equally ſpread on the land, to raiſe the ſurface. But where the water can be conveniently carried off, the beſt method is to make under-ground drains at proper diſtances, which may empty themſelves into large ditches, which are deſigned to carry off the water. This ſort of drains is the moſt convenient, and, as they are hid from the ſight, do not incommode the land; nor is there any ground loſt where theſe are made.

The uſual method of making theſe drains is to dig trenches, and fill the bottoms with ſtones, bricks, ruſhes, or buſhes, which are covered over with the earth which was dug out of the trenches: but this is not the beſt method, becauſe the water has not a free paſſage through theſe drains; ſo that whenever there is a flood, they are often ſtopped by the ſoil which the water frequently brings down with it. The beſt method yet found to make theſe drains is to dig trenches to a proper depth for carrying off the water, which for the principal drains ſhould be three feet wide at their top, and ſloped down for two feet in depth, where there ſhould be a ſmall bank left on each ſide, upon which the croſs ſtakes or bearers ſhould be laid, and below theſe banks there ſhould be an open drain left, at leaſt one foot deep, and nine or ten inches wide, that there may be room for the water to paſs through: the larger drains ſhould be at convenient diſtances, and ſmaller drains of about ſix or ſeven inches wide, and the hollow under the buſhes eight or nine inches deep, ſhould be cut acroſs the ground, which ſhould diſcharge the water into theſe larger drains. The number and ſituation of them muſt be in proportion to the wetneſs of the land; and the depth of earth above the buſhes muſt alſo be proportioned to the intended uſe of the land; for if it is arable land to be ploughed, it muſt not be ſhallower than a foot or fourteen inches, that there may be ſufficient depth for the plough, without diſturbing the buſhes, but for paſture-land nine inches will be full enough; for when the buſhes lie too deep in ſtrong land, they will have little effect, the ground above will bind ſo hard, as to detain the wet on the ſurface. When the drains are dug, there ſhould be prepared a quantity of good bruſh-wood, the larger ſticks ſhould be cut out to lengths of about ſixteen or eighteen inches, which ſhould be laid acroſs upon the two ſide-banks of the drain, at about four inches diſtance; then cover theſe ſticks with the ſmaller bruſh-wood, furze, broom, heath, or any other kind of bruſh, laying it lengthwiſe pretty cloſe; on the top of theſe may be laid ruſhes, flags, &c. and then the earth laid on to cover the whole. This ſort of drains will continue good for a great number of years, and are never liable to the inconveniences of the other; for the water will find an eaſy paſſage through them under the buſhes; and where there is plenty of bruſh-wood, they are made at an eaſy expence; but in places where wood is ſcarce, it would be chargeable to make them: however, in this caſe, it would be a great advantage to theſe lands to plant a ſufficient number of cutttings of willow, or the black poplar, on ſome of the moiſt places, which would furniſh bruſh-wood for theſe purpoſes in four or five years; and as the expence of planting theſe cutings is trifling, there cannot be a greater advantage to an eſtate which wants draining, than to practiſe this method, which is in every perſon's power, ſince there is little expence attending it. In countries where there is plenty of ſtone, that is the beſt material for making theſe under-ground drains; for when theſe are properly made, they will never want repairing.

The beſt time of the year for making theſe drains is about Michaelmas, before the heavy rains of autumn fall, becauſe at this ſeaſon the land is uſually dry, ſo that the drains may be dug to a proper depth; for when the ground is wet, it will be very difficult to dig to any depth, becauſe the water will drain in, wherever there is an opening in the ground. See Bog, Drains, and Fen.

An ingenious mode of draining land lately practiſed, is that called Tap-*draining*, which is nothing more than making a paſſage for the water, by *boring into the earth* at the *ſource* of the ſpring. Lands which are flooded from this cauſe are effectually and cheaply rid of that inconvenience by tapping. Reſpecting this curious ſubject, ſee the late Reports of Agricultural Societies, and thoſe alſo publiſhed by order of the Board of Agriculture.

By 11 Geo. II. cap. 34. 14 Geo. II. cap. 24. and 21 Geo. II. cap. 18. the ſecond offence in ſetting fire to engines for draining the ſeveral fens, to which theſe acts relate, is made felony without clergy. By 22 Geo. II. cap. 11. 16. 19. 29 Geo. II. cap. 22. 30 Geo. II. cap. 32, 33. 35, 36. 31 Geo. II. cap. 18, 19. 32 Geo. II. cap. 13. 33 Geo. II. cap. 32. offenders maliciouſly ſetting fire to any of the works for drain-

ing the ſeveral fens to which theſe acts relate, may be tranſported for ſeven years.

Flooding LAND. See IRRIGATION.

LAND, in the ſea-language, makes part of ſeveral compound terms; thus, *land-laid*, or, *to lay the land*, is juſt to loſe ſight of it. *Land-locked*, is when land lies all round the ſhip, ſo that no point of the compaſs is open to the ſea. If ſhe is at anchor in ſuch a place, ſhe is ſaid to ride *land-locked*, and is therefore concluded to ride ſafe from the violence of the winds and tides. *Land-mark*, any mountain, rock, ſteeple, tree, &c. that may ſerve to make the land known at ſea. *Land is ſhut in*, a term uſed to ſignify that another point of land hinders the ſight of that from which the ſhip came. *Land-to*, or the ſhip *lies land-to*; that is, ſhe is ſo far from ſhore, that it can only juſt be diſcerned. *Land-turn* is a wind that in almoſt all hot countries blows at certain times from the ſhore in the night. *To ſet the land*; that is, to ſee by the compaſs how it bears.

LAND-*Tax*, one of the annual taxes raiſed upon the ſubject. See TAX. The land-tax, in its modern ſhape, has ſuperſeded all the former methods of rating either property, or perſons in reſpect of their property, whether by tenths or fifteenths, ſubſidies on land, hydages, ſcutages, or talliages; a ſhort explication of which will, however, greatly aſſiſt us in underſtanding our ancient laws and hiſtory.

Tenths and fifteenths were temporary aids iſſuing out of perſonal property, and granted to the king by parliament. They were formerly the real tenth or fifteenth part of all the moveables belonging to the ſubject; when ſuch moveables, or perſonal eſtates, were a very different and a much leſs conſiderable thing than what they uſually are at this day. Tenths are ſaid to have been firſt granted under Henry II. who took advantage of the faſhionable zeal for croiſades to introduce this new taxation, in order to defray the expence of a pious expedition to Paleſtine, which he really or ſeemingly had projected againſt Saladine emperor of the Saracens, whence it was originally denominated the *Saladine tenth*. But afterwards fifteenths were more uſually granted than tenths. Originally the amount of theſe taxes was uncertain, being levied by aſſeſſments new-made at every freſh grant of the commons, a commiſſion for which is preſerved by Matthew Paris: but it was at length reduced to a certainty in the eighth year of Edward III. when, by virtue of the king's commiſſion, new taxations were made of every townſhip, borough, and city in the kingdom, and recorded in the exchequer; which rate was, at the time, the fifteenth part of the value of every townſhip, the whole amounting to about 29,000l. and therefore it ſtill kept up the name of a *fifteenth*, when, by the alteration of the value of money and the increaſe of perſonal property, things came to be in a very different ſituation. So that when, of later years, the commons granted the king a fifteenth, every pariſh in England immediately knew their proportion of it; that is, the ſame identical ſum that was aſſeſſed by the ſame aid in the eighth of Edward III.; and then raiſed it by a rate among themſelves, and returned it into the royal exchequer.

The other ancient levies were in the nature of a modern land-tax: for we may trace up the original of that charge as high as to the introduction of our military tenures; when every tenant of a knight's fee was bound, if called upon, to attend the king in his army for 40 days in every year. But this perſonal attendance growing troubleſome in many reſpects, the tenants found means of compounding for it, by firſt ſending others in their ſtead, and in proceſs of time by making a pecuniary ſatisfaction to the crown in lieu of it. This pecuniary ſatisfaction at laſt came to be levied by aſſeſſments, at ſo much for every knight's fee, under the name of ſcutages; which appear to have been levied for the firſt time in the fifth year of Henry II. on account of his expedition to Toulouſe, and were then (Sir Wm. Blackſtone apprehends) mere arbitrary compoſitions, as the king and the ſubject could agree. But this precedent being afterwards abuſed into a means of oppreſſion (by levying ſcutages on the landholders by the king's authority only, whenever our kings went to war, in order to hire mercenary troops and pay their contingent expences), it became thereupon a matter of national complaint; and king John was obliged to promiſe in his *magna charta*, that no ſcutage ſhould be impoſed without the conſent of the common council of the realm.

Of the ſame nature with ſcutages upon knight's fees were the aſſeſſments of hydage upon all other lands, and of talliage upon cities and burghs. But they all gradually fell into diſuſe, upon the introduction of ſubſidies, about the time of king Richard II. and King Henry IV. Theſe were a tax, not immediately impoſed upon property, but upon perſons in reſpect of their reputed eſtates, after the nominal rate of 4s. in the pound for lands, and 2s. 6d. for goods; and for thoſe of aliens in a double proportion. But this aſſeſſment was alſo made according to an ancient valuation; wherein the computation was ſo very moderate, and the rental of the kingdom was ſuppoſed to be ſo exceeding low, that one ſubſidy of this ſort did not, according to Sir Edward Coke, amount to more than 70,000l. whereas a modern land-tax at the ſame rate produces two millions. It was anciently the rule never to grant more than one ſubſidy and two fifteenths at a time: but this rule was broke through for the firſt time on a very preſſing occaſion, the Spaniſh invaſion in 1588; when the parliament gave queen Elizabeth two ſubſidies and four fifteenths. Afterwards, as money ſunk in value, more ſubſidies were given; and we have an inſtance, in the firſt parliament of 1640, of the king's deſiring 12 ſubſidies of the commons, to be levied in three years; which was looked upon as a ſtartling propoſal: though lord Clarendon tells us, that the ſpeaker, ſerjeant Glanvile, made it manifeſt to the houſe, how very inconſiderable a ſum 12 ſubſidies amounted to, by telling them he had computed what he was to pay for them; and when he named the ſum, he being known to be poſſeſſed of a great eſtate, it ſeemed not worth any farther deliberation. And, indeed, upon calculation, we ſhall find, that the total amount of theſe 12 ſubſidies, to be raiſed in three years, is leſs than what is now raiſed in one year by a land-tax of 2s. in the pound.

The grant of ſcutages, talliages, or ſubſidies by the commons, did not extend to ſpiritual preferments; thoſe being uſually taxed at the ſame time by the clergy themſelves in convocation: which grants of the clergy were confirmed in parliament; otherwiſe they were illegal, and not binding; as the ſame noble writer obſerves of the ſubſidies granted by the convocation, which continued ſitting after the diſſolution of the firſt parliament in 1640. A ſubſidy granted by the clergy was after the rate of 4s. in the pound, according to the valuation of their livings in the king's books; and amounted, Sir Edward Coke tells us, to about 20,000l. While this cuſtom continued, convocations were wont to ſit as frequently as parliaments: but the laſt ſubſidies, thus given by the clergy, were thoſe confirmed by ſtatute 15 Car. II. c. 10. ſince which another method of taxation has generally prevailed, which takes in the clergy as well as the laity: in recompenſe for which, the beneficed clergy have from that period been allowed to vote at the election of knights of the ſhire; and thenceforward alſo the practice of giving eccleſiaſtical ſubſidies hath fallen into total diſuſe.

The lay-ſubſidy was uſually raiſed by commiſſioners appointed by the crown, or the great officers of ſtate: and therefore in the beginning of the civil wars between Charles I. and his parliament, the latter, having no other ſufficient revenue to ſupport themſelves and their meaſures, introduced the practice of laying weekly and monthly aſſeſſments of a ſpecific ſum upon the ſeveral counties of the kingdom; to be levied by a pound-

rate on lands and perſonal eſtates: which were occaſionally continued during the whole Uſurpation, ſometimes at the rate of 120,000l. a month, ſometimes at inferior rates. After the Reſtoration, the ancient method of granting ſubſidies, inſtead of ſuch monthly aſſeſſments, was twice, and twice only, renewed; viz. in 1663, when four ſubſidies were granted by the temporalty and four by the clergy; and in 1670, when 800,000l. was raiſed by way of ſubſidy, which was the laſt time of raiſing ſupplies in that manner. For the monthly aſſeſſments being now eſtabliſhed by cuſtom, being raiſed by commiſſioners named by parliament, and producing a more certain revenue; from that time forwards we hear no more of ſubſidies, but occaſional aſſeſſments were granted as the national emergencies required. Theſe periodical aſſeſſments, the ſubſidies which preceded them, and the more ancient ſcutage, hydage, and talliage, were to all intents and purpoſes a land-tax; and the aſſeſſments were ſometimes expreſsly called ſo. Yet a popular opinion has prevailed, that the land-tax was firſt introduced in the reign of king William III.; becauſe in the year 1692 a new aſſeſſment or valuation of eſtates was made throughout the kingdom: which, though by no means a perfect one, had this effect, that a ſupply of 500,000l. was equal to 1s. in the pound of the value of eſtates given in. And, according to this enhanced valuation, from the year 1693 to the preſent, a period of more than a century, the land-tax has continued an annual charge upon the ſubject; about half the time at 4s. in the pound, ſometimes at 3s. ſometimes at 2s. twice at 1s. but without any total intermiſſion. The medium has been 3s. 3d. in the pound; being equivalent to 23 ancient ſubſidies, and amounting annually to more than a million and a half of money. The method of raiſing it is by charging a particular ſum upon each county, according to the valuation given in A. D. 1692; and this ſum is aſſeſſed and raiſed upon individuals (their perſonal eſtate, as well as real, being liable thereto), by commiſſioners appointed in the act, being the principal land-holders in the county and their officers.

An act paſſes annually for the raiſing, in general, 2,037,627l. 9s. 10½d. by the above-ſaid tax at 4s. in the pound; whereof there ſhall be raiſed in the ſeveral counties in England, according to the proportions expreſſed in the act, 1,989,673l. 7s. 10¼d.; and in Scotland, 47,954l. 1s. 2d. by an eight months ceſs of 5994l. 5s. 1¾d. *per menſem*, to be raiſed out of the land-rent, and to be paid at four terms, as ſpecified in the act, by two months amount each time.

Land-*Waiter*, an officer of the cuſtom-houſe, whoſe duty is, upon landing any merchandiſe, to examine, taſte, weigh, meaſure them, &c. and to take an account thereof. In ſome ports they alſo execute the office of a coaſt-waiter. They are likewiſe occaſionally ſtyled *ſearchers*, and are to attend and join with the patent ſearcher in the execution of all cockets for the ſhipping of goods to be exported to foreign parts; and in caſes where drawbacks on bounties are to be paid to the merchant on the exportation of any goods, they, as well as the patent ſearchers, are to certify the ſhipping thereof on the debentures.

LANDAFF, a town or village of Glamorganſhire in South Wales, with a biſhop's ſee, and on that account has the title of a *city*. It is ſeated upon an aſcent on the river Taff, or Tave, near Cardiff; but the cathedral ſtands on a low ground, and is a large ſtately building. The original ſtructure was built about the beginning of the 12th century. The building now uſed as the cathedral includes part of the body of the ancient one; but is in other reſpects as modern as the preſent century, about the middle of which the old church underwent ſuch reparation as was almoſt equivalent to rebuilding. The ruins are at the weſt end of the modern church, and conſiſt of the original weſtern door-way, and part of the north and ſouth ſides. The arch over the door is circular, and has a well carved epiſcopal ſtatue immediately over it. On the upper part of the front under which this door ſtands is a whole length figure of the Virgin Mary, with a croſs on the apex of the building. In this front are two rows of neat-pointed arches for windows; and on the north and ſouth ſides above mentioned are two circular door-caſes half ſunk in the earth. Theſe ruins exhibit an aſpect very different from the preſent cathedral, the new part of which the architect formed principally on the Roman model, without conſidering how incongruous this ſtyle of architecture is with the plan purſued in the ancient part.—Landaff is a place of but ſmall extent, and has no market. It is a port town, however, and carries on a good trade, as it has a very tolerable harbour that opens into the Severn river about four miles diſtant. The ruins of the biſhop's palace ſhow it to have been caſtellated. It was built in 1120, and was deſtroyed by Henry IV. W. lon. 3. 20. N. lat. 51. 33.

LANDAU, a ſtrong town of Germany, in the palatinate of the Rhine. It was formerly imperial, but was ceded to the French in 1648. It ſuſtained a ſevere bombardment by the allies in 1793; but they were compelled to raiſe the ſiege. It is ſeated on the Queich, nine miles S. of Newſtadt, and 270 E. of Paris. E. lon. 8. 12. N. lat. 49. 12.

LANDEN, a town of the Auſtrian Netherlands, in Brabant, famous for a battle gained over the French by the allies, in July 1693, when 20,000 men were killed. It is ſeated on the river Beck, in E. lon. 5. 5. N. lat. 52. 45.

Landen (John, F. R. S.), an eminent mathematician, was born at Peakirk, near Peterborough in Northamptonſhire, in January 1719. He became very early a proficient in the mathematics, for we find him a very reſpectable contributor to the Ladies' Diary in 1744; and he was ſoon among the foremoſt of thoſe who then contributed to the ſupport of that ſmall but valuable publication, in which almoſt every Engliſh mathematician, who has arrived at any degree of eminence for the laſt half century, has contended for fame at one time of his life or other. Mr. Landen continued his contributions to it at times, and under one ſignature or other, till within a few years of his death.

It has been frequently obſerved, that the hiſtories of literary men conſiſt chiefly of an hiſtory of their writings, and the obſervation was never more fully verified than it will be in this article concerning Mr. Landen.

In the 48th volume of the Philoſophical Tranſactions, for the year 1754, Mr. Landen gave "An inveſtigation of ſome theorems which ſuggeſt ſeveral very remarkable properties of the circle, and are at the ſame time of conſiderable uſe in reſolving fractions the denominators of which are certain multinomicils into more ſimple ones, and by that means facilitate the computation of fluents." This ingenious paper was handed to the ſociety by that eminent mathematician the late Thomas Simpſon of Woolwich, a circumſtance which will convey to thoſe who are not themſelves judges of it ſome idea of its merit. In the year 1755, he publiſhed a volume of about 160 pages, entitled "Mathematical Lucubrations." The title to this publication was made choice of as a means of informing the world, that the ſtudy of the mathematics was at that time rather the purſuit of his leiſure hours than his principal employment; and indeed it continued to be ſo the greateſt part of his life, for about the year 1762 he was appointed agent to the right honourable the earl Fitzwilliam, and reſigned that employment only two years before his death. Had it been otherwiſe, it ſeems highly probable he would have extended his reſearches in the mathematics, to which he was moſt enthuſiaſtically devoted, much farther than any other perſon has done. His lucubrations contain a variety of tracts relative to the rectification of curve lines, the ſummation of ſeries, the find-

ing of fluents, and many other points in the higher parts of the mathematics. About the latter end of the year 1757, or the beginning of 1758, he publiſhed propoſals for printing by ſubſcription "The Reſidual Analyſis, a new branch of the Algebraic art:" and in 1758 he publiſhed a ſmall tract in quarto, entitled "A Diſcourſe on the Reſidual Analyſis," in which he reſolved a variety of problems, to which the method of fluxions had been uſually applied, by a mode of reaſoning entirely new; compared thoſe ſolutions with ſolutions of the ſame problems, inveſtigated by the fluxionary method; and ſhowed that the ſolutions by his new method were, in general, more natural and elegant than the fluxionary ones.

In the 51ſt volume of the Philoſophical Tranſactions, for the year 1760, he gave "A new method of computing the ſums of a great number of infinite ſeries." This paper was alſo preſented to the ſociety by his ingenious friend the late Mr. Thomas Simpſon. In 1764, he publiſhed the firſt book of "The Reſidual Analyſis," in a 4to volume of 218 pages, with ſeveral copper-plates. In this treatiſe, beſides explaining the principles which his new analyſis was founded on, he applied it to drawing tangents and finding the properties of curve-lines; to deſcribing their involutes and evolutes, finding the radius of curvature, their greateſt and leaſt ordinates, and points of contrary fluxure; to the determination of their cuſps, and the drawing of aſymptotes: and he propoſed in a ſecond book to extend the application of this new analyſis to a great variety of mechanical and phyſical ſubjects. The papers which were to have formed this book lay long by him; but he never found leiſure to put them in order for the preſs.

On the 16th of January 1766, Mr. Landen was elected a fellow of the Royal Society, and admitted on the 24th of April following. In the 58th volume of the Philoſophical Tranſactions, for the year 1768, he gave a "Specimen of a new method of comparing curvilineal areas; by means of which many areas did not appear to be comparable by any other method;" a circumſtance of no ſmall importance in that part of natural philoſophy which relates to the doctrine of motion. In the 60th volume of the ſame work, for the year 1770, he gave "Some new theorems for computing the whole areas of curve-lines, where the ordinates are expreſſed by fractions of a certain form," in a more conciſe and elegant manner than had been done by Cotes, De Moivre, and others who had conſidered the ſubject before him. In the 61ſt volume, for 1771, he has inveſtigated ſeveral new and uſeful theorems for computing certain fluents, which are aſſignable by arcs of the conic ſections. This ſubject had been conſidered before both by Mr. Maclaurin and Mr. D'Alembert; but ſome of the theorems which were given by theſe celebrated mathematicians, being in part expreſſed by the difference between an arc of an hyperbola and its tangent, and that difference being not directly attainable when the arc and its tangent both become infinite, as they will do when the whole fluent is wanted, although ſuch fluent be finite; theſe theorems therefore fail in thoſe caſes, and the computation becomes impracticable without farther help. This defect Mr. Landen has removed by aſſigning the *limit* of the difference between the hyperbolic arc and its tangent, while the point of contact is ſuppoſed to be removed to an infinite diſtance from the vertex of the curve. And he concludes the paper with a curious and remarkable property relating to pendulous bodies, which is deducible from thoſe theorems. In the ſame year he publiſhed "Animadverſions on Dr. Stewart's computation of the ſun's diſtance from the earth."

In the 65th volume of the Philoſophical Tranſactions, for 1775, he gave the inveſtigation of a general theorem, which he had promiſed in 1771, for finding the length of any arc of a conic hyperbola by means of two elliptic arcs; and obſerves, that by the theorems there inveſtigated, both the elaſtic curve and the curve of equable receſs from a given point, may be conſtructed in thoſe caſes where Mr. Maclaurin's elegant method fails. In the 67th volume, for 1777, he gave "A new theory of the motion of bodies revolving about an axis in free ſpace, when that motion is diſturbed by ſome extraneous force, either percuſſive or accelerative." At this time he did not know that the ſubject had been handled by any perſon before him; and he conſidered only the motion of a ſphere's ſpheroid and cylinder. The publication of this paper, however, was the cauſe of his being told, that the doctrine of rotatory motion had been conſidered by M. D'Alembert; and purchaſing that author's *Opuſcules Mathematiques*, he there learned that M. D'Alembert was not the only one who had conſidered the matter before him; for M. D'Alembert there ſpeaks of ſome mathematician, though he does not mention his name, who, after reading what had been written on the ſubject, doubted whether there be any ſolid whatever, beſide the ſphere, in which any line, paſſing through its centre of gravity, will be a permanent axis of rotation. In conſequence of this, Mr. Landen took up the ſubject again; and though he did not then give a ſolution to the general problem, *viz.* "To determine the motions of a body of any form whatever, revolving without reſtraint about any axis paſſing through its centre of gravity," he fully removed every doubt of the kind which had been ſtarted by the perſon alluded to by M. D'Alembert, and pointed out ſeveral bodies, which, under certain dimenſions, have that remarkable property. This paper is given, among many others equally curious, in a volume of Memoirs which he publiſhed in the year 1780. But what renders that volume yet more valuable, is a very extenſive appendix, containing "Theorems for the calculation of fluents." The tables which contain theſe theorems are more complete and extenſive than any which are to be found in any other author, and are chiefly of his own inveſtigating; being ſuch as had occurred to him in the courſe of a long and cloſe application to mathematical ſtudies in almoſt every branch of thoſe ſciences. In 1781, 1782, and 1783, he publiſhed three little tracts on the ſummation of converging ſeries, in which he explained and ſhowed the extent of ſome theorems which had been given for that purpoſe by M. de Moivre, Mr. Sterling, and his old friend Thomas Simpſon, in anſwer to ſome things which he thought had been written to the diſparagement of thoſe excellent mathematicians. It was the opinion of ſome, that Mr. Landen did not ſhow leſs mathematical ſkill in explaining and illuſtrating theſe theorems, than he has done in his writings on original ſubjects; and that the authors of them were as little aware of the extent of their own theorems as the reſt of the world were, before Mr. Landen's ingenuity made it obvious to all.

About the beginning of the year 1782, Mr. Landen had made ſuch improvements in his theory of rotatory motion, as enabled him, he thought, to give a ſolution of the general problem ſpecified above; but finding the reſult of it to differ very materially from the reſult of the ſolution which had been given of it by M. D'Alembert, and being not able to ſee clearly where that gentleman had erred, he did not venture to make his own ſolution public. In the courſe of that year, having procured the Memoirs of the Berlin Academy for 1757, which contain M. Euler's ſolution of the problem, he found that this gentleman's ſolution gave the ſame reſult as had been deduced by M. D'Alembert; but the perſpicuity of M. Euler's manner of writing enabled him to diſcover where he had erred, which the obſcurity of the other did not do. The agreement, however, of two writers of ſuch eſtabliſhed reputation as M. Euler and M. D'Alembert, made him long dubious of the truth of his own ſolution, and induced him to reviſe the proceſs again and again with the utmoſt circumſpection; and being every time more convinced that his own ſolution was right and theirs

wrong, he at length gave it to the public in the 75th volume of the Philoſophical Tranſactions, for 1785.

The extreme difficulty of the ſubject, joined to the conciſe manner in which Mr. Landen had been obliged to give his ſolution, in order to confine it within proper limits for the Tranſactions, rendered it too difficult, or at leaſt too laborious a piece of buſineſs for moſt mathematicians to read it; and this circumſtance, joined to the eſtabliſhed reputation of Euler, induced many to think that his ſolution was right and Mr. Landen's wrong; and there did not want attempts to prove it. But notwithſtanding theſe attempts were manifeſtly wrong, and that every one who peruſed them ſaw it, they convinced Mr. Landen that there was a neceſſity for giving his ſolution at greater length, in order to render it more generally underſtood. About this time alſo he met by chance with the late P. Friſi's *Coſmographiæ Phyſicæ et Mathematicæ*; in the ſecond part of which there is a ſolution of this problem, agreeing in the reſult with thoſe of M. Euler and D'Alembert, which is not ſurpriſing, as P. Friſi employs the ſame principle that they did. Here Mr. Landen learned that M. Euler had reviſed the ſolution which he had given formerly in the Berlin Memoirs, and given it another form and at greater length in a volume publiſhed at Gryphiſwell in 1765, entitled, *Theoria Motus corporum ſolidorum ſeu rigidorum*. Having therefore procured this book, Mr. Landen found the ſame principles employed in it, and of courſe the ſame concluſion reſulting from them that he had found in M. Euler's former ſolution of the problems: but as the reaſoning was given at greater length, he was enabled to ſee more diſtinctly how M. Euler had been led into the miſtake, and to ſet that miſtake in a ſtronger point of view. As he had been convinced of the neceſſity of explaining his ideas on the ſubject more fully, ſo he now found it neceſſary to loſe no time in ſetting about it. He had for ſeveral years been ſeverely afflicted with the ſtone in the bladder, and toward the latter part of his life to ſuch a degree as to be confined to his bed for more than a month at a time; yet even this dreadful diſorder did not very materially abate his ardour for mathematical ſtudies; for the ſecond volume of his Memoirs was written and reviſed during the intervals of his diſorder. This volume, beſide a ſolution of the general problem concerning rotatory motion, contains the reſolution of the problem concerning the motion of a top; an inveſtigation of the motion of the equinoxes, in which Mr. Landen has firſt of any one pointed out the cauſe of Sir Iſaac Newton's miſtake in his ſolution of this celebrated problem; and ſome other papers of conſiderable importance. He juſt lived to ſee this work finiſhed, and received a copy of it the day before his death, which happened on the 15th of January 1790, at Milton, near Peterborough, in the 71ſt year of his age.

LANDERNAU, a town of France, in the department of Finiſterre and late province of Bretagne, ſeated on the Elhorn, 20 miles N. E. of Breſt. W. lon. 4. 20. N. lat. 48. 28.

LANDGRAVE (formed of the German *land*, "earth," and *graff* or *grave*, "judge" or "count"), a name formerly given to thoſe who executed juſtice in behalf of the emperors, with regard to the internal policy of the country. The title does not ſeem to have been uſed before the 11th century. Theſe judges were firſt appointed within a certain diſtrict of Germany: in proceſs of time the title became hereditary, and theſe judges aſſumed the ſovereignty of the ſeveral diſtricts or countries over which they preſided. Landgrave is now applied by way of eminence to thoſe ſovereign princes of the empire who poſſeſs by inheritance certain eſtates called *landgravates*, and of which they receive the inveſtiture of the emperor. There are four princes who have this title, *viz.* thoſe of Thuringia, Heſſia, Alſace, and Leuchtenberg. There are alſo other landgraves who are not princes but counts of the empire. See COUNT.

LANDGRAVIATE, or LANDGRAVATE, the office, authority, juriſdiction, or territory of a landgrave.

LANDGUARD-FORT ſeems to belong to Suffolk, but is in the limits of Eſſex, and has a fine proſpect of the coaſts of both counties. It was erected, and is maintained, for the defence of the port of Harwich over againſt it; for it commands the entry of it from the ſea up the Manning tree water, and will reach any ſhip that goes in or out. It is placed on a point of land ſo ſurrounded by the ſea at high-water, that it looks like a little iſland at leaſt one mile from the ſhore. The making its foundation ſolid enough for ſo good a fortification coſt many years labour and a prodigious expence. It was built in the reign of king James I. when it was a much more conſiderable fortification than now, having four baſtions mounted with 60 very large guns, particularly thoſe on the royal baſtion, which would throw a 28 pound ball over Harwich. Here is a ſmall garriſon, with a governor, and a platform of guns. This fort is refitted and greatly enlarged for the conveniency of the officers of ordnance, engineers, and matroſſes; and a barrack built for the ſoldiers.

LANDISFARN, or LINDESFARN. See HOLY *Iſland*.

LANDRECY, a town of France, in the department of the North and late province of Hainault. It was beſieged in vain by prince Eugene in 1712. It was taken by the allies in April 1794; but retaken in July following. It is ſeated on the Sambre, 18 miles S. W. of Maubeuge, and 100 N. by E. of Paris. E. lon. 3. 47. N. lat. 50. 7.

LANDSCAPE, in painting, the view or proſpect of a country extended as far as the eye will reach. See PAINTING and DRAWING.

LANDSCROON, a ſea-port town of Sweden, in South-Gothland, and territory of Schonen, ſeated on the Baltic Sea, within the Sound, 22 miles north of Copenhagen. E. lon. 14. 20. N. lat. 55. 42.

LANDSDOWN, a place in Somerſetſhire, near Bath, with a fair on October 10th for cattle and cheeſe.

LANDSHUT, a ſtrong town of Germany in Lower Bavaria, with a ſtrong caſtle on an adjacent hill. It is ſeated on the river Iſer, in E. lon. 1. 15. N. lat. 48. 23. There is another ſmall town of the ſame name in Sileſia, and in the duchy of Schweidnitz, ſeated on the river Zieder, which falls into the Bauber: and there is alſo another in Moravia, ſeated on the river Morave, on the confines of Hungary and Auſtria.

LANERKSHIRE, a county of Scotland, called alſo *Clydeſdale*, from the river Clyde, by which it is watered. It is bounded on the north by the county of Dumbarton; on the eaſt by Stirling, Linlithgow, Edinburgh, and Peebles ſhires; on the ſouth by Dumfries; and on the weſt by Ayr and Renfrew ſhires. Its extent from north to ſouth is about 40 miles, from eaſt to weſt 36. The river Clyde, deſcending from the ſouthern part of this county, divides it into two almoſt equal parts; and after a courſe of about 50 miles, meets the tide a little below Glaſgow (ſee GLASGOW). Proceeding up the river from Glaſgow, the country is rich and well cultivated. Bothwell caſtle, now in ruins, ſtands on an eminence which overlooks the Clyde. Some of its walls are ſtill remaining, which meaſure 15 feet in thickneſs and 60 feet in height. This vaſt fabric was once the abode of a man the moſt notoriouſly marked of any in the annals of Scotland for the audacity and ſplendour of his crimes. Between this caſtle and the priory of Blantyre on the oppoſite ſide of the Clyde, there is ſaid to have been in ancient times a ſubterraneous paſſage under the river. A little above ſtands Bothwell-bridge, noted for the defeat of the Covenanters by the duke of Monmouth in 1679. Eaſt from Bothwell caſtle, in an elevated ſituation, ſtands the Kirk of Shots, amid a wild and barren country. This dreary waſte is covered with heath; and though a high ſituation, is flat, and

very marſhy in many places. It is chiefly employed as ſheep-walks; and notwithſtanding the vicinity of coal and lime, ſeems ſcarce capable of cultivation. This want is, however, compenſated by the abundance of iron-ſtone and coal, which are here brought together by the hand of nature. Nor is this advantage confined to the barren tract in the north-eaſt corner of the ſhire. The whole county abounds with theſe valuable minerals; and two iron-works are erected on the banks of the Clyde, one a little above Glaſgow and another at Cleland near Hamilton. But the moſt conſiderable work of this kind in the county is that of Cleugh, a few miles ſouth-eaſt from the Kirk of Shots. A village is here built for the accommodation of the workmen. It is called *Wilſontown*, from the name of the proprietors. The ſmall borough of Lanerk is ſituated on the brow of a hill, on the north-eaſt ſide of the Clyde, commanding a fine proſpect over the river. In this neighbourhood are ſome of the greateſt cotton manufactories in Scotland. The Clyde near this place runs for ſeveral miles between high rocks covered with wood; and in its courſe exhibits many aſtoniſhing cataracts (ſee the article CLYDE). From Lanerk, paſſing the village of Carſtairs, a few miles to the eaſt we meet the ſmall town of Carnwath. In this neighbourhood, and along the Clyde to the ſouth-eaſt, there is much cultivation and rich paſture. To the ſouth of Carnwath is the town of Biggar; where is ſeen the ruin of a collegiate church founded in 1545.—The lands about the villages of Coulter and Lammington are fertile; but farther up the Clyde we meet with nothing but ſheep-walks and paſture-grounds in tracing it to its ſource.

In the ſouthern part of the ſhire, generally called Clydeſdale, the country is not leſs wild. Among the mountains here, or rather in a hollow near their ſummit, we meet with the village of Leadhills, by ſome ſaid to be the higheſt human habitation in the iſland of Great Britain. Here, however, reſide many hundreds of miners with their families. Theſe miners, though in a great meaſure excluded from ſociety by their ſituation, yet not only find means to procure a comfortable ſubſiſtence, but alſo pay more attention to the cultivation of the mind than many of their countrymen ſituated ſeemingly in more favourable circumſtances for the attainment of knowledge. As an evidence of this, they are very intelligent, and have provided a circulating library for the inſtruction and amuſement of the little community belonging to the village.—Amid theſe mountains particles of gold have ſometimes been found waſhed down by the rains and ſtreams of water; but this deſert tract is chiefly valuable for producing metals of inferior worth. "Nothing (ſays Mr. Pennant) can equal the gloomy appearance of the country round. Neither tree, nor ſhrub, nor verdure, nor picturеſque rock, appear to amuſe the eye. The ſpectator muſt plunge into the bowels of theſe mountains for entertainment." The veins of lead lie moſtly north and ſouth; and their thickneſs, which ſeldom exceeds 40 feet, varies greatly in different parts. Some have been found filled with ore within two fathoms of the ſurface: others ſink to the depth of 90 fathoms. The earl of Hopeton, the proprietor, has in his poſſeſſion a ſolid maſs of lead ore from theſe mines weighing five tons. His lordſhip has alſo, it is ſaid, a piece of native gold that weighs two ounces, which was found here. The lead ſmelted at this place is all ſent to Leith, where it has the privilege of being exported free of duty. The ſcanty paſture afforded by this barren region feeds ſome ſheep and cattle; but thoſe in the neighbourhood of the mines ſometimes periſh by drinking of the water in which the lead ore has been waſhed; for the lead ore communicates a deleterious quality to the water, though that liquid acquires no hurtful taint from remaining in leaden pipes or ciſterns.—North from this mountainous region lies Crawfordmuir.

About nine miles north of Leadhills, on the eaſt ſide of the ſmall river Douglas, which falls into the Clyde a few miles below, ſtands Douglas caſtle, for many ages the reſidence of the ſecond family in Scotland. A modern building has been erected on the ſame ſite, in imitation of the ancient caſtle. Near it ſtands the town of Douglas. A few miles to the north-eaſt is Tinto, a remarkable conic mountain, round the baſe of which the Clyde makes a noble ſweep. Weſtward, beyond Douglas, the ſmall river Netham deſcends into the Clyde through the populous pariſh of Liſmahago.—Hamilton-houſe, the ſeat of the Duke of Hamilton, ſtands in a plain between the rivers Clyde and Avon. It is a magnificent ſtructure, ſurrounded by many venerable oaks. In the vicinity is the town of Hamilton, which contains many handſome houſes. Here are ſeen the ruins of a collegiate church, founded in 1451. At a little diſtance from Hamilton-houſe is an elegant appendage to it called *Chatelherault*, the name of the ancient poſſeſſions held by the family in France. This building is ſeated on the river Avon, and is ſurrounded by woods and deep dells, and every rural beauty that can produce a pleaſing effect on the imagination. On the weſt of Hamilton is the little town of Kilbride; and to the ſouth that of Strathavon, ſurrounded by the fertile tract from which it derives its name. In our way from Hamilton to Glaſgow we meet with the ancient borough of Rutherglen, inhabited chiefly by weavers and other manufacturers; and the village of Govan ſtands on the ſame ſide of the river on the road from Glaſgow to Renfrew.

LANESBOROUGH, a town of Ireland, ſituated in the county of Longford and province of Leinſter. It is a borough, and returns two members to parliament; patronage in the Dillon family. This place is ſituated on the river Shannon, 62 miles from Dublin; and has a barrack for a troop of horſe.—There is a yearly fair here in February. The town gave title of *viſcount* to the family of Lane, and now gives title of *earl* to that of Butler. There is a bridge over the Shannon at Laneſborough into the county Roſcommon. N. lat. 53. 40. W. lon. 8. 6.

LANFRANC, an Italian, born at Pavia, became archbiſhop of Canterbury in 1070. He diſputed againſt Berengarius in the council held at Rome in 1059, and wrote againſt him concerning the real preſence in the euchariſt. He had other diſputes, &c. and died in 1089.

LANFRANC (John), an eminent Italian hiſtory painter, born at Parma in 1581. He was firſt the diſciple of Auguſtin Caracci, and after his death of Annibal, whoſe taſte in deſign and colouring he ſo happily attained, that he was entruſted to execute ſome of his deſigns in the Farneſian palace at Rome.—Theſe he finiſhed in ſo maſterly a manner, that the difference is imperceptible to this day between his work and that of his maſter. His genius directed him to grand compoſitions, which he had a peculiar facility in deſigning, and in painting either in freſco or in oil: he did indeed aſpire to the grace of Correggio, but could never arrive at his excellence; his greateſt power being manifeſted in compoſition and fore-ſhortening. He was deficient in correctneſs and expreſſion; and his colouring, though ſometimes admirable, was frequently too dark. By order of pope Urban VIII. he painted in St. Peter's church at Rome the repreſentation of that ſaint walking on the water, which afforded the pope ſo much ſatisfaction that he knighted him. He died in 1647.

LANGBAINE (GERARD), D. D. a learned Engliſh writer, was born in 1608. He was educated at Queen's-college, Oxford; and became keeper of the archives of that univerſity, provoſt of his college, and doctor of divinity. He was highly eſteemed by archbiſhop Uſher, Selden, and ſeveral other learned men; and died in 1657-8. He publiſhed, 1. An edition of Longinus, in Greek and Latin, with notes. 2. A review of the covenant; and other works.

LANGBAINE (Gerard), an eminent writer, the ſon of the former, was born in 1656. He was put apprentice to Mr. Symonds, bookſeller in St. Paul's church-yard; but was ſoon after called from thence by his mother on the death of his eldeſt brother, and by her entered a gentleman-commoner of Univerſity-college, Oxford, in 1672. Here he run out a good part of his eſtate; but afterwards corrected his manner of living, and for ſome years lived in retirement near Oxford. During this time he improved his taſte for dramatic poetry; and at firſt wrote ſome ſmall pieces without his name, but afterwards publiſhed ſeveral works which he publicly owned. In 1690 he was elected inferior beadle of arts in the univerſity of Oxford; and, in January following, was choſen ſuperior beadle of law, but died ſoon after in 1692. He wrote, 1. The hunter, a diſcourſe on horſemanſhip. 2. A new catalogue of Engliſh plays, with their beſt editions, and divers remarks on the originals of moſt plays, and on the plagiaries of ſeveral authors. 3. An account of the Engliſh dramatic poets.

LANGEAIS, an ancient town of France, in the department of Indre and Loire and late province of Touraine, ſeated on the Loire, 12 miles W. of Tours. E. lon. 0. 31. N. lat. 47. 26.

LANGELAND (Robert), an old Engliſh poet of the 14th century, and one of the firſt diſciples of Wickliffe the reformer. He is ſaid to have been born in Shropſhire, but we have no account of his family. He wrote *The viſions of Pierce Howman*, a piece which abounds with imagination and humour, though dreſſed to great diſadvantage in very uncouth verſification and obſolete language. It is written without rhyme, an ornament which the poet has endeavoured to ſupply by making every verſe begin with the ſame letter. Dr. Hickes obſerves, that this kind of alliterative verſification was adopted by Langeland from the practice of the Saxon poets, and that theſe viſions abound with Saxoniſms: he ſtyles him *celeberrimus ille ſatirographus, morum vindex acerrimus*, &c. Chaucer and Spenſer have attempted imitations of his viſions, and the learned Selden mentions him with honour.

Langeland, an iſland of Denmark in the Baltic ſea, in the ſtrait called *the great belt*, and between Zealand, Saland, and Fyonia. It produces plenty of corn, and the principal town is Rutcoping. E. lon. 11. 10. N. lat. 55. 0.

LANGHORNE (John), D. D. was born at Kirkby-Stephen in Weſtmoreland. His father was the reverend Joſeph Langhorne of Winſton, who died when his ſon was young. After entering into holy orders, he became tutor to the ſons of Mr. Cracroft, a Lincolnſhire gentleman, whoſe daughter he married. This lady in a ſhort time died: and the loſs of her was very pathetically lamented by her huſband in a monody; and by another gentleman, Mr. Cartwright, in a poem intitled "Conſtantia." Dr. Langhorne held the living of Blagden in Somerſetſhire at the time of his death, which happened April 1, 1779. He was the author of ſeveral literary productions; amongſt others, of Poems in 2 vols. 1766; Sermons in 2 vols. 1773; Effuſions of Fancy, 2 vols.; Theodoſius and Conſtantia, 2 vols.; Solyman and Almena; Frederick and Pharamond, or the Conſolations of Human Life, 1769; a Diſſertation on the Eloquence of the Pulpit; and another on Religious Retirement; and he was editor of the Works of St. Evremond, of the Poems of Collins, and ſome other articles.

LANGIONA, a large, rich, and ſtrong town of Aſia, capital of the kingdom of Laos, with a large and magnificent palace where the king reſides. E. lon. 96. 45. N. lat. 22. 38.

LANGOBARDI, a people of Germany ſituated between the Elbe and the Oder, in the Marche of Brandenburg, whom their paucity ennobled; in regard that, being encompaſſed by many and powerful nations, they preſerved themſelves, not ſo much by ſubmiſſion, as by dint of arms and encountering dangers. (Tacitus.)

LANGPORT, in Somerſetſhire, 132 miles from London is a well-frequented town on the Parrot, between Bridgewater and Crewkern. It ſent members to three parliaments, and is governed by a portreeve and a recorder. Here are lighters conſtantly fetching coals, &c. from Bridgewater; and it is a ſtage for the Taunton waggon, which drops the goods here from London to be carried farther by water. Eels are taken in vaſt plenty out of the holes of the banks of the river in froſty weather. The market here is on Saturday, and there are four fairs in the year.

LANGREL-SHOT, at ſea, that conſiſting of two bars of iron joined by a chain or ſhackle, and having half a ball of iron fixed on each end; by means of which apparatus it does great execution among the enemy's rigging.

LANGRES, an ancient town of France, in the department of Upper Marne and late province of Champagne, with a biſhop's ſee. It is ſeated on a mountain, near the ſources of the Marne, and its cutlery wares are in high eſteem. This town is thought to ſtand the higheſt of any in France; and the proſpect from the towers of the principal church is beyond conception. It is 35 miles N. E. of Dijon, and 100 S. by E. of Rheims. E. lon. 5. 24. N. lat. 47. 52.

LANGTON (Stephen), was born in England, but educated at Paris, and was greatly eſteemed for his learning by the king and nobility of France. He was chancellor of Paris, a cardinal of Rome, and in the reign of king John was made archbiſhop of Canterbury by pope Innocent III. in oppoſition both to the monks of Canterbury and to the king. Langton was one of the moſt illuſtrious men of his age for learning; and continued archbiſhop 22 years, dying in 1228. A catalogue of his books is given by Bale and Tanner.

LANGUAGE, in the proper ſenſe of the word, ſignifies the expreſſion of our ideas and their various relations by certain articulate ſounds, which are uſed as the ſigns of thoſe ideas and relations. By articulate ſounds are meant thoſe modulations of ſimple voice, or of ſound emitted from the thorax, which are formed by means of the mouth and its ſeveral organs,—the teeth, the tongue, the lips, and the palate. In a more general ſenſe the word *language* is ſometimes uſed to denote all ſounds by which animals of any kind expreſs their particular feelings and impulſes in a manner that is intelligible to their own ſpecies.

Nature has endowed every animal with powers ſufficient to make known all thoſe of its ſenſations and deſires, with which it is neceſſary, for the preſervation of the individual or the continuance of the kind, that others of the ſame ſpecies ſhould be acquainted. For this purpoſe, the organs of all vocal animals are ſo formed, as, upon any particular impulſe, to utter ſounds, of which thoſe of the ſame ſpecies inſtinctively know the meaning. The ſummons of the hen is inſtantly obeyed by the whole brood of chickens; and in many others of the irrational tribes a ſimilar mode of communication may be obſerved between the parents and the offſpring, and between one animal and its cuſtomary aſſociate. But it is not among animals of the ſame ſpecies only that theſe inſtinctive ſounds are mutually underſtood. It is as neceſſary for animals to know the voices of their enemies as the voices of their friends; and the roaring of the lion is a ſound of which, previous to all experience, every beaſt of the foreſt is naturally afraid. Between theſe animal voices and the language of men there is however very little analogy. Human language is capable of expreſſing ideas and notions, which there is every reaſon to believe that the brutal mind cannot conceive. "Speech (ſays Ariſtotle) is made to indicate what is expedient and what inexpedient, and in conſequence of this what is juſt and unjuſt. It is therefore given to men; becauſe it is peculiar to them that of good and evil, juſt and unjuſt, they only (with

reſpect to other animals) poſſeſs a ſenſe or feeling." The voices of brutes ſeem intended by nature to expreſs, not diſtinct ideas or moral modes, but only ſuch feelings as it is for the good of the ſpecies that they ſhould have the power of making known; and in this, as in all other reſpects, theſe voices are analogous; not to our ſpeaking, but to our weeping, laughing, ſighing, groaning, ſcreaming, and other natural and audible expreſſions of appetite and paſſion.—Another difference between the language of men and the voices of brute animals conſiſts in articulation, by which the former may be reſolved into diſtinct elementary ſounds or ſyllables; whereas the latter, being for the moſt part unarticulated, is not capable of ſuch a reſolution. Hence Homer and Heſiod characterize man by the epithet *μεροψ*, or, "voice dividing," as denoting a power peculiar to the human ſpecies: for though there are a few birds which utter ſounds that may be divided into ſyllables, yet each of theſe birds utters but one ſuch ſound, which ſeems to be employed rather as notes of natural muſic than for the purpoſe of giving information to others; for when the bird is agitated, it utters cries which are very different, and have no articulation. —A third difference between the language of men and the ſignificant cries of brute animals, is, that the former is from art and the latter from nature. Every human language is learned by imitation, and is intelligible only to thoſe who either inhabit the country where it is vernacular, or have been taught it by a maſter or by books: but the voices in queſtion are not learned by imitation; and being wholly inſtinctive, they are intelligible to all the animals of that ſpecies by which they are uttered, though brought together from the moſt diſtant countries on earth That a dog, which had never heard another bark, would notwithſtanding bark himſelf, and that the barkings or yelps of a Lapland dog would be inſtinctively underſtood by the dogs of Spain, Calabria, or any other country, are facts which admit not of doubt: but there is no reaſon to imagine that a man who had never heard any language ſpoken would himſelf ſpeak; and it is well known that the language ſpoken in one country is unintelligible to the natives of another country where a different language is ſpoken. Herodotus indeed records a fact which, could it be depended upon, would tend to overturn this reaſoning, as it infers a natural relation between ideas and certain articulate ſounds. He tells us, that Pſammetichus king of Egypt, in order to diſcover which was the oldeſt language, cauſed two children, newly born of poor parents, to be brought up by a ſhepherd among his cattle, with a ſtrict injunction that they ſhould never hear a human voice; and that at the end of two years the children pronounced at the ſame time the word *βεκκος*, which in the Phrygian language ſignified *bread*. Either this is one of the many fables which that credulous hiſtorian collected among the Egyptians, or the conduct and reaſoning of Pſammetichus were very abſurd; for it is added, that from this circumſtance he inferred that the Phrygians were the moſt ancient people, and that they ſpoke the primitive language. The only rational purpoſe for which ſuch an experiment could be inſtituted, would be to diſcover, not which is the oldeſt or the lateſt language, but whether there be ſuch a thing as a language of nature or inſtinct: but in ſuch a language it is obvious that there could be no word to denote *bread*, becauſe in what is called the ſtate of nature bread is unknown. The experiment of Pſammetichus was probably never made; but in the woods of different countries ſolitary ſavages have at different times been caught, who, though they apparently poſſeſſed all the ſagacity which is natural to man, and though their organs both of hearing and of ſpeech were perfect, never uſed articulate ſounds as ſigns of ſenſations or ideas. They uttered indeed the inarticulate cries which are inſtinctively expreſſive of pleaſure and pain, of joy and ſorrow, more diſtinctly and forcibly than men civilized; but with reſpect to the very rudiments of language, they were what Horace repreſents all mankind to have been originally, *mutum et turpe pecus*. Indeed it ſeems to be obvious, that were there any inſtinctive language, the firſt words uttered by all children would be the ſame; and that every child, whether born in the deſert or in ſociety, would underſtand the language of every other child however educated or however neglected. Nay more, we may venture to affirm, that ſuch a language, though its general uſe might, in ſociety, be ſuperſeded by the prevailing dialect of art, could never be wholly loſt; and that no man of one country would find it difficult, far leſs impoſſible, to communicate the knowledge of his natural and moſt preſſing wants to the men of any other country, whether barbarous or civilized. The exerciſe of cultivated reaſon, and the arts of civil life, have indeed eradicated many of our original inſtincts, but they have not eradicated them all (ſee INSTINCT). There are external indications of the internal feelings and deſires, which appear in the moſt poliſhed ſociety, and which are confeſſedly inſtinctive. The paſſions, emotions, ſenſations, and appetites, are naturally expreſſed in the countenance by characters which the ſavage and the courtier can read with equal readineſs. The look ſerene, the ſmoothed brow, the dimpled ſmile, and the gliſtening eye, denote equanimity and good will in terms which no man miſtakes. The contracted brow, the glaring eye, the ſullen gloom, and the threatening air, denote rage, indignation, and defiance, as plainly and forcibly as revilings or imprecations. To teach men to diſguiſe theſe inſtinctive indications of their temper, and

> "To carry ſmiles and ſunſhine in their face,
> "When diſcontent ſits heavy at their heart,"

conſtitutes a great part of modern and refined education. Yet in ſpite of every effort of the utmoſt ſkill, and of every motive reſulting from intereſt, the moſt conſummate hypocrite, or the moſt hackneyed politician, is not always able to prevent his real diſpoſition from becoming apparent in his countenance. He may indeed, by long practice, have acquired a very great command both over his temper and over the inſtinctive ſigns of it; but at times nature will predominate over art, and a ſudden and violent paſſion will flaſh in his face, ſo as to be viſible to the eye of every beholder. If theſe obſervations be juſt, and we flatter ourſelves with the belief that no man will call them in queſtion, it ſeems to follow, that, if mankind were prompted by inſtinct to uſe articulate ſounds as indications of their paſſions, affections, ſenſations, and ideas, the language of nature could never be wholly forgotten, and that it would ſometimes predominate over the language of art. Groans, ſighs, and ſome inarticulate lively ſounds, are naturally expreſſive of pain and pleaſure, and equally intelligible to all mankind. The occaſional uſe of theſe no art can wholly baniſh; and if there were articulate ſounds naturally expreſſive of the ſame feelings, it is not conceivable that art or education could baniſh the uſe of them, merely becauſe by the organs of the mouth they are broken into parts and reſolvable into ſyllables.

It being thus evident that there is no inſtinctive articulated language, it has become an inquiry of ſome importance, how mankind were firſt induced to fabricate articulate ſounds, and to employ them for the purpoſe of communicating their thoughts. Children learn to ſpeak by inſenſible imitation; and when advanced ſome years in life, they ſtudy foreign languages under proper inſtructors: but the firſt men had no ſpeakers to imitate, and no formed language to ſtudy; by what means then did they learn to ſpeak? On this queſtion only two opinions can poſſibly be formed. Either language

muſt have been originally revealed from heaven, or it muſt be the fruit of human induſtry. The greater part of Jews and Chriſtians, and even ſome of the wiſeſt pagans, have embraced the former opinion; which ſeems to be ſupported by the authority of Moſes, who repreſents the Supreme Being as teaching our firſt parents the *names* of animals. The latter opinion is held by Diodorus Siculus, Lucretius, Horace, and many other Greek and Roman writers, who conſider language as one of the arts invented by man. The firſt men, ſay they, lived for ſome time in woods and caves after the manner of beaſts, uttering only confuſed and indiſtinct noiſes; till, aſſociating for mutual aſſiſtance, they came by degrees to uſe articulate ſounds mutually agreed upon for the arbitrary ſigns or marks of thoſe ideas in the mind of the ſpeaker which he wanted to communicate to the hearer. This opinion ſprung from the atomic coſmogony which was framed by Mochus the Phenician, and afterwards improved by Democritus and Epicurus; and though it is part of a ſyſtem in which the firſt men are repreſented as having grown out of the earth like trees and other vegetables, it has been adopted by ſeveral modern writers of high rank in the republic of letters, and is certainly in itſelf worthy of examination.

The moſt learned, and on every account the moſt reſpectable author who now ſupports this opinion, candidly acknowledges, that if language was invented, it was of very difficult invention, and far beyond the reach of the groſſeſt ſavages. Accordingly he holds, that though men were originally ſolitary animals, and had no natural propenſity to the ſocial life: yet before language could be invented they muſt have been aſſociated for ages, and have carried on of concert ſome common work. Nay, he is decidedly of opinion, that before the invention of an art ſo difficult as language, men muſt not only have herded together, but have alſo formed ſome kind of civil polity, have exiſted in that political ſtate a very long time, and have acquired ſuch powers of abſtraction as to be able to form general ideas. (See Logic and Metaphysics). But it is obvious, that men could not have inſtituted civil polity, or have carried on of concert any common work, without communicating their deſigns to each other: and there are four ways by which the author thinks that this could have been done before the invention of ſpeech; viz. 1ſt, *inarticulate cries*, expreſſive of ſentiments and paſſions; 2d, *geſtures*, and *the expreſſion of countenance*; 3d, *imitative ſounds* expreſſive of audible things; and, 4th, *painting*, by which viſible objects may be repreſented. Of theſe four ways of communication it is plain that only two have any connection with language, viz. inarticulate cries and imitative ſounds; and of theſe the author abandons the latter, as having contributed nothing to the invention of articulation, though he thinks it may have helped to advance its progreſs. "I am diſpoſed (ſays he) to believe, that the framing of words with an analogy to the ſound of the things expreſſed by them belongs rather to languages of art than to the firſt languages ſpoken by rude and barbarous nations." It is therefore inarticulate cries only that muſt have given riſe to the formation of language. Such cries are uſed by all animals who have any uſe of voice to expreſs their wants; and the fact is, that all barbarous nations have cries expreſſing different things, ſuch as joy, grief, terror, ſurpriſe, and the like. Theſe, together with geſtures and expreſſion of the countenance, were undoubtedly the methods of communication firſt uſed by men: and we have but to ſuppoſe (ſays our author) a great number of our ſpecies carrying on ſome common buſineſs, and converſing together by ſigns and cries; and we have men juſt in a ſtate proper for the invention of language. For if we ſuppoſe their numbers to increaſe, their wants would increaſe alſo; and then theſe two methods of communication would become too confined for that larger ſphere of life which their wants would make neceſſary. The only thing then that remained to be done was to give a greater variety to the inſtinctive cries; and as the natural progreſs is from what is eaſy to what is more difficult, the firſt variation would be merely by tones from low to high, and from grave to acute. But this variety could not anſwer all the purpoſes of ſpeech in ſociety; and being advanced ſo far, it was natural that an animal ſo ſagacious as man ſhould go on farther, and come at laſt to the only other variation remaining, namely, articulation. The firſt articulation would be very ſimple, the voice being broken and diſtinguiſhed only by a few vowels and conſonants. And as all natural cries are from the throat and larynx, with little or no operation of the organs of the mouth, it is natural to ſuppoſe, that the firſt languages were for the greater part ſpoken from the throat; that what conſonants were uſed to vary the cries, were moſtly guttural; and that the organs of the mouth would at firſt be very little employed. From this account of the origin of language it appears, that the firſt ſounds articulated were the natural cries by which men ſignified their wants and deſires to one another, ſuch as calling one another for certain purpoſes, and other ſuch things as were moſt neceſſary for carrying on any joint work: then in proceſs of time other cries would be articulated, to ſignify, that ſuch and ſuch actions had been performed or were performing, or that ſuch and ſuch events had happened relative to the common buſineſs. Then names would be invented of ſuch objects as they were converſant with; but as we cannot ſuppoſe ſavages to be deep in abſtraction or ſkilful in the art of arranging things according to their *genera* and *ſpecies*, all things however ſimilar, except perhaps the individuals of the loweſt ſpecies, would be expreſſed by different words not related to each other either by derivation or compoſition. Thus would language grow by degrees; and, as it grew, it would be more and more broken and articulated by conſonants: but ſtill the words would retain a great deal of their original nature of animal cries. And thus things would go on, words unrelated ſtill multiplying, till at laſt the language would become too cumberſome for uſe; and then art would be obliged to interpoſe, and form a language upon a few radical words, according to the rules and method of etymology.

Warburton, Delaney, Johnſon, Beattie, Blair, Dr. Stanhope Smith of New Jerſey, and others, who think that language was originally revealed from heaven, conſider this account of its human invention as a ſeries of mere ſuppoſitions hanging looſely together, and the whole ſuſpended from no fixed principle. The opinions of Diodorus, Vitruvius, Horace, Lucretius, and Cicero, which are frequently quoted in its ſupport, are in their eſtimation of no greater authority than the opinions of other men; for as language was formed and brought to a great degree of perfection long before the era of any hiſtorian with whom we are acquainted, the antiquity of the Greek and Roman writers, who are comparatively of yeſterday, gives them no advantage in this inquiry over the philoſophers of France and England. Ariſtotle has defined man to be ζωον μιμητικον: and the definition is certainly ſo far juſt, that man is much more remarkable for imitation than invention; and therefore, ſay the reaſoners on this ſide of the queſtion, had the human race been originally *mutum et turpe pecus*, they would have continued ſo to the end of time, unleſs they had been taught to ſpeak by ſome ſuperior intelligence. That the firſt men ſprung from the earth like vegetables, no modern philoſopher has ventured to aſſert; nor does there any where appear ſufficient evidence that men were originally in the ſtate of ſavages. The oldeſt book extant contains the only rational coſmogony known to the ancient nations; and that book repreſents the firſt human inhabitants of this earth, not only as reaſoning and ſpeaking animals, but alſo as in a ſtate of high

perfection and happineſs, of which they were deprived for diſobedience to their Creator. Moſes, ſetting aſide his claim to inſpiration, deſerves, from the conſiſtence of his narrative, at leaſt as much credit as Mochus, or Democritus, or Epicurus: and from his prior antiquity, if antiquity could on this ſubject have any weight, he would deſerve more, as having lived nearer to the period of which they all write. But the queſtion reſpecting the origin of language may be decided without reſting in authority of any kind, merely by conſidering the nature of ſpeech and the mental and corporeal powers of man. Thoſe who maintain it to be of human invention, ſuppoſe men at firſt to have been ſolitary animals, afterwards to have herded together without government or ſubordination, then to have formed political ſocieties, and by their own exertions to have advanced from the groſſeſt ignorance to the refinements of ſcience. But, ſay the reaſoners whoſe cauſe we are now pleading, this is a ſuppoſition contrary to all hiſtory and all experience. There is not upon record a ſingle inſtance well authenticated of a people emerging by their own efforts from barbariſm to civilization. There have indeed been many nations raiſed from the ſtate of ſavages; but it is known that they were poliſhed, not by their own repeated exertions, but by the influence of individuals or colonies from nations more enlightened than themſelves. The original ſavages of Greece were tamed by the Pelaſgi, a foreign tribe; and were afterwards further poliſhed by Orpheus, Cecrops, Cadmus, &c. who derived their knowledge from Egypt and the Eaſt. The ancient Romans, a ferocious and motley crew, received the bleſſings of law and religion from a ſucceſſion of foreign kings; and the conqueſts of Rome at a later period contributed to civilize the reſt of Europe. In America, the only two nations which at the invaſion of the Spaniards could be ſaid to have advanced a ſingle ſtep from barbariſm, were indebted for their ſuperiority over the other tribes, not to the gradual and unaſſiſted progreſs of the human mind, but to the wiſe inſtitutions of foreign legiſlators.

This is not the proper place for tracing the progreſs of man from the ſavage ſtate to that of political ſociety (ſee SAVAGE *State*); but experience teaches us, that in every art it is much eaſier to improve than to invent. The human mind, when put into the proper track, is indeed capable of making great advances in arts and ſciences; but if any credit be due to the records of hiſtory, it has not, in a people ſunk in ignorance and barbarity, ſufficient vigour to diſcover that track, or to conceive a ſtate different from the preſent. If the rudeſt inhabitants of America and other countries have continued, as there is every reaſon to believe they have continued, for ages in the ſame unvaried ſtate of barbariſm; how is it imaginable that people ſo much ruder than they, as to be ignorant of all language, ſhould think of inventing an art ſo difficult as that of ſpeech, or even to frame a conception of the thing? In building, fiſhing, hunting, navigating, &c. they might imitate the inſtinctive arts of other animals; but there is no other animal that expreſſes its ſenſations and affections by arbitrary articulate ſounds.—It is ſaid, that before language could be invented, mankind muſt have exiſted for ages in large political ſocieties, and have carried on of concert ſome common work: but if inarticulate cries, and the natural viſible ſigns of the paſſions and affections, were modes of communication ſufficiently accurate to keep a large ſociety together for ages, and to direct its members in the execution of ſome common work, what could be their inducement to the invention of an art ſo uſeleſs and difficult as that of language? Let us however ſuppoſe, ſay the advocates for the cauſe which we are now ſupporting, that different nations of ſavages ſet about inventing an art of communicating their thoughts, which experience had taught them was not abſolutely neceſſary: how came they all, without exception, to think of the one art of articulating the voice for this purpoſe? Inarticulate cries, out of which language is fabricated, have indeed an inſtinctive connection with our paſſions and affections; but there are geſtures and expreſſions of countenance with which our paſſions and affections are in the ſame manner connected. If the natural cries of paſſion could be ſo modified and enlarged as to be capable of communicating to the hearer every idea in the mind of the ſpeaker, it is certain that the natural geſtures could be ſo modified as to anſwer the very ſame purpoſe (ſee PANTOMIME); and it is ſtrange that among the ſeveral nations who invented languages, not one ſhould have ſtumbled upon fabricating viſible ſigns of their ideas, but that all ſhould have agreed to denote them by articulated ſounds. Every nation whoſe language is narrow and rude ſupplies its defects by violent geſticulation; and therefore, as much leſs genius is exerted in the improvement of any art than was requiſite for its firſt invention, it is natural to ſuppoſe, that, had men been left to deviſe for themſelves a method of communicating their thoughts, they would not have attempted any other than that by which they now improve the language tranſmitted by their fathers. It is vain to urge that articulate ſounds are fitter for the purpoſe of communicating thought than viſible geſticulation: for though this may be true, it is a truth which could hardly occur to ſavages, who had never experienced the fitneſs of either; and if, to counterbalance the ſuperior fitneſs of articulation, its extreme difficulty be taken into view, it muſt appear little leſs than miraculous that every ſavage tribe ſhould think of it rather than the eaſier method of artificial geſticulation. Savages, it is well known, are remarkable for their indolence, and for always preferring eaſe to utility; but their modes of life give ſuch a pliancy to their bodies, that they could with very little trouble bend their limbs and members into any poſitions agreed upon as the ſigns of ideas. This is ſo far from being the caſe with reſpect to the organs of articulation, that it is with extreme difficulty, if at all, that a man advanced in life can be taught to articulate any ſound which he has not been accuſtomed to hear. No foreigner who comes to England after the age of thirty, ever pronounces the language tolerably well; an Engliſhman of that age can hardly be taught to utter the guttural ſound which a Scotchman gives to the Greek χ, or even the French ſound of the vowel u: and of the ſolitary ſavages who have been caught in different foreſts, we know not that there has been one who, after the age of manhood, learned to articulate any language ſo as to make himſelf readily underſtood. The preſent age has indeed furniſhed many inſtances of deaf perſons being taught to ſpeak intelligibly by ſkilful maſters moulding the organs of the mouth into the poſitions proper for articulating the voice: but who was to perform this taſk among the inventors of language, when all mankind were equally ignorant of the means by which articulation is effected? In a word, daily experience informs us, that men who have not learned to articulate in their childhood, never afterwards acquire the faculty of ſpeech but by ſuch helps as ſavages cannot obtain; and therefore, if ſpeech was invented at all, it muſt have been either by children who were incapable of invention, or by men who were incapable of ſpeech. A thouſand, nay a million of children could not think of inventing a language. While the organs are pliable, there is not underſtanding enough to frame the conception of a language; and by the time that there is underſtanding, the organs are become too ſtiff for the taſk. And therefore, ſay the advocates for the divine origin of language, reaſon as well as hiſtory intimates, that mankind in all ages muſt have been ſpeaking animals; the young having conſtantly acquired this art by imitating thoſe who were elder; and we may warrantably conclude, that our firſt parents received it by immediate inſpiration.

To this account of the origin of language an objection readily offers itſelf. If the firſt language was communicated by inſpiration, it muſt have been perfect, and held in reverence by thoſe who ſpake it, *i. e.* by all mankind. But a vaſt variety of languages have prevailed in the world; and ſome of theſe which remain are known to be very imperfect, whilſt there is reaſon to believe that many others are loſt. If different languages were originally invented by different nations, all this would naturally follow from the mixture of theſe nations; but what could induce men poſſeſſed of one perfect language of divine original, to forſake it for barbarous jargons of their own invention, and in every reſpect inferior to that with which their forefathers or themſelves had been inſpired?

In anſwer to this objection, it is ſaid, that nothing was given by inſpiration but the faculty of ſpeech and the elements of language; for when once men had language, it is eaſy to conceive how they might have modified it by their natural powers, as thouſands can improve what they could not invent. The firſt language, if given by inſpiration, muſt in its principles have had all the perfection of which language is ſuſceptible; but from the nature of things it could not poſſibly be very copious. The words of language are either proper names or the ſigns of ideas and relations; but it cannot be ſuppoſed that the All-wiſe Inſtructor would load the memories of men with words to denote things then unknown, or with the ſigns of ideas which they had not then acquired. It was ſufficient that a foundation was laid of ſuch a nature as would ſupport the largeſt ſuperſtructure which they might ever after have occaſion to raiſe upon it, and that they were taught the method of building by compoſition and derivation. This would long preſerve the language radically the ſame, though it could not prevent the introduction of different dialects in the different countries over which men ſpread themſelves. In whatever region we ſuppoſe the human race to have been originally placed, the increaſe of their numbers would in proceſs of time either diſperſe them into different nations, or extend the one nation to a vaſt diſtance on all ſides from what we may call the ſeat of government. In either caſe they would every where meet with new objects, which would occaſion the invention of new names; and as the difference of climate and other natural cauſes would compel thoſe who removed eaſtward or northward to adopt modes of life in many reſpects different from the modes of thoſe who travelled towards the weſt or the ſouth, a vaſt number of words would in one country be fabricated to denote complex conceptions, which muſt neceſſarily be unintelligible to the body of the people inhabiting countries where thoſe conceptions had never been formed. Thus would various dialects be unavoidably introduced into the original language, even whilſt all mankind remained in one ſociety and under one government. But after ſeparate and independent ſocieties were formed, theſe variations would become more numerous, and the ſeveral dialects would deviate farther and farther from each other, as well as from the idiom and genius of the parent tongue, in proportion to the diſtance of the tribes by whom they were ſpoken. If we ſuppoſe a few people either to have been baniſhed together from the ſociety of their brethren, or to have wandered of their own accord to a diſtance, from which through trackleſs foreſts they could not return (and ſuch emigrations have often taken place), it is eaſy to ſee how the moſt copious language muſt in their mouths have ſoon become narrow, and how the offſpring of inſpiration muſt have in time become ſo deformed as hardly to retain a feature of the anceſtor whence it originally ſprung. Men do not long retain a practical ſkill in thoſe arts which they never exerciſe; and there are abundance of facts to prove, that a ſingle man caſt upon a deſert iſland, and having to provide the neceſſaries of life by his own ingenuity, would ſoon loſe the art of ſpeaking with fluency his mother-tongue. A ſmall number of men caſt away together would indeed retain that art ſomewhat longer; but in a ſpace of time not very long, it would in a great meaſure be loſt by them or their poſterity. In this ſtate of baniſhment, as their time would be almoſt wholly occupied in hunting, fiſhing, and other means within their reach to ſupport a wretched exiſtence, they would have very little leiſure, and perhaps leſs deſire, to preſerve by converſation the remembrance of that eaſe and thoſe comforts of which they now found themſelves for ever deprived; and they would of courſe ſoon forget all the words which in their native language had been uſed to denote the accommodations and elegancies of poliſhed life. This at leaſt ſeems to be certain, that they would not attempt to teach their children a part of language which in their circumſtances could be of no uſe to them, and of which it would be impoſſible to make them comprehend the meaning; for where there are no ideas, the ſigns of ideas cannot be made intelligible. From ſuch colonies as this diſperſed over the earth, it is probable that all thoſe nations of ſavages have ariſen, which have induced ſo many philoſophers to imagine that the ſtate of the ſavage was the original ſtate of man: and if ſo, we ſee that from the language of inſpiration muſt have unavoidably ſprung a number of different dialects all extremely rude and narrow, and retaining nothing of the parent tongue, except perhaps the names of the moſt conſpicuous objects of nature, and of thoſe wants and enjoyments which are inſeparable from humanity. The ſavage ſtate has no artificial wants, and furniſhes few ideas that require *terms* to expreſs them. The habits of ſolitude and ſilence incline a ſavage rarely to ſpeak; and when he ſpeaks, he uſes the ſame terms to denote different ideas. Speech, therefore, in this rude condition of men, muſt be extremely narrow and extremely various. Every new region, and every new climate, ſuggeſts different ideas, and creates different wants, which muſt be expreſſed either by terms entirely new, or by old terms uſed with a new ſignification. Hence muſt originate great diverſity, even in the firſt elements of ſpeech, among all ſavage nations, the words retained of the original language being uſed in various ſenſes, and pronounced, as we may believe, with various accents. When any of thoſe ſavage tribes emerged from their barbariſm, whether by their own efforts or by the aid of people more enlightened than themſelves, it is obvious that the improvement and copiouſneſs of their language would keep pace with their own progreſs in knowledge and in the arts of civil life; but in the infinite multitude of words which civilization and refinement add to language, it would be little leſs than miraculous were any two nations to agree upon the ſame ſounds to repreſent the ſame ideas. Superior refinement, indeed, may induce imitation, conqueſts may impoſe a language, and extenſion of empires may melt down different nations and different dialects into one maſs; but independent tribes naturally give riſe to diverſity of tongues, nor does it ſeem poſſible that they ſhould retain more of the original language than the words expreſſive of thoſe objects with which all men are at all times equally concerned.

The variety of tongues, therefore, the copiouſneſs of ſome, and the narrowneſs of others, furniſh no good objection to the divine origin of language in general; for whether language was at firſt revealed from heaven, or in a courſe of ages invented by men, a multitude of dialects would inevitably ariſe as ſoon as the human race was ſeparated into a number of diſtinct and independent nations.—We pretend not to decide for our readers in a queſtion of this nature: we have given the beſt arguments on both ſides which we could either deviſe or find in the writings of others: and if it be ſeen, as we doubt not it will, that our own judgment leans to the ſide of revelation, let it not be haſtily condemned by thoſe whoſe knowledge

of languages extends no farther than to Greece and Rome, and France and England; for if they will carry their philological enquiries to the eaſt, they may perhaps be able to trace the remains of one original language through a great part of the globe at this day.

Language, whatever was its origin, muſt be ſubject to perpetual changes from its very nature, as well as from that variety of incidents which affect all ſublunary things; and thoſe changes muſt always correſpond with the change of circumſtances in the people by whom the language is ſpoken. When any particular ſet of ideas becomes prevalent among any ſociety of men, words muſt be adopted to expreſs them; and from theſe the language muſt aſſume its character. Hence the language of a brave and martial people is bold and nervous, although perhaps rude and uncultivated; while the languages of thoſe nations in which luxury and effeminacy prevail, are flowing and harmonious, but devoid of force and energy of expreſſion.

But although it may be conſidered as a general rule, that the language of any people is a very exact index of the ſtate of their minds, yet it admits of ſome particular exceptions. For as man is naturally an imitative animal, and in matters of this kind never has recourſe to invention but through neceſſity, colonies planted by any nation, at whatever diſtance from the mother-country, always retain the ſame general ſounds and *idiom* of language with thoſe from whom they are ſeparated. In proceſs of time, however, the coloniſts and the people of the mother-country, by living under different climates, by being engaged in different occupations, and by adopting, of courſe, different modes of life, may loſe all knowledge of one another, aſſume different national characters, and form each a diſtinct language to themſelves, totally different in genius and ſtyle, though agreeing with one another in the fundamental ſounds and general idiom. If, therefore, this particular idiom, formed before their ſeparation, happen to be more peculiarly adapted to the genius of the mother-country than of the colonies, theſe will labour under an inconvenience on this account, which they may never be wholly able to overcome; and this inconvenience muſt prevent their language from ever attaining to that degree of perfection to which, by the genius of the people, it might otherwiſe have been carried. Thus various languages may have been formed out of one parent tongue; and thus that happy concurrence of circumſtances which has raiſed ſome languages to a high degree of perfection, may be eaſily accounted for, while many ineffectual efforts have been made to raiſe other languages to the ſame degree of excellence.

As the knowledge of languages conſtitutes a great part of erudition; as their beauty and deformities furniſh employment to taſte, and as theſe depend much upon the idioms of the different tongues, we ſhall proceed to make a few remarks upon the advantages and defects of ſome of thoſe idioms of language with which we are beſt acquainted.—As the words IDIOM and GENIUS of a language are often confounded, it will be neceſſary to inform the reader, that by IDIOM we would here be underſtood to mean *that general mode of arranging words into ſentences which prevails in any particular language*; and by the GENIUS of a language, we mean to expreſs *the particular ſet of ideas which the words of any language, either from their formation or multiplicity, are moſt naturally apt to excite in the mind of any one who hears it properly uttered.* Thus, although the *Engliſh*, *French*, *Italian*, and *Spaniſh* languages nearly agree in the ſame general IDIOM, yet the particular GENIUS of each is remarkably different: the *Engliſh* is naturally bold, nervous, and ſtrongly articulated; the *French* is weaker, and more flowing; the *Italian* more ſoothing and harmonious; and the *Spaniſh* more grave, ſonorous, and ſtately. Now, when we examine the ſeveral languages which have been moſt eſteemed in Europe, we find that there are only two IDIOMS among them which are eſſentially diſtinguiſhed from one another; and all thoſe languages are divided between theſe two idioms, following ſometimes the one and ſometimes the other, either wholly or in part. The languages which may be ſaid to adhere to the firſt IDIOM, are thoſe which in their conſtruction follow the order of nature; that is, expreſs their ideas in the natural order in which they occur to the mind; the ſubject which occaſions the action appearing firſt; then the action, accompanied with its ſeveral modifications; and, laſt of all, the object to which it has reference.—Theſe may properly be called ANALOGOUS languages; and of this kind are the Engliſh, French, and moſt of the modern languages in Europe.—The languages which may be referred to the other IDIOM, are thoſe which follow no other order in their conſtruction than what the taſte or fancy of the compoſer may ſuggeſt; ſometimes making the object, ſometimes the action, and ſometimes the modification of the action, to precede or follow the other parts. The confuſion which this might occaſion is avoided by the particular manner of *inflecting* their words, by which they are made to refer to the others with which they ought to be connected, in whatever part of the ſentence they occur, the mind being left at liberty to connect the ſeveral parts with one another after the whole ſentence is concluded. And as the words may be here tranſpoſed at pleaſure, thoſe languages may be called TRANSPOSITIVE languages. To this claſs we muſt, in an eſpecial manner, refer the *Latin* and *Greek* languages. As each of theſe IDIOMS has ſeveral advantages and defects peculiar to itſelf, we ſhall endeavour to point out the moſt conſiderable of them, in order to aſcertain with greater preciſion the particular character and excellence of ſome of thoſe languages now principally ſpoken or ſtudied in Europe.

The partiality which our forefathers, at the revival of letters in Europe, naturally entertained for the Greek and Roman languages, made them look upon every diſtinguiſhing peculiarity belonging to them as *one* of the *many* cauſes of the amazing ſuperiority which thoſe languages evidently enjoyed above every other at that time ſpoken in Europe.—This blind deference ſtill continues to be paid to them, as our minds are early prepoſſeſſed with theſe ideas, and as we are taught in our earlieſt infancy to believe, that to entertain the leaſt idea of our own language being equal to the Greek or Latin in any particular whatever, would be a certain mark of ignorance or want of taſte.—Their rights, therefore, like thoſe of the church in former ages, remain ſtill to be examined; and we, without exerting our reaſon to diſcover truth from falſehood, tamely ſit down ſatisfied with the idea of their undoubted preeminence in every reſpect. But if we look around us for a moment, and obſerve the many excellent productions which are to be met with in almoſt every language of Europe, we muſt be ſatisfied, that *even theſe* are now poſſeſſed of *ſome* powers which might afford at leaſt a preſumption, that, if they were cultivated with a proper degree of attention, they might, in *ſome reſpects*, be made to rival, if not to excel, thoſe beautiful and juſtly admired remains of antiquity. Without endeavouring to derogate from their merit, let us, with the cool eye of philoſophic reaſoning, endeavour to bring before the ſacred tribunal of Truth ſome of thoſe opinions which have been moſt generally received upon this ſubject, and reſt the determination of the cauſe on her impartial deciſion.

The learned reader well knows, that the ſeveral changes which take place in the arrangement of the words in every TRANSPOSITIVE language, could not be admitted without occaſioning great confuſion, unleſs certain claſſes of words were endowed with particular variations, by means of which they might be made to refer to the other words with which

they ought naturally to be connected. From this cauſe proceeds the neceſſity of ſeveral variations of *verbs*, *nouns*, and *adjectives*; which are not in the leaſt eſſential or neceſſary in the ANALOGOUS languages, as we have pretty fully explained under the article GRAMMAR, to which we refer for ſatisfaction on this head. We ſhall in this place conſider, whether theſe variations are an advantage or a diſadvantage to language.

As it is generally ſuppoſed, that every language whoſe verbs admit of *inflection* is on that account much more perfect than one where they are varied by *auxiliaries*; we ſhall, in the firſt place, examine this with ſome degree of attention; and that what is ſaid on this head may be the more intelligible, we ſhall give examples from the Latin and Engliſh languages. We make choice of theſe languages, becauſe the Latin is more purely *tranſpoſitive* than the Greek, and the Engliſh admits of leſs *inflection* than any other language we are acquainted with.

If any preference be due to a language from the one or the other method of *conjugating* verbs, it muſt in a great meaſure be owing to one or more of theſe three cauſes:—Either it muſt admit of a greater variety of ſounds, and conſequently more room for harmonious diverſity of tones in the language:—or a greater freedom of expreſſion is allowed in uttering any ſimple idea, by the one admitting of a greater variety in the arrangement of the words which are neceſſary to expreſs that idea than the other does:—or, laſtly, a greater preciſion and accuracy in fixing the meaning of the perſon who uſes the language, ariſe from the uſe of one of theſe forms, than from the uſe of the other: for, as every other circumſtance which may ſerve to give a diverſity to language, ſuch as the general and moſt prevalent ſounds, the frequent repetition of any one particular letter, and a variety of other circumſtances of that nature, which may ſerve to debaſe a particular language, are not influenced in the leaſt by the different methods of varying the verbs, they cannot be here conſidered. We ſhall therefore proceed to make a compariſon of the advantages or diſadvantages which may accrue to a language by inflecting its verbs with regard to each of theſe particulars,—variety of ſound, variety of arrangement, and accuracy of meaning.

The *firſt* particular that we have to examine is, Whether the one method of expreſſing the variations of a verb admits of a greater variety of ſounds? In this reſpect the *Latin* ſeems, at firſt view, to have a great advantage over the *Engliſh*: for the words *amo*, *amabam*, *amaveram*, *amavero*, *amem*, &c. ſeem to be more different from one another than the Engliſh tranſlations of theſe, *I love*, *I did love*, *I had loved*, *I ſhall have loved*, *I may love*, &c.; for although the ſyllable AM is repeated in every one of the firſt, yet as the laſt ſyllable uſually ſtrikes the ear with greater force, and leaves a greater impreſſion than the firſt, it is very probable that many will think the frequent repetition of the word LOVE in the laſt inſtance, more ſtriking to the ear than the repetition of *am* in the former. We will therefore allow this its full weight, and grant that there is as great, or even a greater difference between the ſounds of the different *tenſes* of a Latin verb, than there is between the words that are equivalent to them in Engliſh. But as we here conſider the variety of ſounds of the language in general, before any juſt concluſion can be drawn, we muſt not only compare the different parts of the ſame verb, but alſo compare the different verbs with one another in each of theſe languages. And here, at firſt view, we perceive a moſt ſtriking diſtinction in favour of the *analogous* language over the *inflected*: for as it would be impoſſible to form a particular ſet of inflections different from one another for each particular verb, all thoſe languages which have adopted this method have been obliged to reduce their verbs into a ſmall number of claſſes; all the words of each of which claſſes, commonly called *conjugations*, have the ſeveral variations of the *modes*, *tenſes*, and *perſons*, expreſſed exactly in the ſame manner, which muſt of neceſſity introduce a ſimilarity of ſounds into the language in general, much greater than where every particular verb always retains its own diſtinguiſhing ſound. To be convinced of this, we need only repeat any number of verbs in Latin and Engliſh, and obſerve on which ſide the preference with reſpect to variety of ſounds muſt fall.

Pono,	*I put.*	Moveo,	*I move.*
Dono,	*I give.*	Doleo,	*I ail.*
Cano,	*I ſing.*	Lugeo,	*I mourn.*
Sono,	*I ſound.*	Obeo,	*I die.*
Orno,	*I adorn.*	Gaudeo,	*I rejoice.*
Pugno,	*I fight.*	Incipio,	*I begin.*
Lego,	*I read.*	Facio,	*I make.*
Scribo,	*I write.*	Fodio,	*I dig.*
Puto,	*I think.*	Rideo,	*I laugh.*
Vivo,	*I live.*	Impleo,	*I fill.*
Ambulo,	*I walk.*	Abſtineo,	*I forbear.*

The ſimilarity of ſounds is here ſo obvious in the Latin, as to be perceived at the firſt glance; nor can we be ſurpriſed to find it ſo, when we conſider that all their regular verbs, amounting to 4000 or upwards, muſt be reduced to four conjugations, and even theſe differing but little from one another, which muſt of neceſſity produce the ſameneſs of ſounds which we here perceive; whereas, every language that follows the natural order, like the Engliſh, inſtead of this ſmall number of uniform terminations, have almoſt as many diſtinct ſounds as original verbs in their language.

But if, inſtead of the preſent of the indicative mood, we ſhould take almoſt any other tenſe of the Latin verb, the ſimilarity of ſounds would be ſtill more perceptible, as many of theſe tenſes have the ſame termination in all the four conjugations, particularly in the imperfect of the indicative, as below.

Pone-bam;	*I did put,*	*I put.*
Dona-bam;	*I did give,*	*I gave.*
Cane bam;	*I did ſing,*	*I ſung.*
Sona-bam;	*I did ſound,*	*I ſounded.*
Orna-bam;	*I did adorn,*	*I adorned.*
Pugna-bam;	*I did fight,*	*I fought.*
Lege bam;	*I did read,*	*I read.*
Scribe-bam;	*I did write,*	*I wrote.*
Puta bam;	*I did think,*	*I thought.*
Vive bam;	*I did live,*	*I lived.*
Ambula-bam;	*I did walk,*	*I walked.*
Move-bam;	*I did move,*	*I moved.*
Dole bam;	*I did ail,*	*I ailed.*
Luge-bam;	*I did mourn,*	*I mourned.*
Obi bam;	*I did die,*	*I died.*
Gaude-bam;	*I did rejoice,*	*I rejoiced.*
Incipie bam;	*I did begin,*	*I began.*
Facie-bam;	*I did make,*	*I made.*
Fodie bam;	*I did dig,*	*I dug.*
Ride-bam;	*I did laugh,*	*I laughed.*
Imple-bam;	*I did fill,*	*I filled.*
Abſtine-bam;	*I did forbear,*	*I forbore.*

It is unneceſſary to make any remarks on the Latin words in this example: but in the Engliſh tranſlation we have carefully marked in the firſt column the words without any inflection; and in the ſecond have put down the ſame meaning by an inflection of our verb, which we have been enabled to do, from peculiar excellency in our own language, unknown to any other either ancient or modern. Were it neceſſary to purſue this

ſubject farther, we might obſerve, that the *perfect* tenſe in all the conjugations ends univerſally in *I*, the *pluperfect* in ERAM, and the *future* in AM or BO; in the ſubjunctive mood, the *imperfect univerſally* in REM, the *perfect in* ERIM, the *pluperfect* in ISSEM, and the *future* in ERO: and as a ſtill greater fameneſs is obſervable in the different variations for the perſons in theſe tenſes, ſeeing the firſt perſon plural in all tenſes ends in MUS, and the ſecond perſon in TIS, with little variation in the other perſons; it is evident that, in reſpect of diverſity of ſounds, this method of conjugating verbs by *inflection*, is greatly inferior to the more natural method of expreſſing the various connections and relations of the verbal attributive by different words, uſually called *auxiliaries*.

The *ſecond* particular, by which the different methods of marking the relation of the verbal attributive can affect language, ariſes from the variety of expreſſions which either of theſe may admit of in uttering the ſame ſentiment. In this reſpect, likewiſe, the method of conjugating by inflection ſeems to be deficient. Thus the preſent of the indicative mood in Latin can at moſt be expreſſed only in two ways, viz. SCRIBO, and EGO SCRIBO; which ought perhaps in ſtrictneſs to be admitted only as one: whereas, in Engliſh, we can vary it in four different ways, viz. *1ſt*, I WRITE; *2dly*, I DO WRITE; *3dly*, WRITE I DO; *4thly*, WRITE DO I. And if we conſider the further variation which theſe receive in power as well as in ſound, by having the emphaſis placed on the different words; inſtead of four, we ſhall find eleven different variations: thus, *1ſt*, I *write*, with the emphaſis upon the *I*;—*2dly*, I WRITE, with the emphaſis upon the word WRITE. Let any one pronounce theſe with the different emphaſis neceſſary, and he will be immediately ſatisfied that they are not only diſtinct from each other with reſpect to meaning, but alſo with regard to ſound; and the ſame muſt be underſtood of all the other parts of this example.

3. I *do write*,
4. *I* DO *write*,
5. *I do* WRITE,
6. WRITE *I do*,
7. *Write* I *do*.
8. *Write I* DO,
9. WRITE *do I*,
10. *Write* DO *I*,
11. *Write do* I.

None of the Latin tenſes admit of more variations than the two above mentioned: nor do almoſt any of the Engliſh admit of fewer than in the above example; and ſeveral of theſe phraſes, which muſt be conſidered as exact tranſlations of ſome of the tenſes of the Latin verb, admit of many more. Thus the imperfect of the ſubjunctive mood, which in Latin admits of the above two variations, admits in Engliſh of the following:

1. *I might have written.*
2. *Written I might have.*
3. *Have written I might.*
4. *Written might have I.*
5. *I written might have.*
6. *Have written might I.*

And if we likewiſe conſider the variations which may be produced by a variation of the emphaſis, they will be as under:

1. I *might have written.*
2. *I* MIGHT *have written.*
3. *I might* HAVE *written.*
4. *I might have* WRITTEN.
5. WRITTEN *I might have.*
6. *Written I might have.*
7. *Written I* MIGHT *have.*
8. *Written I might* HAVE.
9. HAVE *written I might.*
10. *Have* WRITTEN *I might.*
11. *Have written* I *might.*
12. *Have written I* MIGHT.
13. WRITTEN *might have I.*
14. *Written* MIGHT *have I.*
15. *Written might* HAVE *I.*
16. *Written might have* I.
17. I *written might have.*
18. *I* WRITTEN *might have.*
19. *I written* MIGHT *have.*
20. *I written might* HAVE.
21. HAVE *written might I.*
22. *Have* WRITTEN *might I.*
23. *Have written* MIGHT *I.*
24. *Have written might* I.

In all 24 variations, inſtead of two.—If we likewiſe conſider, that the Latins were obliged to employ the ſame word, not only to expreſs "I *might* have written," but alſo, "I *could*, I *would*, or I *ſhould* have written;" each of which would admit of the ſame variations as the word *might*; we have in all *ninety-ſix* different expreſſions in Engliſh for the ſame phraſe which in Latin admits only of two, unleſs they have recourſe to other forced turns of expreſſion, which the defects of their verbs in this particular have compelled them to invent.

But if it ſhould be objected, that the laſt circumſtance we have taken notice of as a defect, can only be conſidered as a defect of the Latin language, and is not to be attributed to the *inflection* of their verbs, ſeeing they might have had a particular tenſe for each of theſe different words *might, could, would*, and *ſhould*; we anſwer, that, even admitting this excuſe as valid, the ſuperiority of the analogous language, as ſuch, ſtill remains in this reſpect as 12 to 1.—Yet even this conceſſion is greater than ought to have been made: For as the difficulty of forming a ſufficient variety of words for all the different modifications which a verb may be made to undergo is too great for any rude people to overcome; we find, that every nation which has adopted this mode of inflection, not excepting the Greeks themſelves, has been obliged to remain ſatisfied with fewer words than would have been neceſſary even to effect this purpoſe, and make the ſame word ſerve a double, treble, or even quadruple office, as in the Latin tenſe which gave riſe to theſe obſervations; ſo that, however in phyſical neceſſity this may not be chargeable upon this particular mode of conſtruction, yet in moral certainty it muſt always be the caſe; and therefore we may ſafely conclude, that the mode of varying verbs by inflection affords leſs variety in the arrangement of the words of the particular phraſes, than the method of varying them by the help of auxiliaries.

But if there ſhould ſtill remain any ſhadow of doubt in the mind of the reader, whether the method of varying the verbs by *inflection* is inferior to that by *auxiliaries*, with regard to diverſity of ſounds, or variety of expreſſion, there cannot be the leaſt doubt, but that with reſpect to preciſion, diſtinctneſs, and accuracy, in expreſſing any idea, the latter enjoys a ſuperiority beyond all compariſon.—Thus the Latin verb *Amo* may be Engliſhed either by the words, *I love*, or *I do love*, and the emphaſis placed upon any of the words that the circumſtances may require; by means of which, the meaning is pointed out with a force and energy which it is altogether impoſſible to produce by the uſe of any ſingle word. The following line from Shakeſpeare's *Othello* may ſerve as an example:

———Excellent wretch!
Perdition catch my ſoul, but *I* DO *love* thee!

In which the ſtrong emphaſis upon the word DO, gives it a force and energy which conveys, in an irreſiſtible manner, a moſt perfect knowledge of the ſituation of the mind of the ſpeaker at the time.—That the whole energy of the expreſſion depends upon this ſeemingly inſignificant word, we may be at once ſatisfied of, by keeping it away in this manner:

———Excellent wretch!
Perdition catch my ſoul, but *I love* thee.

How poor—how tame—how inſignificant is this, when compared with the other! Here nothing remains but a tame aſſertion, uſhered in with a pompous exclamation which could not here be introduced with any degree of propriety. Whereas, in the way that Shakeſpeare has left it to us, it has an energy which nothing can ſurpaſs; for, overpowered with the irreſiſtible force of Deſdemona's charms, this ſtrong exclama-

tion is extorted from the ſoul of Othello in ſpite of himſelf.—Surpriſed at this tender emotion, which brings to his mind all thoſe amiable qualities for which he had ſo much eſteemed her, and at the ſame time fully impreſſed with the firm perſuaſion of her guilt, he burſts out into that ſeemingly inconſiſtent exclamation, *Excellent wretch!* and then he adds in the warmth of his ſurpriſe, thinking it a thing moſt aſtoniſhing that any warmth of affection ſhould ſtill remain in his breaſt, he even confirms it with an oath,—*Perdition catch my ſoul, but I* DO *love thee!* "In ſpite of all the falſehoods with which I know thou haſt deceived me—in ſpite of all the crimes of which I know thee guilty—in ſpite of all thoſe reaſons for which I ought to hate thee—in ſpite of myſelf,—ſtill I find that I love,—yes, I DO love thee." We look upon it as a thing altogether impoſſible to transfuſe the energy of this expreſſion into any language whoſe verbs are regularly inflected.

In the ſame manner we might go through all the other tenſes, and ſhew that the ſame ſuperiority is to be found in each. Thus, in the *perfect tenſe* of the Latins, inſtead of the ſimple AMAVI, we ſay, I HAVE LOVED; and by the liberty we have of putting the emphaſis upon any of the words which compoſe this phraſe, we can in the moſt accurate manner fix the preciſe idea which we mean to excite: for if we ſay, I *have loved*, with the emphaſis upon the word I, it at once points out the perſon as the principal object in that phraſe, and makes us naturally look for a contraſt in ſome other perſon, and the other parts of the phraſe become ſubordinate to it;—"HE *has loved* thee much, but I *have loved* thee infinitely more." The Latins too, as they were not prohibited from joining the pronoun with their verb, were alſo acquainted with this excellence, which Virgil has beautifully uſed in this verſe:

——Nos *patriam fugimus*;
TU, *Tityre, lentus in umbra*, &c.

But *we* are not only enabled thus to diſtinguiſh the perſon in as powerful a manner as the Latins, but can alſo with the ſame facility point out any of the other circumſtances as principals; for if we ſay, with the emphaſis upon the word *have*, "I HAVE *loved*," it as naturally points out the time as the principal object, and makes us look for a contraſt in that peculiarity, I HAVE: "I *have* loved indeed;—my imagination *has* been led aſtray,—my reaſon *has* been perverted:—but *now* that time has opened my eyes, I can ſmile at thoſe imaginary diſtreſſes which once perplexed me." In the ſame manner we can put the emphaſis upon the other word of the phraſe, *loved*,—"I *have* LOVED." Here the paſſion is exhibited as the principal circumſtance; and as this can never be excited without ſome object, we naturally wiſh to know the object of that paſſion—"Who! what have you *loved?*" are the natural queſtions we would put in this caſe. "I have LOVED—— Eliza."—In this manner we are, on all occaſions, enabled to expreſs, with the utmoſt preciſion, that particular idea which we would wiſh to excite, ſo as to give an energy and perſpicuity to the language, which can never be attained by thoſe languages whoſe verbs are conjugated by inflection: and if to this we add the inconvenience which all inflected languages are ſubject to, by having too ſmall a number of tenſes, ſo as to be compelled to make one word on many occaſions ſupply the place of two, three, or even four, the balance is turned ſtill more in our favour.—Thus, in Latin, the ſame word AMABO ſtands for *ſhall* or *will* love, ſo that the reader is left to gueſs from the context which of the two meanings it was moſt likely the writer had in view. In the ſame manner, *may* or *can* love are expreſſed by the ſame word AMEM; as are alſo *might, could, would*, or *ſhould* love, by the ſingle word AMAREM, as we have already obſerved; ſo that the reader is left to gueſs which of theſe four meanings the writer intended to expreſs; which occaſions a perplexity very different from that clear preciſion which our language allows of, by not only pointing out the different words, but alſo by allowing us to put the emphaſis upon any of them we pleaſe, which ſuperadds energy and force to the preciſion it would have had without that aſſiſtance.

Upon the whole, therefore, after the moſt candid examination, we muſt conclude, that the method of conjugating verbs by *inflection* is inferior to that which is performed by the help of *auxiliaries*;—becauſe it does not afford ſuch a diverſity of ſounds, nor allow ſuch variety in the arrangement of expreſſion for the ſame thought,—nor give ſo great diſtinction and preciſion in the meaning.—It is, however, attended with one conſiderable advantage above the other method: for as the words of which it is formed are neceſſarily of greater length, and more ſonorous, than in the analogous languages, it admits of a more flowing harmony of expreſſion; for the number of monoſyllables in this laſt greatly checks that pompous dignity which naturally reſults from longer words. Whether this ſingle advantage is ſufficient to counterbalance all the other defects with which it is attended, is left to the judgment of the reader to determine:—but we may remark, before we quit the ſubject, that even this excellence is attended with ſome peculiar inconveniences, which ſhall be more particularly pointed out in the ſequel.

But perhaps it might ſtill be objected, that although the compariſon we have made above may be fair, and the concluſion juſt, with regard to the Latin and Engliſh languages, yet it does not appear clear, that on that account the method of conjugating verbs by *inflection* is *inferior* to that by *auxiliaries*; for although it be allowed that the Latin language is defective in point of tenſes, yet if a language were formed which had a ſufficient number of inflected tenſes to anſwer every purpoſe; if it had, for inſtance, a word properly formed for every variation of each tenſe; one for *I love*, another for *I do love*; one for *I ſhall*, another for *I will love*; one for *I might*, another for *I could*, and *would*, and *ſhould love*; and ſo on through all the other tenſes; that this language would not be liable to the objections we have brought againſt the inflection of verbs; and that of courſe, the objections we have brought are only valid againſt thoſe languages which have followed that mode and executed it imperfectly.—We anſwer, that although this would in ſome meaſure remedy the evil, yet it would not remove it entirely. For, in the firſt place, unleſs every verb, or every ſmall number of verbs, were conjugated in one way, having the ſound of the words in each tenſe, and diviſion of tenſes, as we may ſay different from all the other conjugations,—it would always occaſion a ſameneſs of ſound, which would in ſome meaſure prevent that variety of ſounds ſo proper for a language. And even if this could be effected, it would not give ſuch a latitude to the expreſſion as auxiliaries allow: for although there ſhould be two words, one for *I might*, another for *I could* love, yet as theſe are ſingle words, they cannot be varied; whereas, by auxiliaries, either of theſe can be varied 24 different ways, as has been ſhown above. In the laſt place, no ſingle word can ever expreſs all that variety of meaning which we can do by the help of our auxiliaries and the emphaſis. *I have loved*, if expreſſed by any one word, could only denote at all times one diſtinct meaning; ſo that to give it the power of ours, three diſtinct words at leaſt would be neceſſary. However, if all this were done—that is, if there were a diſtinct conjugation formed for every 40 or 50 verbs:—if each of the tenſes were properly formed, and all of them different from every other tenſe as well as every other verb; and theſe all carried through each of the different perſons, ſo as to be all different from one another;—and if likewiſe there were a diſtinct word to mark each of the ſeparate meanings which the ſame tenſe

could be made to aſſume by means of the emphaſis; and if all this infinite variety of words could be formed in a diſtinct manner, different from each other, and harmonious, this language would have powers greater than any that could be formed by auxiliaries, if it were poſſible for the human powers to acquire ſuch a degree of knowledge as to be able to employ it with facility. But how could this be attained, ſince upwards of ten thouſand words would be neceſſary to form the variations of any one verb, and a hundred times that number would not include the knowledge of the verbs alone of ſuch a language?—How much, therefore, ought we to admire the ſimple perſpicuity of our language, which enables us, by the proper application of ten or twelve ſeemingly trifling words, the meaning and uſe of which can be attained with the utmoſt eaſe, to expreſs all that could be expreſſed by this unwieldy apparatus!—What can equal the ſimplicity or the power of the one method, but the well-known powers of the 24 letters, the knowledge of which can be obtained with ſo much eaſe—and their powers know no limits?—or, what can be compared to the fancied perfection of the other, but the tranſcript of it which the Chineſe ſeem to have formed in their unintelligible language?

Having thus conſidered pretty fully the advantages and defects of each of theſe two methods of varying verbs, we cannot help feeling a ſecret wiſh ariſe in our mind, that there had been a people ſagacious enough to have united the powers of the one method with thoſe of the other; nor can we help being ſurpriſed, that among the changes which took place in the ſeveral languages of Europe after the downfal of the Roman monarchy, ſome of them did not accidentally ſtumble on the method of doing it. From many concurring circumſtances, it ſeems probable, that the greateſt part, if not all the Gothic nations that over-ran Italy at that time, had their verbs varied by the help of auxiliaries; and many of the modern European languages which have ſprung from them, have ſo far borrowed from the Latin, as to have ſome of the tenſes of their verbs inflected: yet the Engliſh alone have in any inſtance combined the joint powers of the two; which could only be done by forming inflections for the different tenſes in the ſame manner as the Latins, and at the ſame time retaining the original method of varying them by auxiliaries; by which means either the one or the other method could have been employed as occaſion required. We have luckily two tenſes formed in that way: the *preſent* of the indicative, and the aoriſt of the *paſt*.—In almoſt all our verbs theſe can be declined with or without auxiliaries. Thus the preſent, without an auxiliary, is, *I love, I write, I ſpeak*; with an auxiliary, *I do write, I do love, I do ſpeak*. In the ſame manner, the paſt tenſe, by inflection, is, *I loved, I wrote, I ſpoke*; by auxiliaries, *I did love, I did ſpeak, I did write*. Every author, who knows any thing of the power of the Engliſh language, knows the uſe which may be made of this diſtinction. What a pity is it that we ſhould have ſtopt ſhort ſo ſoon! How blind was it in ſo many other nations to imitate the defects, without making a proper uſe of that beautiful language, which is now numbered among the dead!

After the verbs, the next moſt conſiderable variation we find between the *analogous* and *tranſpoſitive* languages is in the nouns; the latter varying the different caſes of theſe by *inflection*; whereas the former expreſs all the different variations of them by the help of other words prefixed, called *prepoſitions*. Now, if we conſider the advantages or diſadvantages of either of theſe methods under the ſame heads as we have done the verbs, we ſhall find, that with regard to the firſt particular, viz. variety of ſounds, almoſt the ſame remarks may be made as upon the verbs; for if we compare any particular noun by itſelf, the variety of ſound appears much greater between the different caſes in the *tranſpoſitive*, than between the tranſlation of theſe in the *analogous* language. Thus REX, REGIS, REGI, REGEM, &c. are more diſtinct from one another in point of ſound, than the tranſlation of theſe, *a king, of a king, to a king, a king*, &c. But if we proceed one ſtep further, and conſider the variety which is produced in the language *in general* by the one or the other of theſe methods, the caſe is entirely reverſed. For as it would have been impoſſible to form diſtinct variations, different from one another, for each caſe of every noun, they have been obliged to reduce all their nouns into a few general claſſes, called *declenſions*, and to give to all thoſe included under each claſs the ſame termination in every caſe; which produces a like ſimilarity of ſound with what we already obſerved was occaſioned to the verbs from the ſame cauſe; whereas in the analogous languages, as there is no neceſſity for any conſtraint, there is almoſt as great a variety of ſounds as there are of nouns. The Latins have only five different declenſions; ſo that all the great number of words of this general order muſt be reduced to the very ſmall diverſity of ſounds which theſe few claſſes admit of; and even the ſounds of theſe few claſſes are not ſo much diverſified as they might have been, as many of the different *caſes* in the different *declenſions* have exactly the ſame ſounds, as we ſhall have occaſion to remark more fully hereafter. We might here produce examples to ſhow the great *ſimilarity* of ſounds between different nouns in the Latin language, and *variety* in the Engliſh, in the ſame way as we did of the verbs: but as every reader in the leaſt acquainted with theſe two languages can ſatisfy himſelf in this particular, without any further trouble than by marking down any number of Latin nouns, with their tranſlations into Engliſh, we think it unneceſſary to dwell longer on this particular.

But if the inflection of nouns is a diſadvantage to a language in point of diverſity of ſounds, it is very much the reverſe with regard to the variety it allows in the arranging the words of the phraſe. Here, indeed, the tranſpoſitive language ſhines forth in all its glory, and the analogous muſt yield the palm without the ſmalleſt diſpute. For as the *nominative caſe* (or that noun which is the cauſe of the energy expreſſed by the verb) is different from the *accuſative* (or that noun upon which the energy expreſſed by the verb is exerted), theſe may be placed in any ſituation that the writer ſhall think proper, without occaſioning the ſmalleſt confuſion: whereas in the analogous languages, as theſe two different ſtates of the noun are expreſſed by the ſame word, they cannot be diſtinguiſhed but by their poſition alone: ſo that the noun which is the efficient cauſe muſt always precede the verb, and that which is the paſſive ſubject muſt follow; which greatly cramps the harmonious flow of compoſition.—Thus the Latins, without the ſmalleſt perplexity in the meaning, could ſay either *Brutum amavit Caſſius*, or *Caſſius amavit Brutum*, or *Brutum Caſſius amavit*, or *Caſſius Brutum amavit*. As the termination of the word *Caſſius* always points out that it is in the *nominative caſe*, and therefore that he is the perſon from whom the energy proceeds; and in the ſame manner, as the termination of the word *Brutum* points out that it is in the *accuſative caſe*, and conſequently that he is the object upon whom the energy is exerted; the meaning continues ſtill diſtinct and clear, notwithſtanding of all theſe ſeveral variations: whereas in the Engliſh language, we could only ſay *Caſſius loved Brutus*, or, by a more forced phraſeology, *Caſſius Brutus loved*: Were we to reverſe the caſe, as in the Latin, the meaning alſo would be reverſed; for if we ſay *Brutus loved Caſſius*, it is evident, that, inſtead of being the perſon beloved, as before, *Brutus* now becomes the perſon from whom the energy proceeds, and *Caſſius* becomes the object beloved.—In this reſpect, therefore, the analogous languages are greatly inferior to the tranſpoſitive; and indeed it is from this ſingle circumſtance alone that they derive their chief excellence.

But although it thus appears evident, that any language, which has a particular variation of its nouns to diſtinguiſh the *accuſative* from the *nominative* caſe, has an advantage over thoſe languages which have none; yet it does not appear that any other of their caſes adds to the variety, but rather the reverſe: for, in Latin, we can only ſay *Amor Dei*; in Engliſh the ſame phraſe may be rendered, either,—*the love of God—of God the love*,—or, by a more forced arrangement, *God the love of*. And as theſe oblique caſes, as the Latins called them, except the accuſative, are clearly diſtinguiſhed from one another, and from the nominative, by the prepoſition which accompanies them, we are not confined to any particular arrangement with regard to theſe as with the accuſative, but may place them in what order we pleaſe, as in Milton's elegant invocation at the beginning of Paradiſe Loſt:

> Of man's firſt diſobedience, and the fruit
> Of that forbidden tree, whoſe mortal taſte
> Brought death into the world, and all our wo,
> With loſs of Eden, till one greater man
> Reſtore us, and regain the bliſsful ſeat,
> Sing, heavenly Muſe!

In this ſentence the tranſpoſition is almoſt as great as the Latin language would admit of, and the meaning as diſtinct as if Milton had begun with the plain language of proſe, thus,—"Heavenly muſe, ſing of man's firſt diſobedience," &c.

Before we leave this head, we may remark, that the little attention which ſeems to have been paid to this peculiar advantage derived from the uſe of an accuſative caſe different from the nominative, is ſomewhat ſurpriſing. The Latins, who had more occaſion to attend to this with care than any other nation, and even the Greeks themſelves, have in many caſes overlooked it, as is evident from the various inſtances we meet with in their languages where this is not diſtinguiſhed. For all nouns of the neuter gender both in Greek and Latin have in every declenſion their nominative and accuſative ſingular alike. Nor in the plural of ſuch nouns is there any diſtinction between theſe two caſes; and in Latin all nouns whatever of the third, fourth, and fifth declenſions, of which the number is very conſiderable, have their nominative and accuſative plural alike. So that their language reaps no advantage in this reſpect from almoſt one half of their nouns. Nor have any of the modern languages in Europe, however much they may have borrowed from the ancient languages in other reſpects, attempted to copy from them in this particular; from which perhaps more advantage would have been gained, than from copying all the other ſuppoſed excellencies of their language.—But to return to our ſubject.

It remains that we conſider, whether the inflection of nouns gives any advantage over the method of defining them by prepoſitions, in point of diſtinctneſs and preciſion of meaning? But in this reſpect, too, the analogous languages muſt come off victorious. Indeed this is the particular in which their greateſt excellence conſiſts; nor was it, we believe, ever diſputed, but that, in point of accuracy and preciſion, this method muſt excel all others, however it may be defective in other reſpects. We obſerved under this head, when ſpeaking of verbs, that it might perhaps be poſſible to form a language by inflection which ſhould be capable of as great accuracy as in the more ſimple order of auxiliaries: but this would have been ſuch an infinite labour, that it was not to be expected that ever human powers would have been able to accompliſh it. More eaſy would it have been to have formed the ſeveral inflections of the nouns ſo different from one another, as to have rendered it impoſſible ever to miſtake the meaning. Yet even this has not been attempted. And as we find that thoſe languages which have adopted the method of inflecting their verbs are more imperfect in point of preciſion than the other, ſo the ſame may be ſaid of inflecting the nouns: for, not to mention the energy which the analogous languages acquire by putting the accent upon the noun, or its prepoſition (when in an oblique caſe), according as the ſubject may require, to expreſs which variation of meaning no particular variety of words have been invented in any inflected language, they are not even complete in other reſpects. The Latin, in particular, is in many caſes defective, the ſame termination being employed in many inſtances for different caſes of the ſame noun. Thus the genitive and dative ſingular, and nominative and vocative plural, of the firſt declenſion, are all exactly alike, and can only be diſtinguiſhed from one another by the formation of the ſentences;—as are alſo the nominative, vocative, and ablative ſingular, and the dative and ablative plural. In the ſecond, the genitive ſingular, and nominative and vocative plural, are the ſame; as are alſo the dative and ablative ſingular, and dative and ablative plural; except thoſe in UM, whoſe nominative, accuſative, and vocative ſingular, and nominative, accuſative, and vocative plural, are alike. The other three declenſions agree in as many of their caſes as theſe do; which evidently tends to perplex the meaning, unleſs the hearer is particularly attentive to, and well acquainted with, the particular conſtruction of the other parts of the ſentence; all of which is totally removed, and the cleareſt certainty exhibited at once, by the help of prepoſitions in the analogous languages.

It will hardly be neceſſary to enter into ſuch a minute examination of the advantages or diſadvantages attending the variation of *adjectives*; as it will appear evident, from what has been already ſaid, that the endowing them with terminations ſimilar to, and correſponding with, *ſubſtantives*, muſt tend ſtill more to increaſe the ſimilarity of ſounds in any language, than any of thoſe particulars we have already taken notice of; and were it not for the liberty which they have, in tranſpoſitive languages, of ſeparating the adjective from the ſubſtantive, this muſt have occaſioned ſuch a jingle of ſimilar ſounds as could not fail to have been moſt diſguſting to the ear: but as it would have been impoſſible in many caſes, in thoſe languages where the verbs and nouns are inflected, to have pronounced the words which ought to have followed each other, unleſs their adjectives could have been ſeparated from the ſubſtantives; therefore, to remedy this inconvenience, they were forced to deviſe this unnatural method of inflecting them alſo; by which means it is eaſy to recogniſe to what ſubſtantive any adjective has a reference, in whatever part of the ſentence it may be placed. In theſe languages, therefore, this inflection, both as to gender, number, and caſe, becomes abſolutely neceſſary; and, by the diverſity which it admitted in the arranging the words of the ſeveral phraſes, might counterbalance the jingle of ſimilar ſounds which it introduced into the language.

Having thus examined the moſt ſtriking particulars in which the tranſpoſitive and analogous languages differ, and endeavoured to ſhow the general tendency of every one of the particulars ſeparately, it would not be fair to diſmiſs the ſubject without conſidering each of theſe as a whole, and pointing out their general tendency in that light: for we all know, that it often happens in human inventions, that every part which compoſes a whole, taken ſeparately, may appear extremely fine; and yet, when all theſe parts are put together, they may not agree, but produce a jarring and confuſion very different from what we might have expected. We therefore imagine a few remarks upon the genius of each of theſe two diſtinct IDIOMS of language conſidered as a whole will not be deemed uſeleſs.

Although all languages agree in this reſpect, that they are the means of conveying the ideas of one man to another; yet as there is an infinite variety of ways in which we might wiſh to convey theſe ideas, ſometimes by the eaſy and familiar mode of converſation, and at other times by more ſolemn addreſſes to

the underſtanding, by pompous declamation, &c. it may ſo happen, that the genius of one language may be more properly adapted to the one of theſe than the other, while another language may excel in the oppoſite particular. This is exactly the caſe in the two general IDIOMS of which we now treat. Every particular in a *tranſpoſitive* language, is peculiarly calculated for that ſolemn dignity which is neceſſary for pompous orations. Long ſounding words, formed by the inflection of the different parts of ſpeech,—flowing periods, in which the attention is kept awake by the harmony of the ſounds, and in expectation of that word which is to unravel the whole,—if compoſed by a ſkilful artiſt, are admirably ſuited to that ſolemn dignity and awful grace which conſtitute the eſſence of a public harangue. On the contrary, in private converſation, where the mind wiſhes to unbend itſelf with eaſe, theſe become ſo many clogs which encumber and perplex. At theſe moments we wiſh to transfuſe our thoughts with eaſe and facility —we are tired with every unneceſſary ſyllable—and wiſh to be freed from the trouble of attention as much as may be. Like our ſtate-robes, we would wiſh to lay aſide our pompous language, and enjoy ourſelves at home with freedom and eaſe. Here the ſolemnity and windings of the *tranſpoſitive* language are burdenſome; while the facility with which a ſentiment can be expreſſed in the *analogous* language is the thing that we wiſh to acquire. Accordingly in Terence and Plautus, where the beauties of dialogue are moſt charmingly diſplayed, tranſpoſition is ſparingly uſed. In this humble, though moſt engaging ſphere, the analogous language moves unrivalled;—in this it wiſhes to indulge, and never tires. But it in vain attempts to rival the *tranſpoſitive* in dignity and pomp: the number of monoſyllables interrupt the flow of harmony; and although they may give a greater variety of ſounds, yet they do not naturally poſſeſs that dignified gravity which ſuits the other language. This, then, muſt be conſidered as the ſtriking particular in the genius of theſe two different IDIOMS, which marks their characters.

If we conſider the effects which theſe two different characters of language muſt naturally produce upon the people who employ them, we ſhall ſoon perceive, that the genius of the *analogous* language is much more favourable for the moſt engaging purpoſes of life, the civilizing the human mind by mutual intercourſe of thought, *than the tranſpoſitive*. For as it is chiefly by the uſe of ſpeech that man is raiſed above the brute creation;—as it is by this means he improves every faculty of his mind, and, to the obſervations which he may himſelf have made, has the additional advantage of the experience of thoſe with whom he may converſe, as well as the knowledge which the human race have acquired by the accumulated experience of all preceding ages:—as it is by the enlivening glow of converſation that kindred ſouls catch fire from one another, that thought produces thought, and each improves upon the other, till they ſoar beyond the bounds which human reaſon, if left alone, could ever have aſpired to;—we muſt ſurely conſider that language as the moſt beneficial to ſociety, which moſt effectually removes theſe bars that obſtruct its progreſs. Now, the genius of the *analogous* languages is ſo eaſy, ſo ſimple and plain, as to be within the reach of every one who is born in the kingdom where it is uſed to ſpeak it with facility; even the rudeſt among the vulgar can hardly fall into any conſiderable grammatical errors: whereas, in the *tranſpoſitive* languages, ſo many rules are neceſſary to be attended to, and ſo much variation is produced in the meaning, by the ſlighteſt variations in the ſound, that it requires a ſtudy far above the reach of the illiterate mechanic ever to attain. So that, how perfect ſoever the language may be when ſpoken with purity, the bulk of the nation muſt ever labour under the inconvenience of rudeneſs and inaccuracy of ſpeech, and all the evils which this naturally produces.—Accordingly, we find, that in Rome, a man, even in the higheſt rank, received as much honour, and was as much diſtinguiſhed among his equals, for being able to converſe with eaſe, as a modern author would be for writing in an eaſy and elegant ſtyle; and Cæſar among his contemporaries was as much eſteemed for his ſuperiority in ſpeaking the language in ordinary converſation with eaſe and elegance, as for his powers of oratory, his ſkill in arms, or his excellence in literary compoſition. It is needleſs to point out the many inconveniences which this muſt unavoidably produce in a ſtate. It is ſufficient to obſerve, that it naturally tends to introduce a vaſt diſtinction between the different orders of men; to ſet an impenetrable barrier between thoſe born in a high and thoſe born in a low ſtation; to keep the latter in ignorance and barbarity, while it elevates the former to ſuch a height as muſt ſubject the other to be eaſily led by every popular demagogue.—How far the hiſtory of the nations who have followed this IDIOM of language confirms this obſervation, every one is left to judge for himſelf.

Having thus conſidered LANGUAGE in general, and pointed out the genius and tendency of the two moſt diſtinguiſhed IDIOMS which have prevailed; we ſhall cloſe theſe remarks with a few obſervations upon the particular nature and genius of thoſe languages which are now chiefly ſpoken or ſtudied in Europe.

Of all the nations whoſe memory hiſtory has tranſmitted to us, none have been ſo eminently diſtinguiſhed for their literary accompliſhments, as well as acquaintance with the polite arts, as the Greeks: nor are we as yet acquainted with a language poſſeſſed of ſo many advantages, with ſo few defects, as that which they uſed, and which continues ſtill to be known by their name.—The neceſſary connection between the progreſs of knowledge and the improvement of language has been already explained; ſo that it will not be ſurpriſing to find their progreſs in the one keep pace with that of the other: but it will be of utility to point out ſome advantages which that diſtinguiſhed people poſſeſſed, which other nations, perhaps not leſs diſtinguiſhed for talents or taſte, have not enjoyed, which have contributed to render their language the moſt univerſally admired in ancient as well as in modern times.

It has been already obſerved, that the original inhabitants of Greece, who were groſs ſavages, and whoſe language of courſe would be very rude and narrow, were firſt tamed by the Pelaſgi, an eaſtern or an Egyptian tribe. From the eaſt it is well known that arts and ſciences were ſpread over the reſt of the world, and that Egypt was one of the countries firſt civilized. The language therefore imported into Greece by the Pelaſgi would be pure from the fountain head, and much more perfect in its ſtructure than if it had been tranſmitted through many nations. But this was not the only circumſtance highly fortunate for the Greek language. Before it had time to be fully eſtabliſhed among the people, its aſperities, which it had in common with the other dialects of the eaſt, were poliſhed away by ſuch a ſucceſſion of poets, muſicians, philoſophers, and legiſlators, from different countries, as never appeared in any other nation at a period ſo early as to give their genius and taſte its full influence. In this reſpect, no people were ever ſo eminently diſtinguiſhed as the ancient Greeks, who had their Orpheus, their Linus, their Cecrops, and their Cadmus, who introduced their different improvements at a time when the nation had no ſtandard of taſte formed by itſelf. Hence the original ſounds of the Greek language are the moſt harmonious, and the moſt agreeable to the ear, of any that have hitherto been invented. They are indeed agreeable to every perſon who hears them, even when the meaning of the words is not underſtood; whereas almoſt all other languages, till they are underſtood, appear, to an ear which has not been accuſtomed to them,

jarring and diſcordant. This is the fundamental excellence of that juſtly admired language; nor have the people failed to improve this to the utmoſt of their power, by many aids of their own invention. The Greek language is of the *tranſpoſitive* kind: but a people ſo lively, ſo acute, and ſo loquacious, could ill bear the ceremonious reſtraint to which that mode of language naturally ſubjected them; and have therefore, by various methods, freed it in a great meaſure from the ſtiffneſs which that produced. In inflecting their nouns and verbs, they ſometimes prefix a ſyllable, and ſometimes add one; which, beſides the variety that it gives to the founds of the language, adds greatly to the diſtinctneſs, and admits of a more natural arrangement of the words than in the Latin, and of conſequence renders it much fitter for the eaſineſs of private converſation: and indeed the genius of the people ſo far prevailed over the *idiom* of the language, as to render it, in the age of its greateſt perfection, capable of almoſt as much eaſe, and requiring almoſt as little tranſpoſition of words, as thoſe languages which have been called *analogous*. But as thoſe nations who ſpoke this language were all governed by popular aſſemblies, and as no authority could be obtained among them but by a ſkill in rhetoric and the powers of perſuaſion; it became neceſſary for every one, who wiſhed to acquire power or conſideration in the ſtate, to improve himſelf in the knowledge of that language, in the uſe of which alone he could expect honours or reputation. Hence it happened, that while the vivacity of the people rendered it eaſy, the great men ſtudiouſly improved every excellence that it could reap from its powers as a *tranſpoſitive* language; ſo that, when brought to its utmoſt perfection by the amazing genius of the great Demoſthenes, it attained a power altogether unknown to any other language.—Thus happily circumſtanced, the Greek language arrived at that envied pre-eminence which it ſtill juſtly retains. From the progreſs of arts and ſciences; from the gaiety and inventive genius of the people; from the number of free ſtates into which Greece was divided, each of which invented words of its own, all of which contributed to the general ſtock; and from the natural communication which took place between theſe ſtates, which excited in the ſtrongeſt degree the talents of the people; it acquired a copiouſneſs unknown to any ancient language, and excelled by few of the moderns.—In point of harmony of numbers, it is altogether unrivalled; and on account of the eaſe as well as dignity which, from the cauſes above mentioned, it acquired, it admits of perfection in a greater number of particular kinds of compoſition than any other language known.—The irreſiſtible force and overwhelming impetuoſity of Demoſthenes ſeems not more natural to the genius of the language, than the more flowery charms of Plato's calm and harmonious cadences, or the unadorned ſimplicity of Xenophon; nor does the majeſtic pomp of Homer ſeem to be more agreeable to the genius of the language in which he wrote, than the more humble ſtrains of Theocritus, or the laughing feſtivity of Anacreon. Equally adapted to all purpoſes, when we peruſe any of theſe authors, we would imagine the language was moſt happily adapted for his particular ſtyle alone. The ſame powers it likewiſe, in a great meaſure, poſſeſſed for converſation; and the dialogue ſeems not more natural for the dignity of Sophocles or Euripides, than for the more eaſy tenderneſs of Menander, or buffoonery of Ariſtophanes.—With all theſe advantages, however, it muſt be acknowledged, that it did not poſſeſs that unexceptionable clearneſs of meaning which ſome analogous languages enjoy, or that characteriſtic force which the emphaſis properly varied has power to give, were not theſe defects counterbalanced by other cauſes which we ſhall afterwards point out.

The Romans, a people of fierce and warlike diſpoſitions, for many ages during the infancy of their republic, more intent on purſuing conqueſts and military glory than in making improvements in literature or the fine arts, beſtowed little attention to their language. Of a diſpoſition leſs ſocial or more phlegmatic than the Greeks, they gave themſelves no trouble about rendering their language fit for converſation; and it remained ſtrong and nervous, but, like their ideas, was limited and confined. More diſpoſed to command reſpect by the power of their arms than by the force of perſuaſion, they deſpiſed the more effeminate powers of ſpeech: ſo that, before the Punic wars, their language was perhaps more reſerved and uncourtly than any other at that time known.—But after their rival Carthage was deſtroyed, and they had no longer that powerful curb upon their ambition; when riches flowed in upon them by the multiplicity of their conqueſts; luxury began to prevail, the ſtern auſterity of their manners to relax, and ſelfiſh ambition to take place of that diſintereſted love for their country ſo eminently conſpicuous among all orders of men before that period.—Popularity began then to be courted: ambitious men, finding themſelves not poſſeſſed of that merit which inſured them ſucceſs with the virtuous ſenate, amuſed the mob with artful and ſeditious harangues; and by making them believe that they were poſſeſſed of all power, and had their ſacred rights encroached upon by the ſenate, led them about at their pleaſure, and got themſelves exalted to honours and riches by theſe inſidious arts. It was then the Romans firſt began to perceive the uſe to which a command of language could be put. Ambitious men then ſtudied it with care, to be able to accompliſh their ends; while the more virtuous were obliged to acquire a ſkill in this, that they might be able to repel the attacks of their adverſaries.—Thus it happened, that in a ſhort time that people, from having entirely neglected, began to ſtudy their language with the greateſt aſſiduity; and as Greece happened to be ſubjected to the Roman yoke about that time, and a friendly intercourſe was eſtabliſhed between theſe two countries, this greatly conſpired to nouriſh in the minds of the Romans a taſte for that art of which they had lately become ſo much enamoured. Greece had long before this period been corrupted by luxury; their taſte for the fine arts had degenerated into unneceſſary refinement; and all their patriotiſm conſiſted in popular harangues and unmeaning declamation. Oratory was then ſtudied as a refined art; and all the ſubtleties of it were taught by rule, with as great care as the gladiators were afterwards trained up in Rome. But while they were thus idly trying who ſhould be the lord of their own people, the nerves of government were relaxed, and they became an eaſy prey to every invading power. In this ſituation they became the *ſubjects*, under the title of the *allies*, of Rome, and introduced among them the ſame taſte for haranguing which prevailed among themſelves. Well acquainted as they were with the powers of their own language, they ſet themſelves with unwearied aſſiduity to poliſh and improve that of their new maſters: but with all their aſſiduity and pains, they never were able to make it arrive at that perfection which their own language had acquired; and in the Auguſtan age, when it had arrived at the ſummit of its glory, Cicero bitterly complains of its want of copiouſneſs in many particulars.

But as it was the deſire of all who ſtudied this language with care, to make it capable of that ſtately dignity and pomp neceſſary for public harangues, they followed the genius of the language in this particular, and in a great meaſure neglected thoſe letter delicacies which form the pleaſure of domeſtic enjoyment; ſo that, while it acquired more copiouſneſs, more harmony, and preciſion, it remained ſtiff and inflexible for converſation: nor could the minute diſtinction of nice grammatical rules be ever brought down to the apprehenſion of the vulgar: whence the language ſpoken among the lower claſs

of people remained rude and unpoliſhed even to the end of the monarchy. The Huns who over-ran Italy, incapable of acquiring any knowledge of ſuch a difficult and abſtruſe language, never adopted it; and the native inhabitants being made acquainted with a language more natural and eaſily acquired, quickly adopted that idiom of ſpeech introduced by their conquerors, although they ſtill retained many of thoſe words which the confined nature of the barbarian language made neceſſary to allow them to expreſs their ideas. And thus it was that the language of Rome, that proud miſtreſs of the world, from an original defect in its formation, although it had been carried to a perfection in other reſpects far ſuperior to any northern language at that time, eaſily gave way to them, and in a few ages the knowledge of it was loſt among mankind: while, on the contrary, the more eaſy nature of the Greek language has ſtill been able to keep ſome ſlight footing in the world, although the nations in which it has been ſpoken have been ſubjected to the yoke of foreign dominion for upwards of two thouſand years, and their country has been twice ravaged by barbarous nations, and more cruelly depreſſed than ever the Romans were.

From the view which we have already given of the Latin language, it appears evident, that its idiom was more ſtrictly tranſpoſitive than that of any other language yet known, and was attended with all the defects to which that idiom is naturally ſubjected: nor could it boaſt of ſuch favourable alleviating circumſtances as the Greek, the prevailing ſounds of the Latin being far leſs harmonious to the ear; and although the formation of the words is ſuch as to admit of full and diſtinct ſounds, and ſo modulated as to lay no reſtraint upon the voice of the ſpeaker; yet, to a perſon unacquainted with the language, they do not convey that enchanting harmony ſo remarkable in the Greek language. The Latin is ſtately and ſolemn; it does not excite diſguſt; but at the ſame time it does not charm the ear, ſo as to make it liſten with delightful attention. To one acquainted with the language, indeed, the nervous boldneſs of the thoughts, the harmonious rounding of the periods, the full ſolemn ſwelling of the ſounds, ſo diſtinguiſhable in the moſt eminent writers in that language which have been preſerved to us, all conſpire to make it pleaſing and agreeable.—In theſe admired works we meet with all its beauties, without perceiving any of its defects; and we naturally admire, as perfect, a language which is capable of producing ſuch excellent works.—Yet with all theſe ſeeming excellencies, this language is leſs copious, and more limited in its ſtyle of compoſition, than many modern languages; far leſs capable of preciſion and accuracy than almoſt any of theſe; and infinitely behind them all in point of eaſineſs in converſation. But theſe points have been ſo fully proved already, as to require no further illuſtration.—Of the compoſitions in that language which have been preſerved to us, the *Orations* of Cicero are beſt adapted to the genius of the language, and we there ſee it in its utmoſt perfection. In the *Philoſophical Works* of that great author we perceive ſome of its defects: and it requires all the powers of that great man to render his *Epiſtles* agreeable, as theſe have the genius of the language to ſtruggle with.—Next to oratory, hiſtory agrees with the genius of this language; and Cæſar, in his Commentaries, has exhibited the language in its pureſt elegance, without the aid of pomp or foreign ornament.—Among the poets, Virgil has beſt adapted his works to his language. The flowing harmony and pomp of it are well adapted for the epic ſtrain, and the correct delicacy of his taſte rendered him perfectly equal to the taſk. But Horace is the only poet whoſe force of genius was able to overcome the bars which the language threw in his way, and ſucceed in lyric poetry. Were it not for the brilliancy of the thoughts, and acuteneſs of the remarks, which ſo eminently diſtinguiſh this author's compoſitions, his odes would long ere now have ſunk into utter oblivion. But ſo conſcious have all the Roman poets been of the unfitneſs of their language for eaſy dialogue, that almoſt none of them, after Plautus and Terence, have attempted any dramatic compoſitions in that language. Nor have we any reaſon to regret that they neglected this branch of poetry, as it is probable, if they had ever become fond of theſe, they would have been obliged to have adopted ſo many unnatural contrivances to render them agreeable, as would have prevented us (who of courſe would have conſidered ourſelves as bound to follow them) from making that progreſs in the drama which ſo particularly diſtinguiſhes the productions of modern times.

The modern *Italian*, from an inattention too common in literary ſubjects, has been uſually called a *child of the Latin language*, and is commonly believed to be the ancient Latin a little debaſed by the mixture of the barbarous language of thoſe people who conquered Italy. The truth is, the caſe is directly the reverſe: for this language, in its general idiom and fundamental principles, is evidently of the analogous kind, firſt introduced by thoſe fierce invaders, although it has borrowed many of its words, and ſome of its modes of phraſeology, from the Latin, with which they were ſo intimately blended that this could ſcarcely be avoided; and it has been from remarking this ſlight connection ſo obvious at firſt ſight, that ſuperficial obſervers have been led to draw this general concluſion, ſo contrary to fact.

When Italy was over-run with the Lombards, and the empire deſtroyed by theſe northern invaders, they, as conquerors, continued to ſpeak their own native language. Fierce and illiterate, they would not ſtoop to the ſervility of ſtudying a language ſo clogged with rules, and difficult of attainment, as the Latin would naturally be to a people altogether unacquainted with nice grammatical diſtinctions: while the Romans of neceſſity were obliged to ſtudy the language of their conquerors, as well to obtain ſome relief of their grievances by prayers and ſupplications, as to deſtroy that odious diſtinction which ſubſiſted between the conquerors and conquered while they continued as diſtinct people. As the language of their new maſters, although rude and confined, was natural in its order, and eaſy to be acquired, the Latins would ſoon attain a competent ſkill in it: and as they bore ſuch a proportion to the whole number of people, the whole language would partake ſomewhat of the general ſound of the former: for, in ſpite of all their efforts to the contrary, the organs of ſpeech could not at once be made to acquire a perfect power of uttering any unaccuſtomed ſounds; and as it behoved the language of the barbarians to be much leſs copious than the Latin, whenever they found themſelves at a loſs for a word, they would naturally adopt thoſe which moſt readily preſented themſelves from their new ſubjects. Thus a language in time was formed, ſomewhat reſembling the Latin both in the general tenor of the ſounds and in the meaning of many words: and as the barbarians gave themſelves little trouble about language, and in ſome caſes perhaps hardly knew the general analogy of their own language, it is not ſurpriſing if their new ſubjects ſhould find themſelves ſometimes at a loſs on that account; or if, in theſe ſituations, they followed on ſome occaſions the analogy ſuggeſted to them by their own: which accounts for the ſtrange degree of mixture of heterogeneous grammatical analogy we meet with in the Italian as well as Spaniſh and French languages. The idiom of all the Gothic languages is purely analogous; and in all probability, before their mixture with the Latins and other people in their provinces, the ſeveral grammatical parts of ſpeech followed the plain ſimple idea which that ſuppoſes; the verbs and nouns were all probably

varied by auxiliaries, and their adjectives retained their ſimple unalterable ſtate:—but by their mixture with the Latins, this ſimple form has been in many caſes altered; their verbs became in ſome caſes inflected; but their nouns in all theſe languages ſtill retained their original form; although they have varied their adjectives, and foolithly clogged their nouns with gender, according to the Latin idioms. From this heterogeneous and fortuitous (as we may ſay, becauſe injudicious) mixture of parts, reſults a language poſſeſſing almoſt all the defects of each of the languages of which it is compoſed, with few of the excellencies of either: for it has neither the eaſe and preciſion of the *analogous*, nor the pomp and boldneſs of the *tranſpoſitive* languages; at the ſame time that it is clogged with almoſt as many rules, and liable to as great abuſes.

Theſe obſervations are equally applicable to the French and Spaniſh as to the Italian language. With regard to this laſt in particular, we may obſerve, that as the natural inhabitants of Italy, before the laſt invaſion of the barbarians, were ſunk and enervated by luxury, and that by depreſſion of mind and genius which anarchy always produces, they had become fond of feaſting and entertainments, and the enjoyment of ſenſual pleaſures conſtituted their higheſt delight; their language partook of the ſame debility as their body.—The barbarians, too, unaccuſtomed to the ſeductions of pleaſure, ſoon fell from their original boldneſs and intrepidity, and, like Hannibal's troops of old, were enervated by the ſenſual gratifications in which a nation of conquerors unaccuſtomed to the reſtraint of government freely indulged. The ſoftneſs of the air, the fertility of the climate, the unaccuſtomed flow of riches which they at once acquired, together with the voluptuous manner of their conquered ſubjects; all conſpired to enervate their minds, and render them ſoft and effeminate. No wonder, then, if a language new moulded at this juncture, ſhould partake of the genius of the people who formed it; and, inſtead of participating of the martial boldneſs and ferocity of either of their anceſtors, ſhould be ſoftened and enfeebled by every device which an effeminate people could invent.—The ſtrong conſonants which terminated the words, and gave them life and boldneſs, being thought too harſh for the delicate ears of theſe ſons of ſloth, were baniſhed their language; while ſonorous vowels, which could be protracted to any length in muſic, were ſubſtituted in their ſtead.—Thus the Italian language is formed flowing and harmonious, but deſtitute of thoſe nerves which conſtitute the ſtrength and vigour of a language: at the ſame time, the ſounds are neither enough diverſified, nor in themſelves of ſuch an agreeable tone, as to afford great pleaſure without the aid of muſical notes; and the ſmall pleaſure which this affords is ſtill leſſened by the little variety of meaſure which the great ſimilarity of the terminations of the words occaſions. Hence it happens, that this language is fitted for excelling in fewer branches of literature than almoſt any other: and although we have excellent hiſtorians, and more than ordinary poets, in Italian, yet they labour under great inconveniences, from the language wanting nerves and ſtatelineſs for the former, and ſufficient variety of modulation for the latter. It is, more particularly on this account, altogether unfit for an epic poem: and though attempts have been made in this way by two men whoſe genius, if not fettered by the language, might have been crowned with ſucceſs; yet theſe, notwithſtanding the ſame that with ſome they may have acquired, muſt, in point of poetic harmony, be deemed defective by every impartial perſon. Nor is it poſſible that a language which hardly admits of poetry without rhyme, can ever be capable of producing a perfect poem of great length; and the ſtanza to which their poets have ever confined themſelves, muſt always produce the moſt diſagreeable effect in a poem where unreſtrained pomp or pathos are neceſſary qualifications. The only ſpecies of poetry in which the Italian language can claim a ſuperior excellence, is the tender tone of elegy: and here it remains unrivalled and alone; the plaintive melody of the ſounds, and ſmooth flow of the language, being perfectly adapted to expreſs that ſoothing melancholy which this ſpecies of poetry requires. On this account the plaintive ſcenes of the *Paſtor Fido* of *Guarini* have juſtly gained to that poem an univerſal applauſe; although, unleſs on this account alone, it is perhaps inferior to almoſt every other poem of the kind which ever appeared. We muſt obſerve with ſurpriſe, that the Italians, who have fettered every other ſpecies of poetry with the ſevereſt ſhackles of rhyme, have in this ſpecies ſhewed an example of the moſt unreſtrained freedom; the happy effects of which ought to have taught all Europe the powerful charms attending it: yet with amazement we perceive, that ſcarce an attempt to imitate them has been made by any poet in Europe except by Milton in his Lycidas; no dramatic poet, even in Britain, having ever adopted the unreſtrained harmony of numbers to be met with in this and many other of their beſt dramatic compoſitions.

Of all the languages which ſprung up from the mixture of the Latins with the northern people on the deſtruction of the Roman empire, none of them approach ſo near to the genius of the Latin as the Spaniſh does. For as the Spaniards have been always remarkable for their military proweſs and dignity of mind, their language is naturally adapted to expreſs ideas of that kind. Sonorous and ſolemn, it admits nearly of as much dignity as the Latin. For converſation, it is the moſt elegant and courteous language in Europe.

The humane and generous order of chivalry was firſt invented, and kept its footing longeſt, in this nation; and although it ran at laſt into ſuch a ridiculous exceſs as deſervedly made it fall into univerſal diſrepute, yet it left ſuch a ſtrong tincture of romantic heroiſm upon the minds of all ranks of people, as made them jealous of their glory, and ſtrongly emulous of cultivating that heroic politeneſs, which they conſidered as the higheſt perfection they could attain. Every man diſdained to flatter, or to yield up any point of honour which he poſſeſſed; at the ſame time, he rigorouſly exacted from others all that was his due. Theſe circumſtances have given riſe to a great many terms of reſpect and courteous condeſcenſion, without meanneſs or flattery, which give their dialogue a reſpectful politeneſs and elegance unknown to any other European language. This is the reaſon why the characters ſo finely drawn by Cervantes in Don Quixote are ſtill unknown to all but thoſe who underſtand the language in which he wrote. Nothing can be more unlike the gentle meekneſs and humane heroiſm of the knight, or the native ſimplicity, warmth of affection, and reſpectful loquacity of the ſquire, than the inconſiſtent follies of the one, or the impertinent forwardneſs and diſreſpectful petulance of the other, as they are exhibited in every Engliſh tranſlation. Nor is it, as we imagine, poſſible to repreſent ſo much familiarity, united with ſuch becoming condeſcenſion in the one, and unfeigned deference in the other, in any other European language, as is neceſſary to paint theſe two admirable characters.

Although this language, from the ſolemn dignity and majeſtic elegance of its ſtructure, is perhaps better qualified than any other modern one for the ſublime ſtrains of epic poetry; yet as the poets of this nation have all along imitated the Italians by a moſt ſervile ſubjection to rhyme, they never have produced one poem of this ſort, which in point of poeſy of ſtyle deſerves to be tranſmitted to poſterity. And in any other ſpecies of poetry but this, or the higher tragedy, it is not naturally fitted to excel. But although the drama and other polite branches of literature were early cultivated in this

country, and made conſiderable progreſs in it, before the thirſt of gain debaſed their ſouls, or the deſire of univerſal dominion made them forfeit that liberty which they once ſo much prized; ſince they became enervated by an overbearing pride, and their minds enſlaved by ſuperſtition, all the polite arts have been neglected: ſo that, while other European nations have been advancing in knowledge, and improving their language, they have remained in a ſtate of torpid inactivity: and their language has not arrived at that perfection which its nature would admit, or the acute genius of the people might have made us naturally expect.

It will perhaps by ſome be thought an unpardonable inſult, if we do not allow the French the preference of all modern languages in many reſpects. But ſo far muſt we pay a deference to truth, as to be obliged to rank it among the pooreſt languages in Europe. Every other language has ſome ſounds which can be uttered clearly by the voice: even the Italian, although it wants energy, ſtill poſſeſſes diſtinctneſs of articulation. But the French is almoſt incapable of either of theſe beauties; for in that language the vowels are ſo much curtailed in the pronunciation, and the words run into one another in ſuch a manner, as neceſſarily to produce an indiſtinctneſs which renders it incapable of meaſure or harmony. From this cauſe, it is in a great meaſure incapable of poetic modulation, and rhyme has been obliged to be ſubſtituted in its ſtead; ſo that this pooreſt of all contrivances which has ever yet been invented to diſtinguiſh poetry from proſe, admitted into all the modern languages when ignorance prevailed over Europe, has ſtill kept ſome footing in the greateſt part of theſe, rather through a deference for eſtabliſhed cuſtoms than from any neceſſity. Yet as the French language admits of ſo little poetic modulation, rhyme is in ſome meaſure *neceſſary* to it; and therefore this poor deviation from proſe has been adopted by it, and dignified with the name of *Poetry*. But by their blind attachment to this artifice, the French have neglected to improve ſo much as they might have done the ſmall powers for harmony of which their language is poſſeſſed; and by being long accuſtomed to this falſe taſte, they have become fond of it to ſuch a ridiculous exceſs, as to have all their tragedies, nay even their comedies, in rhyme. While the poet is obliged to enervate his language, and check the flow of compoſition, for the ſake of linking his lines together, the judicious actor finds more difficulty in deſtroying the appearance of that meaſure, and preventing the clinking of the rhymes, than in all the reſt of his taſk.—After this, we need not be ſurpriſed to find Voltaire attempt an epic poem in this ſpecies of poetry; although the more judicious Fenelon in his *Telemaque* had ſhown to his countrymen the only ſpecies of poeſy that their language could admit of for any poem that aſpired to the dignity of the epic ſtrain.—Madam Deſhouliers, in her *Idyllic*, has ſhown the utmoſt extent of harmony to which their language can attain in ſmaller poems: indeed in the tenderneſs of an elegy, or the gaiety of a ſong, it may ſucceed; but it is ſo deſtitute of force and energy, that it can never be able to reach the pindaric, or even perhaps the lyric ſtrain—as the ineffectual efforts even of the harmonious Rouſſeau, in his tranſlation of the Pſalms of David of this ſtamp, may fully convince us.

With regard to its powers in other ſpecies of compoſition, the ſententious rapidity of Voltaire, and the more nervous dignity of Rouſſeau, afford us no ſmall preſumption, that, in a ſkilful hand, it might acquire ſo much force, as to tranſmit to futurity hiſtorical facts in a ſtyle not altogether unworthy of the ſubject. In attempts at pathetic declamation, the ſuperior abilities of the compoſer may perhaps on ſome occaſions excite a great idea; but this is ever cramped by the genius of the language: and although no nation in Europe can boaſt of ſo many orations where this grandeur is attempted, yet perhaps there are few who cannot produce more perfect, although not more laboured compoſitions of this kind.

But notwithſtanding the French language labours under all theſe inconveniences; although it can neither equal the dignity or genuine politeneſs of the Spaniſh, the nervous boldneſs of the Engliſh, nor the melting ſoftneſs of the Italian; although it is deſtitute of poetic harmony, and ſo much cramped in ſound as to be abſolutely unfit for almoſt every ſpecies of muſical compoſition; yet the ſprightly genius of that volatile people has been able to ſurmount all theſe difficulties, and render it the language moſt generally eſteemed, and moſt univerſally ſpoken, of any in Europe; for this people, naturally gay and loquacious, and fond to exceſs of thoſe ſuperficial accompliſhments which engage the attention of the fair ſex, have invented ſuch an infinity of words capable of expreſſing vague and unmeaning compliment, now dignified by the name of *politeneſs*, that, in this ſtrain, one who uſes the French can never be at a loſs; and as it is eaſy to converſe *more*, and really ſay *leſs*, in this than in any other language, a man of very moderate talents may diſtinguiſh himſelf much more by uſing this than any other that has ever yet been invented. On this account, it is peculiarly well adapted to that ſpecies of converſation which muſt ever take place in thoſe general and promiſcuous companies, where many perſons of both ſexes are met together for the purpoſes of relaxation or amuſement; and muſt of courſe be naturally admitted into the courts of princes, and aſſemblies of great perſonages; who, having fewer equals with whom they can aſſociate, are more under a neceſſity of converſing with ſtrangers, in whoſe company the tender ſtimulus of friendſhip does not ſo naturally expand the heart to mutual truſt or unreſtrained confidence. In theſe circumſtances, as the heart remaineth diſengaged, converſation muſt neceſſarily flag; and mankind in this ſituation will gladly adopt that language in which they can converſe moſt eaſily without being deeply intereſted. On theſe accounts the French now is, and probably will continue to be, reckoned the moſt polite language in Europe, and therefore the moſt generally ſtudied and known: nor ſhould we envy them this diſtinction, if our countrymen would not weaken and enervate their own manly language, by adopting too many of their unmeaning phraſes.

The Engliſh is perhaps poſſeſſed of a greater degree of excellence, blended with a greater number of defects, than any of the languages we have hitherto mentioned. As the people of Great Britain are a bold, daring, and impetuous race of men, ſubject to ſtrong paſſions, and, from the abſolute freedom and independence which reigns amongſt all ranks of people throughout this happy iſle, little ſolicitous about controlling theſe paſſions;—our language takes its ſtrongeſt characteriſtical diſtinction from the genius of the people; and, being bold, daring, and abrupt, is admirably well adapted to expreſs thoſe great emotions which ſpring up in an intrepid mind at the proſpect of intereſting events. Peculiarly happy too in the full and open ſound of the vowels, which forms the characteriſtic *tone* of the language, and in the ſtrong uſe of the aſpirate H in almoſt all thoſe words which are uſed as exclamations, or marks of ſtrong emotions upon intereſting occaſions, that particular claſs of words called *interjections* have, in our language, more of that fulneſs and unreſtrained freedom of tones, in which their chief power conſiſts, and are puſhed forth from the inmoſt receſſes of the ſoul in a more forcible and unreſtrained manner, than any other language whatever. Hence it is more peculiarly adapted for the great and intereſting ſcenes of the *drama* than any language that has yet appeared on the globe. Nor has any other nation ever arrived at that perfection which the Engliſh may juſtly claim in that reſpect; for however faulty our dramatic compoſitions may be in ſome of the critical niceties which relate to this art—in nervous force of diction, and in

the natural expreſſion of thoſe great emotions which conſtitute its ſoul and energy, we claim, without diſpute, an unrivalled ſuperiority. Our language too, from the great intercourſe that we have had with almoſt all the nations of the globe by means of our extenſive commerce, and from the eminent degree of perfection which we have attained in all the arts and ſciences, has acquired a copiouſneſs beyond what any other modern language can lay claim too; and even the moſt partial favourers of the Greek language are forced to acknowledge, that in this reſpect it muſt give place to the Engliſh. Nor is it leſs happy in that facility of conſtruction which renders it more peculiarly adapted to the genius of a free people, than any other form of language. Of an *idiom* purely analogous, it has deviated leſs from the genius of that *idiom*, and poſſeſſes more of the characteriſtic advantages attending it, than any other language that now exiſts: for, while *others*, perhaps by their more intimate connection with the Romans, have adopted ſome of their tranſpoſitions, and clogged their language with unneceſſary fetters, *we* have preſerved ourſelves free from the contagion, and ſtill retain the primitive ſimplicity of our language. Our *verbs* are all varied by auxiliaries (except in the inſtance we have already given, which is ſo much in our favour): our *nouns* remain free from the perplexing embarraſſment of *genders*, and our *pronouns* mark this diſtinction where neceſſary with the moſt perfect accuracy; our *articles* alſo are of courſe freed from this unnatural encumbrance, and our *adjectives* preſerve their natural freedom and independence. From theſe cauſes our language follows an order of conſtruction ſo natural and eaſy, and the rules of *ſyntax* are ſo few and obvious, as to be within the reach of the moſt ordinary capacity. So that from this, and the great clearneſs and diſtinctneſs of meaning with which this mode of conſtruction is neceſſarily accompanied, it is much better adapted for the familiar intercourſe of private ſociety, and liable to fewer errors in uſing it, than any other language yet known; and on this account we may boaſt, that in no nation of Europe do the lower claſs of people ſpeak their language with ſo much accuracy, or have their minds ſo much enlightened by knowledge, as in Great Britain. What then ſhall we ſay of the diſcernment of thoſe grammarians, who are every day echoing back to one another complaints of the poverty of our language, on account of the few and ſimple rules which it requires in ſyntax? As juſtly might we complain of an invention in mechanics, which, by means of one or two ſimple movements, obvious to an ordinary capacity, little liable to accidents, and eaſily put in order by the rudeſt hand, ſhould poſſeſs the whole powers of a complex machine, which had required an infinite apparatus of wheels and contrary movements, the knowledge of which could only be acquired, or the various accidents to which it was expoſed by uſing it be repaired, by the powers of an ingenious artiſt, as complain of this characteriſtic excellence of our language as a defect.

But if we thus enjoy in an eminent degree the advantages attending an *analogous* language, we likewiſe feel in a conſiderable meaſure the defects to which it is expoſed; as the number of monoſyllables with which it muſt always be embarraſſed, notwithſtanding the great improvements which have been made in our language ſince the revival of letters in Europe, prevents in ſome degree that ſwelling fulneſs of ſound which ſo powerfully contributes to harmonious dignity and graceful cadences in literary compoſitions. And as the genius of the people of Britain has always been more diſpoſed to the rougher arts of command than to the ſofter inſinuations of perſuaſion, no pains have been taken to correct theſe natural defects of our language: but, on the contrary, by an inattention of which we have hardly a parallel in the hiſtory of any civilized nation, we meet with many inſtances, even within this laſt century, of the harmony of ſound being ſacrificed to that brevity ſo deſirable in converſation, as many elegant words have been curtailed, and harmonious ſyllables ſuppreſſed, to ſubſtitute in their ſtead others, ſhorter, indeed, but more barbarous and uncouth.—Nay, ſo little attention have our forefathers beſtowed upon the harmony of ſounds in our language, that one would be tempted to think, on looking back to its primitive ſtate, that they had on ſome occaſions ſtudiouſly debaſed it. Our language, at its firſt formation, ſeems to have laboured under a capital defect in point of ſound, as ſuch a number of S's enter into the formation of our words, and ſuch a number of letters and combinations of other letters aſſume a ſimilar ſound, as to give a general hiſs through the whole tenor of our language, which muſt be exceedingly diſagreeable to every unprejudiced ear.—We would therefore have naturally expected, that at the revival of letters, when our forefathers became acquainted with the harmonious languages of Greece and Rome, they would have acquired a more correct taſte, and endeavoured, if poſſible, to diminiſh the prevalence of this diſguſting ſound. But ſo far have they been from thinking of this, that they have multiplied this letter exceedingly. The plurals of almoſt all our nouns were originally formed by adding the harmonious ſyllable *en* to the ſingular, which has given place to the letter *s*; and inſtead of *houſen* formerly, we now ſay *houſes*. In like manner, many of the variations of our verbs were formed by the ſyllable *eth*, which we have likewiſe changed into the ſame diſagreeable letter; ſo that, inſtead of *loveth*, *moveth*, *writeth*, *walketh*, &c. we have changed them into the more modiſh form of *loves*, *moves*, *writes*, *walks*, &c. Our very auxiliary verbs have ſuffered the ſame change; and inſtead of *hath* and *doth*, we now make uſe of *has* and *does*. From theſe cauſes, notwithſtanding the great improvements which have been made in our language, within theſe few centuries, in other reſpects, yet, with regard to the pleaſingneſs of ſound alone, it was perhaps much more perfect in the days of Chaucer than at preſent: and although cuſtom may have rendered theſe ſounds ſo familiar to our ear, as not to affect us much; yet to an unprejudiced perſon, unacquainted with our language, we have not the ſmalleſt doubt but the language of *Bacon* or *Sidney* would appear more harmonious than that of *Robertſon* or *Hume*. This is indeed the fundamental defect of our language, and loudly calls for reformation.

But notwithſtanding this great and radical defect with regard to pleaſingneſs of ſounds, which muſt be ſo ſtrongly perceived by every one who is unacquainted with the meaning of our words; yet to thoſe who underſtand the language, the exceeding copiouſneſs which it allows in the choice of words proper for the occaſion, and the nervous force with the perſpicuity and graceful elegance the emphaſis beſtows upon it, make this defect be totally overlooked; and we could produce ſuch numerous works of proſe, which excel in almoſt every different ſtyle of compoſition, as would be tireſome to enumerate: every reader of taſte and diſcernment will be able to recollect a ſufficient number of writings which excel in point of ſtyle, between the graceful and becoming gravity ſo conſpicuous in all the works of the author of the *Whole Duty of Man*, and the animated and nervous diction of Robertſon in his Hiſtory of Charles the Fifth,—the more flowery ſtyle of Shaftesbury, or the attic ſimplicity and elegance of Addiſon. But although we can equal, if not ſurpaſs, every modern language in works of proſe, it is in its poetical powers that our language ſhines forth with the greateſt luſtre. The brevity to which we muſt here neceſſarily confine ourſelves, prevents us from entering into a minute examination of the poetical powers of our own, compared with other languages; otherwiſe it would be eaſy to ſhow, that every other modern language labours under great reſtraints in this reſpect which ours is freed

from;—that our language admits of a greater variety of poetic movements, and diverſity of cadence, than any of the admired languages of antiquity; that it diſtinguiſhes with the greateſt accuracy between accent and quantity, and is poſſeſſed of every other poetic excellence which their languages were capable of; ſo that we are poſſeſſed of all the ſources of harmony which they could boaſt; and, beſides all theſe, have one ſuperadded, which is the cauſe of greater variety and more forcible expreſſion in numbers than all the reſt; that is, the unlimited power given by the emphaſis over quantity and cadence; by means whereof, a neceſſary union between ſound and ſenſe, numbers and meaning, in verſification, unknown to the ancients, has been brought about, which gives our language in this reſpect a ſuperiority over all thoſe juſtly admired languages. But as we cannot here further purſue this ſubject, we ſhall only obſerve, that theſe great and diſtinguiſhing excellencies far more than counterbalance the inconveniences that we have already mentioned; and although, in mere pleaſantneſs of ſounds, or harmonious flow of ſyllables, our language may be inferior to the Greek, the Latin, Italian, and Spaniſh; yet in point of manly dignity, graceful variety, intuitive diſtinctneſs, nervous energy of expreſſion, unconſtrained freedom and harmony of poetic numbers, it will yield the palm to none. Our immortal Milton, ſlowly riſing, in graceful majeſty ſtands up as equal, if not ſuperior in theſe reſpects, to any poet in any other language that ever yet exiſted;—while Thomſon, with more humble aim, in melody more ſmooth and flowing, ſoftens the ſoul to harmony and peace:—the plaintive moan of Hammond calls forth the tender tear and ſympathetic ſigh; while Gray's more ſoothing melancholy fixes the ſober mind to ſilent contemplation:—more tender ſtill than theſe, the amiable Shenſtone comes; and from his Doric reed, ſtill free from courtly affectation, flows a ſtrain ſo pure, ſo ſimple, and of ſuch tender harmony, as even Arcadian ſhepherds would be proud to own. But far before the reſt, the daring Shakeſpeare ſteps forth conſpicuous, clothed in native dignity; and, preſſing forward with unremitting ardour, boldly lays claim to both dramatic crowns held out to him by Thalia and Melpomene:—his rivals, far behind, look up, and envy him for theſe unfading glories; and the aſtoniſhed nations round, with diſtant awe, behold and tremble at his daring flight.——Thus the language, equally obedient to all, bends with eaſe under their hands, whatever form they would have it aſſume; and, like the yielding wax, readily receives, and faithfully tranſmits to poſterity, thoſe impreſſions which they have ſtamped upon it.

Such are the principal outlines of the language of Great Britain; ſuch are its beauties, and ſuch its moſt capital defects; a language more peculiarly circumſtanced than any that has ever yet appeared.—It is the language of a great and powerful nation, whoſe fleets ſurround the globe, and whoſe merchants are in every port; a people admired or revered by all the world:—and yet it is leſs known in every foreign country than many of the other languages in Europe. In it are written more perfect treatiſes on every art and ſcience than are to be found in any other language;—yet it is leſs ſought after or eſteemed by the literati in any part of the globe than almoſt any of theſe. Its ſuperior powers for every purpoſe of language are ſufficiently obvious from the models of perfection in almoſt every particular which can be produced in it:—yet it is neglected, deſpiſed, and vilified by the people who uſe it; and many of thoſe authors who owe almoſt the whole of their fame to the excellence of the language in which they wrote, look upon that very language with the higheſt contempt. Neglected and deſpiſed, it has been trodden under foot as a thing altogether unworthy of cultivation or attention. Yet in ſpite of all theſe inconveniences, in ſpite of the many wounds it has thus received, it ſtill holds up its head, and preſerves evident marks of that comelineſs and vigour which are its characteriſtical diſtinction. Like a healthy oak planted in a rich and fertile ſoil, it has ſprung up with vigour: and although neglected, and ſuffered to be over-run with weeds; although expoſed to every blaſt, and unprotected from every violence; it ſtill beareth up under all theſe inconveniences, and ſhoots up with a robuſt healthineſs and wild luxuriance of growth. Should this plant, ſo ſound and vigorous, be now cleared from thoſe weeds with which it has been ſo much encumbered;—ſhould every obſtacle which now buries it under thick ſhades, and hides it from the view of every paſſenger, be cleared away;—ſhould the ſoil be cultivated with care, and a ſtrong fence be placed around it, to prevent the idle or the wicked from breaking or diſtorting its branches;—who can tell with what additional vigour it would flouriſh, or what amazing magnitude and perfection it might at laſt attain!—How would the aſtoniſhed world behold, with reverential awe, the majeſtic gracefulneſs of that object which they ſo lately deſpiſed!

Beauty of LANGUAGE *conſidered in regard to Compoſition.* The beauties of language may be divided into three claſſes: 1. Thoſe which ariſe from ſound; 2. Thoſe which reſpect ſignificance; 3. Thoſe derived from a reſemblance between ſound and ſignification.

I. *With reſpect to ſound.* In a curſory view, one would imagine, that the agreeableneſs or diſagreeableneſs of a word with reſpect to ſound, ſhould depend upon the agreeableneſs or diſagreeableneſs of its component ſyllables: which is true in part, but not entirely; for we muſt alſo take under conſideration the effect of ſyllables in ſucceſſion. In the firſt place, ſyllables in immediate ſucceſſion, pronounced each of them with the ſame, or nearly the ſame, aperture of the mouth, produce a ſucceſſion of weak and feeble ſounds; witneſs the French words *dit-il, pathetique:* on the other hand, a ſyllable of the greateſt aperture ſucceeding one of the ſmalleſt, or the contrary, makes a ſucceſſion which, becauſe of its remarkable diſagreeableneſs, is diſtinguiſhed by a proper name, viz. *hiatus.* The moſt agreeable ſucceſſion is, where the cavity is increaſed and diminiſhed alternately, within moderate limits: examples, *Alternative, longevity, puſillanimous.* Secondly, words conſiſting wholly of ſyllables pronounced ſlow, or of ſyllables pronounced quick, commonly called *long* and *ſhort ſyllables*, have little melody in them; witneſs the words *petitioner, fruiterer, dizzineſs:* on the other hand, the intermixture of long and ſhort ſyllables is remarkably agreeable; for example, *degree, repent, wonderful, altitude, rapidity, independent, impetuoſity*; the cauſe of which is explained in POETRY, Part II.

To proceed to the muſic of periods. As the arrangement of words in ſucceſſion, ſo as to afford the greateſt pleaſure to the ear, depends on principles remote from common view, it will be neceſſary to premiſe ſome general obſervations upon the appearance that objects make when placed in an increaſing or decreaſing ſeries; which appearance will vary according to the prevalence of reſemblance or of contraſt. Where the objects vary by ſmall differences ſo as to have a mutual reſemblance, we in aſcending conceive the ſecond object of no greater ſize than the firſt, the third of no greater ſize than the ſecond, and ſo of the reſt; which diminiſheth in appearance the ſize of every object except the firſt: but when, beginning at the greateſt object, we proceed gradually to the leaſt, reſemblance makes us imagine the ſecond as great as the firſt, and the third as great as the ſecond: which in appearance magnifies every object except the firſt. On the other hand, in a ſeries varying by large differences, where contraſt prevails, the effects are directly oppoſite; a great object ſucceeding a ſmall one of the ſame kind, appears greater than uſual; and a little

object ſucceeding one that is great, appears leſs than uſual. Hence a remarkable pleaſure in viewing a ſeries aſcending by large differences; directly oppoſite to what we feel when the differences are ſmall. The leaſt object of a ſeries aſcending by large differences has the ſame effect upon the mind as if it ſtood ſingle without making a part of the ſeries: but the ſecond object, by means of contraſt, appears greater than when viewed ſingly and apart; and the effect is perceived in aſcending progreſſively, till we arrive at the laſt object. The oppoſite effect is produced in deſcending; for in this direction, every object, except the firſt, appears leſs than when viewed ſeparately and independent of the ſeries. We may then aſſume as a maxim, which will hold in the compoſition of language as well as of other ſubjects, That a ſtrong impulſe ſucceeding a weak, makes a double impreſſion on the mind; and that a weak impulſe ſucceeding a ſtrong, makes ſcarce any impreſſion.

After eſtabliſhing this maxim, we can be at no loſs about its application to the ſubject in hand. The following rule is laid down by Diomedes (*De ſtruct. perfectæ orat.* lib. ii.). In verbis obſervandum eſt, ne a majoribus ad minora deſcendat oratio; melius enim dicitur, *Vir eſt optimus*, quam, *Vir optimus eſt*." This rule is alſo applicable to entire members of a period, which, according to our author's expreſſion, ought not, more than ſingle words, to proceed from the greater to the leſs, but from the leſs to the greater. In arranging the members of a period, no writer equals Cicero: The following examples are too beautiful to be ſlurred over by a reference.

Quicum quæſtor fueram,
Quicum me ſors conſuetudoque majorum,
Quicum me deorum hominumque judicium conjunxerat.

Again:

Habet honorem quem petimus,
Habet ſpem quam præpoſitam nobis habemus,
Habet exiſtimationem, multo ſudore, labore, vigiliiſque, collectam.

Again:

Eripite nos ex miſeriis,
Eripite nos ex faucibus eorum,
Quorum crudelitas noſtro ſanguine non poteſt expleri.
De oratore, l. 1. § 52.

This order of words or members gradually increaſing in length, may, ſo far as concerns the pleaſure of ſound, be denominated *a climax in ſound*.

With reſpect to the muſic of periods as united in a diſcourſe, this depends chiefly on variety. Hence a rule for arranging the members of different periods with relation to each other, That to avoid a tedious uniformity of ſound and cadence, the arrangement, the cadence, and the length of the members, ought to be diverſified as much as poſſible: and if the members of different periods be ſufficiently diverſified, the periods themſelves will be equally ſo.

II. *With reſpect to ſignification.* The beauties of language with reſpect to ſignification may not improperly be diſtinguiſhed into two kinds: firſt, the beauties that ariſe from a right choice of words or materials for conſtructing the period; and next, the beauties that ariſe from a due arrangement of theſe words or materials.

1. Communication of thought being the chief end of language, it is a rule, That perſpicuity ought not to be ſacrificed to any other beauty whatever. Nothing therefore in language ought more to be ſtudied, than to prevent all obſcurity in the expreſſion; for to have no meaning is but one degree worſe than to have a meaning that is not underſtood. We ſhall here give a few examples where the obſcurity ariſes from a wrong choice of words.

Livy, ſpeaking of a rout after a battle, "Multique in ruina *majore* quam fuga oppreſſi obtruncatique." This author is frequently obſcure by expreſſing but part of his thought, leaving it to be completed by his reader. His deſcription of the ſea-fight, *l.* 28. *cap.* 30. is extremely perplexed.

Unde tibi reditum *certo ſubtemine* Parcæ
Rupêre. *Hor.*

Qui perſæpe cavâ teſtudine flevit amorem
Non elaboratum ad pedem. *Id.*

Me fabuloſæ Vulture in Appulo
Altricis extra limen Apuliæ,
Ludo fatigatumque *ſomno*,
Fronde novâ puerum palumbes
Texere. *Id.*

Puræ rivus aquæ, ſilvaque jugerum
Paucorum, et ſegetis certa fides meæ,
Fulgentem imperio fertilis Africæ
Fallit ſorte beatior. *Id.*

Cum fas atque neſas exiguo *fine* libidinum
Diſcernunt avidi. *Id.*

Ac ſpem fronte ſerenat. *Virg.*

The rule next in order is, That the language ought to correſpond to the ſubject: heroic actions or ſentiments require elevated language; tender ſentiments ought to be expreſſed in words ſoft and flowing; and plain language, void of ornament, is adapted to ſubjects grave and didactic. Language may be conſidered as the dreſs of thought; and where the one is not ſuited to the other, we are ſenſible of incongruity, in the ſame manner as where a judge is dreſſed like a ſop, or a peaſant like a man of quality. Where the impreſſion made by the words reſembles the impreſſion made by the thought, the ſimilar emotions mix ſweetly in the mind, and double the pleaſure; but where the impreſſions made by the thought and the words are diſſimilar, the unnatural union they are forced into is diſagreeable.

This concordance between the thought and the words has been obſerved by every critic, and is ſo well underſtood as not to require any illuſtration. But there is a concordance of a peculiar kind that has ſcarcely been touched in works of criticiſm, though it contributes to neatneſs of compoſition. It is what follows.

In a thought of any extent, we commonly find ſome parts intimately united, ſome ſlightly, ſome disjoined, and ſome directly oppoſed to each other. To find theſe conjunctions and disjunctions imitated in the expreſſion, is a beauty; becauſe ſuch imitation makes the words concordant with the ſenſe. This doctrine may be illuſtrated by a familiar example: When we have occaſion to mention the intimate connection that the ſoul hath with the body, the expreſſion ought to be, *the ſoul and body*; becauſe the article *the*, relative to both, makes a connection in the expreſſion, reſembling in ſome degree the connection in the thought: but when the ſoul is diſtinguiſhed from the body, it is better to ſay *the ſoul and the body*; becauſe the disjunction in the words reſembles the disjunction in the thought. We proceed to other examples, beginning with conjunctions.

"Conſtituit agmen; et expedire tela animoſque, equitibus juſſis," &c. *Livy, l.* 38. § 25. Here the words that expreſs the connected ideas are artificially connected by ſubjecting them both to the regimen of one verb. And the two following are of the ſame kind:

"Quum ex paucis quotidie aliqui eorum caderent aut vulnerarentur, et qui ſuperarent, feſſi et corporibus et animis eſſent," &c. *Ibid.* § 29.

Poſt acer Mneſtheus adducto conſtitit arcu
Alta petens, pariterque oculos telumque tetendit.
Æneid. v. 507.

But to juſtify this artificial connection among the words, the ideas they expreſs ought to be intimately connected; for otherwiſe that concordance which is required between the ſenſe and the expreſſion will be impaired. In that view, the following paſſage from Tacitus is exceptionable; where words that ſignify ideas very little connected, are however forced into an artificial union. "Germania omnis a Gallis, Rhætiiſque, et Pannoniis, Rheno et Danubio fluminibus; a Sarmatis Daciſque, mutuo metu aut montibus ſeparatur."

Upon the ſame account, the following paſſage ſeems equally exceptionable.

——————The fiend look'd up, and knew
His mounted ſcale aloft; nor more, but fled
Murm'ring, and with him fled the ſhades of night.
Paradiſe Loſt, B. iv. *at the end.*

There is no natural connection between a perſon's flying or retiring, and the ſucceſſion of day-light to darkneſs; and therefore to connect artificially the terms that ſignify theſe things cannot have a ſweet effect.

Two members of a thought connected by their relation to the ſame action, will naturally be expreſſed by two members of the period governed by the ſame verb; in which caſe theſe members, in order to improve their connection, ought to be conſtructed in the ſame manner. This beauty is ſo common among good writers as to have been little attended to; but the neglect of it is remarkably diſagreeable: for example, "He did not mention Leonora, nor that her father was dead." Better thus: "He did not mention Leonora, nor her father's death."

Where two ideas are ſo connected as to require but a copulative, it is pleaſant to find a connection in the words that expreſs theſe ideas, were it even ſo ſlight as where both begin with the ſame letter. Thus,

"The peacock, in all his pride, does not diſplay half the colour that appears in the garments of a Britiſh lady, when ſhe is either dreſſed for a ball or a birth day." *Spect.*

"Had not my dog of a ſteward run away as he did, without making up his accounts, I had ſtill been immerſed in ſin and ſea-coal." *Ib.*

My life's companion, and my boſom-friend,
One faith, one fame, one fate ſhall both attend.
Dryden, *Tranſlation of Æneid.*

Next as to examples of disjunction and oppoſition in the parts of the thought, imitated in the expreſſion; an imitation that is diſtinguiſhed by the name of *antitheſis*.

Speaking of Coriolanus, ſoliciting the people to be made conſul:

With a proud heart he wore his humble weeds. *Coriolanus.*

"Had you rather Cæſar were living, and die all ſlaves, than that Cæſar were dead, to live all free men? *Julius Cæſar.*

He hath cool'd my friends and heated mine enemies.
Shakeſpeare.

An artificial connection among the words, is undoubtedly a beauty when it repreſents any peculiar connection among the conſtituent parts of the thought; but where there is no ſuch connection, it is a poſitive deformity, becauſe it makes a diſcordance between the thought and expreſſion. For the ſame reaſon, we ought alſo to avoid every artificial oppoſition of words where there is none in the thought. This laſt, termed *verbal antitheſis*, is ſtudied by low writers, becauſe of a certain degree of livelineſs in it. They do not conſider how incongruous it is, in a grave compoſition, to cheat the reader, and to make him expect a contraſt in the thought, which upon examination is not found there.

A fault directly oppoſite to the laſt mentioned, is to conjoin artificially words that expreſs ideas oppoſed to each other. This is a fault too groſs to be in common practice; and yet writers are guilty of it in ſome degree, when they conjoin by a copulative things tranſacted at different periods of time. Hence a want of neatneſs in the following expreſſion: "The nobility too, whom the king had no means of retaining by ſuitable offices and preferments, had been ſeized with the general diſcontent, and unwarily threw themſelves into the ſcale which began already too much to preponderate." *Hume.* In periods of this kind, it appears more neat to expreſs the paſt time by the participle paſſive, thus: "The nobility having been ſeized with the general diſcontent, unwarily threw themſelves," &c. or, "The nobility, who had been ſeized, &c. unwarily threw themſelves," &c.

It is unpleaſant to find even a negative and affirmative propoſition connected by a copulative:

If it appear not plain, and prove untrue,
Deadly divorce ſtep between me and you! *Shakeſpeare.*

In mirth and drollery it may have a good effect to connect verbally things that are oppoſite to each other in the thought. Example: Henry IV. of France introducing the Mareſchal Biron to ſome of his friends, "Here, gentlemen (ſays he), is the Mareſchal Biron, whom I freely preſent both to my friends and enemies."

This rule of ſtudying uniformity between the thought and expreſſion may be extended to the conſtruction of ſentences or periods. A ſentence or period ought to expreſs one entire thought or mental propoſition; and different thoughts ought to be ſeparated in the expreſſion by placing them in different ſentences or periods. It is therefore offending againſt neatneſs, to crowd into one period entire thoughts requiring more than one; which is joining in language things ſeparated in reality. Of errors againſt this rule take the following examples:

"Behold, thou art fair, my beloved, yea pleaſant: alſo our bed is green."

Burnet, in the Hiſtory of his own times, giving lord Sunderland's character, ſays: "His own notions were always good; but he was a man of great expence."

"I have ſeen a woman's face break out in heats, as ſhe has been talking againſt a great lord, whom ſhe had never ſeen in her life; and indeed never knew a party-woman that kept her beauty for a twelvemonth." *Spect.*

Lord Bolingbroke, ſpeaking of Strada: "I ſingle him out among the moderns, becauſe he had the fooliſh preſumption to cenſure Tacitus, and to write hiſtory himſelf; and your lordſhip will forgive this ſhort excurſion in honour of a favourite writer."

To crowd into a ſingle member of a period different ſubjects, is ſtill worſe than to crowd them into one period:

——————Trojam genitore Adamaſto
Paupere (manſiſſetque utinam fortuna!) profectus.
Æneid. iii. 614.

From conjunctions and disjunctions in general, we proceed to compariſons, which make one ſpecies of them, beginning with ſimilies. And here alſo the intimate connection that words have with their meaning requires, that in deſcribing two reſembling objects, a reſemblance in the two members of the

period ought to be ſtudied. To begin with examples of reſemblances expreſſed in words that have no reſemblance:

"I have obſerved of late, the ſtyle of ſome great miniſters very much to exceed that of any other productions." *Swift.* This, inſtead of ſtudying the reſemblance of words in a period that expreſſes a compariſon, is going out of one's road to avoid it. Inſtead of *productions*, which reſemble not miniſters great nor ſmall, the proper word is *writers* or *authors*.

"I cannot but fancy, however, that this imitation, which paſſes ſo currently with *other judgments*, muſt at ſome time or other have ſtuck a little with your *lordſhip*." *Shafteſb.* Better thus: "I cannot but fancy, however, that this imitation, which paſſes ſo currently with *others*, muſt at ſome time or other have ſtuck a little with your *lordſhip*."

"A glutton or mere ſenſualiſt is as ridiculous as the other two characters." *Id.*

"They wiſely prefer *the generous efforts of good will and affection*, to the reluctant compliances *of ſuch as* obey by force." *Bolingb.*

It is a ſtill greater deviation from congruity, to affect not only variety in the words, but alſo in the conſtruction.

Hume ſpeaking of Shakeſpeare: "There may remain a ſuſpicion that we over-rate the greatneſs of his genius, in the ſame manner as bodies appear more gigantic on account of their being diſproportioned and miſhapen." This is ſtudying variety in a period where the beauty lies in uniformity. Better thus: "There may remain a ſuſpicion that we over-rate the greatneſs of his genius, in the ſame manner as we over-rate the greatneſs of bodies that are diſproportioned and miſhapen."

Next of compariſon where things are oppoſed to each other. And here it muſt be obvious, that if reſemblance ought to be ſtudied in the words which expreſs two reſembling objects, there is equal reaſon for ſtudying oppoſition in the words which expreſs contraſted objects. This rule will be beſt illuſtrated by examples of deviations from it.

"A friend exaggerates a man's virtues; an enemy inflames his crimes." *Spect.* Here the oppoſition in the thought is neglected in the words; which at firſt view ſeem to import, that the friend and enemy are employed in different matters, without any relation to each other, whether of reſemblance or of oppoſition. And therefore the contraſt or oppoſition will be better marked by expreſſing the thought as follows: "A friend exaggerates a man's virtues, an enemy his crimes."

"The wiſe man is happy when he gains his own approbation; the fool when he recommends himſelf to the applauſe of thoſe about him." *Ib.* Better: "The wiſe man is happy when he gains his own approbation, the fool when he gains that of others."

We proceed to a rule of a different kind. During the courſe of a period, the ſcene ought to be continued without variation: the changing from perſon to perſon, from ſubject to ſubject, or from perſon to ſubject, within the bounds of a ſingle period, diſtracts the mind, and affords no time for a ſolid impreſſion.

Hooke, in his Roman hiſtory, ſpeaking of Eumenes, who had been beat to the ground with a ſtone, ſays, "After a ſhort time *he* came to himſelf; and the next day *they* put him on board his ſhip, *which* conveyed him firſt to Corinth, and thence to the iſland of Ægina."

The following period is unpleaſant, even by a very ſlight deviation from the rule: "That ſort of inſtruction which is acquired by inculcating an important moral truth," &c. This expreſſion includes two perſons, one acquiring, and one inculcating; and the ſcene is changed without neceſſity. To avoid this blemiſh, the thought may be expreſſed thus: "That ſort of inſtruction which is afforded by inculcating," &c.

The bad effect of ſuch a change of perſon is remarkable in the following paſſage: "The *Britons*, daily haraſſed by cruel inroads from the Picts, were forced to call in the Saxons for their defence, *who* conſequently reduced the greateſt part of the iſland to their own power, drove the Britons into the moſt remote and mountainous parts, and *the reſt of the country*, in cuſtoms, religion, and language, became wholly Saxon." *Swift.*

The following paſſage has a change from ſubject to perſon: "*This proſtitution of praiſe* is not only a deceit upon the groſs of mankind, who take their notion of characters from the learned; but alſo *the better ſort* muſt by this means loſe ſome part at leaſt of that deſire of fame which is the incentive to generous actions, when they find it promiſcuouſly beſtowed on the meritorious and undeſerving." *Guardian*, N° 4.

The preſent head, which relates to the choice of materials, ſhall be cloſed with a rule concerning the uſe of copulatives. Longinus obſerves, that it animates a period to drop the copulatives; and he gives the following example from Xenophon: "Cloſing their ſhields together, they were puſh'd, they fought, they ſlew, they were ſlain." The reaſon may be what follows. A continued ſound, if not loud, tends to lay us aſleep: an interrupted ſound rouſes and animates by its repeated impulſes: thus feet compoſed of ſyllables, being pronounced with a ſenſible interval between each, make more lively impreſſions than can be made by a continued ſound. A period of which the members are connected by copulatives, produceth an effect upon the mind approaching to that of a continued ſound; and therefore the ſuppreſſing copulatives muſt animate a deſcription. It produces a different effect akin to that mentioned: the members of a period, connected by proper copulatives, glide ſmoothly and gently along; and are a proof of ſedateneſs and leiſure in the ſpeaker: on the other hand, one in the hurry of paſſion, neglecting copulatives and other particles, expreſſes the principal image only; and for that reaſon, hurry or quick action is beſt expreſſed without copulatives:

Veni, vidi, vici.

——————————— Ite:
Ferte citi flammas, date vela, impellite remos.
Æneid. iv. 593.

Quis globus, O cives, caligine volvitur atra?
Ferte citi ferrum, date tela, ſcandite muros.
Hoſtis adeſt, eja. *Æneid.* ix. 37.

In this view Longinus juſtly compares copulatives in a period to ſtrait tying, which in a race obſtructs the freedom of motion.

It follows, that a plurality of copulatives in the ſame period ought to be avoided; for if the laying aſide copulatives give force and liveline ſs, a redundancy of them muſt render the period languid. The following inſtance may be appealed to, though there are but two copulatives: "Upon looking over the letters of my female correſpondents, I find ſeveral from women complaining of jealous huſbands; and at the ſame time proteſting their own innocence, and deſiring my advice upon this occaſion." *Spect.*

Where the words are intended to expreſs the coldneſs of the ſpeaker, there indeed the redundancy of copulatives is a beauty:

"Dining one day at an alderman's in the city, Peter obſerved him expatiating after the manner of his brethren in the praiſes of his ſirloin of beef." 'Beef (ſaid the ſage magiſtrate) is the king of meat: beef comprehends in it the quinteſſence of partridge, and quail, and veniſon, and pheaſant, and plum-pudding, and cuſtard." *Tale of a Tub*, § 4. And the author ſhows great delicacy of taſte by varying the expreſſion in the mouth of Peter, who is repreſented more animated: "Bread (ſays he), dear brothers, is the ſtaff of life; in which bread is contained, *incluſive*, the quinteſſence o. beef,

mutton, veal, veniſon, partridge, plum-pudding, and cuſtard."

Another caſe muſt alſo be excepted. Copulatives have a good effect where the intention is to give an impreſſion of a great multitude conſiſting of many diviſions; for example: "The army was compoſed of Grecians, and Carians, and Lycians, and Pamphylians, and Phrygians." The reaſon is, that a leiſurely ſurvey, which is expreſſed by the copulatives, makes the parts appear more numerous than they would do by a haſty ſurvey: in the latter caſe, the army appears in one group; in the former, we take as it were an accurate ſurvey of each nation, and of each diviſion.

2. To pave the way for the rules of arrangement, it will be here neceſſary to explain the difference between a natural ſtyle and that where tranſpoſition or inverſion prevails. In a natural ſtyle, relative words are by juxtapoſition connected with thoſe to which they relate, going before or after, according to the peculiar genius of the language. Again, a circumſtance connected by a prepoſition, follows naturally the word with which it is connected. But this arrangement may be varied, when a different order is more beautiful: a circumſtance may be placed before the word with which it is connected by a prepoſition; and may be interjected even between a relative word and that to which it relates. When ſuch liberties are frequently taken, the ſtyle becomes inverted or tranſpoſed.

But as the liberty of inverſion is a capital point in the preſent ſubject, it will be neceſſary to examine it more narrowly, and in particular to trace the ſeveral degrees in which an inverted ſtyle recedes more and more from that which is natural. And firſt, as to the placing a circumſtance before the word with which it is connected, this is the eaſieſt of all inverſion, even ſo eaſy as to be conſiſtent with a ſtyle that is properly termed *natural:* witneſs the following examples:

"In the ſincerity of my heart, I profeſs," &c.

"By our own ill management, we are brought to ſo low an ebb of wealth and credit, that," &c.

"On Thurſday morning there was little or nothing tranſacted in Change-alley."

"At St. Bride's church in Fleet-ſtreet, Mr. Woolſton (who writ againſt the miracles of our Saviour), in the utmoſt terrors of conſcience, made a public recantation."

The interjecting a circumſtance between a relative word and that to which it relates, is more properly termed *inverſion*; becauſe, by a disjunction of words intimately connected, it recedes farther from a natural ſtyle. But this licence has degrees; for the disjunction is more violent in ſome caſes than in others.

In nature, though a ſubject cannot exiſt without its qualities, nor a quality without a ſubject; yet in our conception of theſe, a material difference may be remarked. We cannot conceive a quality but as belonging to ſome ſubject: it makes indeed a part of the idea which is formed of the ſubject. But the oppoſite holds not; for though we cannot form a conception of a ſubject void of all qualities, a partial conception may be formed of it, abſtracting from any particular quality: we can, for example, form the idea of a fine Arabian horſe without regard to his colour, or of a white horſe without regard to his ſize. Such partial conception of a ſubject is ſtill more eaſy with reſpect to action or motion, which is an occaſional attribute only, and has not the ſame permanency with colour or figure: we cannot form an idea of motion independent of a body; but there is nothing more eaſy than to form an idea of a body at reſt. Hence it appears, that the degree of inverſion depends greatly on the order in which the related words are placed: when a ſubſtantive occupies the firſt place, the idea it ſuggeſts muſt ſubſiſt in the mind at leaſt for a moment, independent of the relative words afterward introduced; and that moment may without difficulty be prolonged by interjecting a circumſtance between the ſubſtantive and its connections. This liberty therefore, however frequent, will ſcarce alone be ſufficient to denominate a ſtyle *inverted.* The caſe is very different, where the word that occupies the firſt place denotes a quality or an action; for as theſe cannot be conceived without a ſubject, they cannot without greater violence be ſeparated from the ſubject that follows; and for that reaſon, every ſuch ſeparation by means of an interjected circumſtance belongs to an inverted ſtyle.

To illuſtrate this doctrine, examples are neceſſary. In the following, the word firſt introduced does not imply a relation:

——————Nor Eve to iterate
Her former treſpaſs fear'd.

——————Hunger and thirſt at once,
Powerful perſuaders, quicken'd at the ſcent
Of that alluring fruit, urg'd me ſo keen.

Moon that now meet'ſt the orient ſun, now fli'ſt
With the fix'd ſtars, fixed in their orb that flies,
And ye five other wand'ring fires that move
In myſtic dance not without ſong, reſound
His praiſe.

Where the word firſt introduced imports a relation, the diſjunction will be found more violent:

Of man's firſt diſobedience, and the fruit
Of that forbidden tree, whoſe mortal taſte
Brought death into the world, and all our wo,
With loſs of Eden, till one greater man
Reſtore us, and regain the bliſsful ſeat,
Sing, heav'nly muſe!

——————Upon the firm opacous globe
Of this round world, whoſe firſt convex divides
The luminous inferior orbs, inclos'd
From chaos and th' inroad of darkneſs old,
Satan alighted walks.

——————On a ſudden open fly,
With impetuous recoil and jarring ſound,
Th' infernal doors.

——————Wherein remain'd,
For what could elſe? to our almighty foe
Clear victory, to our part loſs and rout.

Language would have no great power, were it confined to the natural order of ideas: by inverſion a thouſand beauties may be compaſſed, which muſt be relinquiſhed in a natural arrangement.

Rules. 1. In the arrangement of a period, as well as in a right choice of words, the firſt and great object being perſpicuity, the rule above laid down, that perſpicuity ought not to be ſacrificed to any other beauty, holds equally in both. Ambiguities occaſioned by a wrong arrangement are of two ſorts; one where the arrangement leads to a wrong ſenſe, and one where the ſenſe is leſs doubtful. The firſt, being the more culpable, ſhall take the lead, beginning with examples of words put in a wrong place.

"How much the imagination of ſuch a preſence muſt exalt a genius, we may obſerve *merely* from the influence which an ordinary preſence has over men." *Shafteſb.* This arrangement leads to a wrong ſenſe: the adverb *merely* ſeems by its poſition to affect the preceding word; whereas it is intended to affect the following words, *an ordinary preſence;* and therefore

the arrangement ought to be thus: "How much the imagination of ſuch a preſence muſt exalt a genius, we may obſerve from the influence which an ordinary preſence merely has over men." [Or better],—which even an ordinary preſence has over men."

"Sixtus the Fourth was, if I miſtake not, a great collector of books at leaſt." *Boling.* The expreſſion here leads evidently to a wrong ſenſe; the adverb *at leaſt* ought not to be connected with the ſubſtantive *books*, but with *collector*, thus: "Sixtus the Fourth was a great collector at leaſt of books."

Speaking of Louis XIV. "If he was not the greateſt king, he was the beſt actor of majeſty at leaſt that ever filled a throne." *Id.* Better thus: "If he was not the greateſt king, he was at leaſt the beſt actor of majeſty," &c. This arrangement removes the wrong ſenſe occaſioned by the juxtapoſition of *majeſty* and *at leaſt*.

The following examples are of a wrong arrangement of members:

"I have confined myſelf to thoſe methods for the advancement of piety, which are in the power of a prince limited like ours by a ſtrict execution of the laws." *Swift.* The ſtructure of this period leads to a meaning which is not the author's, viz. power limited by a ſtrict execution of the laws. That wrong ſenſe is removed by the following arrangement: "I have confined myſelf to thoſe methods for the advancement of piety, which, by a ſtrict execution of the laws, are in the power of a prince limited like ours."

"This morning, when one of lady Lizard's daughters was looking over ſome hoods and ribbands brought by her tirewoman, with great care and diligence, I employed no leſs in examining the box which contained them." *Guardian.* The wrong ſenſe occaſioned by this arrangement may be eaſily prevented by varying it thus: "This morning, when, with great care and diligence, one of lady Lizard's daughters was looking over ſome hoods and ribbands," &c.

"A great ſtone that I happened to find after a long ſearch by the ſea-ſhore, ſerved me for an anchor." *Swift.* One would think that the ſearch was confined to the ſea-ſhore; but as the meaning is, that the great ſtone was found by the ſea-ſhore, the period ought to be arranged thus: "A great ſtone that, after a long ſearch, I happened to find by the ſea-ſhore, ſerved me for an anchor."

Next of a wrong arrangement where the ſenſe is left doubtful; beginning, as in the former ſort, with examples of a wrong arrangement of words in a member:

"Theſe forms of converſation *by degrees* multiplied and grew troubleſome." *Spect.* Here it is left doubtful whether the modification *by degrees* relates to the preceding member or to what follows: it ſhould be, "Theſe forms of converſation multiplied by degrees."

"Nor does this falſe modeſty expoſe us *only* to ſuch actions as are indiſcreet, but very often to ſuch as are highly criminal." *Spect.* The ambiguity is removed by the following arrangement: "Nor does this falſe modeſty expoſe us to ſuch actions only as are indiſcreet," &c.

"The empire of Blefuſcu is an iſland ſituated to the north-eaſt ſide of Lilliput, from whence it is parted *only* by a channel of 800 yards wide." *Swift.* The ambiguity may be removed thus: "from whence it is parted by a channel of 800 yards wide only."

In the following examples the ſenſe is left doubtful by wrong arrangement of members:

"The miniſter who grows leſs by his elevation, *like a little ſtatue placed on a mighty pedeſtal*, will always have his jealouſy ſtrong about him." *Bolingb.* Here, ſo far as can be gathered from the arrangement, it is doubtful whether the object introduced by way of ſimile relates to what goes before or to what follows. The ambiguity is removed by the following arrangement: "The miniſter who, like a little ſtatue placed on a mighty pedeſtal, grows leſs by his elevation, will always," &c.

Speaking of the ſuperſtitious practice of locking up the room where a perſon of diſtinction dies: "The knight, ſeeing his habitation reduced to ſo ſmall a compaſs, and himſelf in a manner ſhut out of his own houſe, *upon the death of his mother*, ordered all the apartments to be flung open, and exorciſed by his chaplain." *Spect.* Better thus: "The knight, ſeeing his habitation reduced to ſo ſmall a compaſs, and himſelf in a manner ſhut out of his own houſe, ordered, upon the death of his mother, all the apartments to be flung open."

Speaking of ſome indecencies in converſation: "As it is impoſſible for ſuch an irrational way of converſation to laſt long among a people that make any profeſſion of religion, or ſhow of modeſty, *if the country gentlemen get into it*, they will certainly be left in the lurch." *Ib.* The ambiguity vaniſhes in the following arrangement: "the country gentlemen, if they get into it, will certainly be left in the lurch."

"And ſince it is neceſſary that there ſhould be a perpetual intercourſe of buying and ſelling, and dealing upon credit, *where fraud is permitted or connived at, or hath no law to puniſh it*, the honeſt dealer is always undone, and the knave gets the advantage." *Swift.* Better thus: "And ſince it is neceſſary that there ſhould be a perpetual intercourſe of buying and ſelling, and dealing upon credit, the honeſt dealer, where fraud is permitted or connived at, or hath no law to puniſh it, is always undone, and the knave gets the advantage."

From theſe examples, the following obſervation will occur: That a circumſtance ought never to be placed between two capital members of a period; for by ſuch ſituation it muſt always be doubtful, ſo far as we gather from the arrangement, to which of the two members it belongs: where it is interjected, as it ought to be, between parts of the member to which it belongs, the ambiguity is removed, and the capital members are kept diſtinct, which is a great beauty in compoſition. In general, to preſerve members diſtinct that ſignify things diſtinguiſhed in the thought, the beſt method is, to place firſt in the conſequent member ſome word that cannot connect with what precedes it.

If it ſhall be thought that the objections here are too ſcrupulous, and that the defect of perſpicuity is eaſily ſupplied by accurate punctuation; the anſwer is, That punctuation may remove an ambiguity, but will never produce that peculiar beauty which is perceived when the ſenſe comes out clearly and diſtinctly by means of a happy arrangement. Such influence has this beauty, that, by a natural tranſition of perception, it is communicated to the very ſound of the words, ſo as in appearance to improve the muſic of the period. But as this curious ſubject comes in more properly elſewhere, it is ſufficient at preſent to appeal to experience, that a period, ſo arranged as to bring out the ſenſe clear, ſeems always more muſical than where the ſenſe is left in any degree doubtful.

The next rule is, That words expreſſing things connected in the thought, ought to be placed as near together as poſſible. This rule is derived immediately from human nature, prone in every inſtance to place together things in any manner connected: where things are arranged according to their connections, we have a ſenſe of order; otherwiſe we have a ſenſe of diſorder, as of things placed by chance: and we naturally place words in the ſame order in which we would place the things they ſignify. The bad effect of a violent ſeparation of words or members thus intimately connected, will appear from the following examples:

"For the Engliſh are naturally fanciful, and very often diſ-

poſed, by that gloomineſs and melancholy of temper which is ſo frequent in our nation, to many wild notions and viſions, to which others are not ſo liable." *Spect.* Here the verb or aſſertion is, by a pretty long circumſtance, violently ſeparated from the ſubject to which it refers: this makes a harſh arrangement; the leſs excuſable that the fault is eaſily prevented by placing the circumſtance before the verb, after the following manner: "For the Engliſh are naturally fanciful, and by that gloomineſs and melancholy of temper which is ſo frequent in our nation, are often diſpoſed to many wild notions," &c.

"From whence we may date likewiſe the rivalſhip of the houſe of France, for we may reckon that of Valois and that of Bourbon as one upon this occaſion, and the houſe of Auſtria, that continues at this day, and has oft coſt ſo much blood and ſo much treaſure in the courſe of it." *Bolingbr.*

"It cannot be impertinent or ridiculous therefore in ſuch a country, whatever it might be in the abbot of St. Real's, which was Savoy, I think; or in Peru, under the incas, where Garcilaſſo de la Vega ſays it was lawful for none but the nobility to ſtudy—for men of all degrees to inſtruct themſelves in thoſe affairs wherein they may be actors, or judgers of thoſe that act, or controllers of thoſe that judge." *Ibid.*

"If Scipio, who was naturally given to women, for which anecdote we have, if I miſtake not, the authority of Polybius, as well as ſome verſes of Nevius preſerved by Aulus Gellius, had been educated by Olympias at the court of Philip, it is improbable that he would have reſtored the beautiful Spaniard." *Ibid.*

If any one have a curioſity for more ſpecimens of this kind, they will be found without number in the works of the ſame author.

A pronoun, which ſaves the naming a perſon or thing a ſecond time, ought to be placed as near as poſſible to the name of that perſon or thing. This is a branch of the foregoing rule; and with the reaſon there given, another occurs, viz. That if other ideas intervene, it is difficult to recal the perſon or thing by reference.

"If I had leave to print the Latin letters tranſmitted to me from foreign parts, they would fill a volume, and be a full defence againſt all that Mr. Partridge, or his accomplices of the Portugal inquiſition, will be ever able to object; *who*, by the way, are the only enemies my predictions have ever met with at home or abroad." Better thus: "and be a full defence againſt all that can be objected by Mr. Partridge, or his accomplices of the Portugal inquiſition; who, by the way, are," &c.

"There being a round million of creatures in human figure throughout this kingdom, *whoſe* whole ſubſiſtence," &c. *Swift.* Better: "There being, throughout this kingdom, a round million of creatures in human figure, whoſe whole ſubſiſtence," &c.

The following rule depends on the communication of emotions to related objects; a principle in human nature that hath an extenſive operation: and we find this operation, even where the objects are not otherwiſe related than by juxtapoſition of the words that expreſs them. Hence, to elevate or depreſs an object, one method is, to join it in the expreſſion with another that is naturally high or low: witneſs the following ſpeech of Eumenes to the Roman ſenate:

"Cauſam veniendi ſibi Romam fuiſſe, præter cupiditatem viſendi *deos homineſque*, quorum beneficio in ea fortuna eſſet, ſupra quam ne optare quidem auderet, etiam ut coram moneret ſenatum ut Perſei conatus obviam iret." *Livy.* To join the Romans with the gods in the ſame enunciation, is an artful ſtroke of flattery, becauſe it tacitly puts them on a level.

On the other hand, the degrading or vilifying an object is done ſucceſsfully by ranking it with one that is really low: "I hope to have this entertainment in readineſs for the next winter; and doubt not but it will pleaſe more than the opera or puppet-ſhow." *Spect.*

"Manifold have been the judgments which Heaven from time to time, for the chaſtiſement of a ſinful people, has inflicted upon whole nations. For when the degeneracy becomes common, it is but juſt the puniſhment ſhould be general. Of this kind, in our own unfortunate country, was that deſtructive peſtilence, whoſe mortality was ſo fatal as to ſweep away, if Sir William Petty may be believed, five millions of Chriſtian ſouls, beſides women and Jews." *Arbuthnot.*

"Such alſo was that dreadful conflagration enſuing in this famous metropolis of London, which conſumed, according to the computation of Sir Samuel Moreland, 100,000 houſes, not to mention churches and ſtables." *Ibid.*

"But on condition it might paſs into a law, I would gladly exempt both lawyers of all ages, ſubaltern and field officers, young heirs, dancing-maſters, pick-pockets, and players."—*Swift.*

> Sooner let earth, air, ſea, to chaos fall,
> Men, monkeys, lap-dogs, parrots, periſh all.
>
> *Rape of the Lock.*

Circumſtances in a period reſemble ſmall ſtones in a building, employed to fill up vacuities among thoſe of a larger ſize. In the arrangement of a period, ſuch under parts crowded together make a poor figure; and never are graceful but when interſperſed among the capital parts.

"It is likewiſe urged, that there are, by computation, in this kingdom, above 10,000 parſons, whoſe revenues, added to thoſe of my lords the biſhops, would ſuffice to maintain," &c. *Swift.* Here two circumſtances, viz. *by computation*, and *in this kingdom*, are crowded together unneceſſarily. They make a better appearance ſeparated in the following manner: "It is likewiſe urged, that in this kingdom there are by computation above 10,000 parſons," &c.

If there be room for a choice, the ſooner a circumſtance is introduced, the better; becauſe circumſtances are proper for that coolneſs of mind, with which we begin a period as well as a volume: in the progreſs, the mind warms, and has a greater reliſh for matters of importance. When a circumſtance is placed at the beginning of the period, or near the beginning, the tranſition from it to the principal ſubject is agreeable: it is like aſcending, or going upward. On the other hand, to place it late in the period has a bad effect; for after being engaged in the principal ſubject, one is with reluctance brought down to give attention to a circumſtance. Hence evidently the preference of the following arrangement, "Whether in any country a choice altogether unexceptionable has been made, ſeems doubtful;" before this other, "Whether a choice altogether unexceptionable has in any country been made," &c.

For this reaſon the following period is exceptionable in point of arrangement: "I have conſidered formerly, with a good deal of attention, the ſubject upon which you command me to communicate my thoughts to you." *Boling.* Which, with a ſlight alteration, may be improved thus: "I have formerly, with a good deal of attention, conſidered the ſubject," &c.

Swift, ſpeaking of a virtuous and learned education: "And although they may be, and too often are, drawn by the temptations of youth, and the opportunities of a large fortune, into ſome irregularities, *when they come forward into the great world*; it is ever with reluctance and compunction of mind, becauſe their bias to virtue ſtill continues." Better: "And although, *when they come forward into the great world*, they may be, and too often," &c.

In arranging a period, it is of importance to determine in what part of it a word makes the greateſt figure, whether at the beginning, during the courſe, or at the cloſe. The breaking ſilence rouſes the attention, and prepares for a deep impreſſion at the beginning: the beginning, however, muſt yield to the cloſe; which being ſucceeded by a pauſe, affords time for a word to make its deepeſt impreſſion. Hence the following rule, That to give the utmoſt force to a period, it ought, if poſſible, to be cloſed with that word which makes the greateſt figure. The opportunity of a pauſe ſhould not be thrown away upon acceſſories, but reſerved for the principal object, in order that it may make a full impreſſion: which is an additional reaſon againſt cloſing a period without a circumſtance. There are, however, periods that admit not ſuch a ſtructure; and in that caſe the capital word ought, if poſſible, to be placed in the front, which next to the cloſe is the moſt advantageous for making an impreſſion. Hence, in directing our diſcourſe to a man of figure, we ought to begin with his name; and one will be ſenſible of a degradation when this rule is neglected, as it frequently is for the ſake of verſe. We give the following examples:

Integer vitæ, ſceleriſque purus,
Non eget Mauri jaculis, neque arcu,
Nec venenatis gravida ſagittis,
Fuſce, pharetra. *Horat. Carm. l. 1. ode 22.*

Je crains Dieu, cher Abner, et n'ai point d'autre crainte.

In theſe examples, the name of the perſon addreſſed to makes a mean figure, being like a circumſtance ſlipped into a corner. That this criticiſm is well founded, we need no other proof than Addiſon's tranſlation of the laſt example:

O Abner! I fear my God, and I fear none but him:
Guardian, N° 117.

O father, what intends thy hand, ſhe cry'd,
Againſt thy only ſon? What fury, O ſon,
Poſſeſſes thee to bend that mortal dart
Againſt thy father's head?
Paradiſe Loſt, book ii. *l.* 727.

Every one muſt be ſenſible of a dignity in the invocation at the beginning, which is not attained by that in the middle. It is not meant, however, to cenſure this paſſage: on the contrary, it appears beautiful, by diſtinguiſhing the reſpect that is due to a father from that which is due to a ſon.

The ſubſtance of what is ſaid in this and the foregoing ſection, upon the method of arranging words in a period, ſo as to make the deepeſt impreſſion with reſpect to ſound as well as ſignification, is comprehended in the following obſervation:—That order of words in a period will always be the moſt agreeable, where, without obſcuring the ſenſe, the moſt important images, the moſt ſonorous words, and the longeſt members, bring up the rear.

Hitherto of arranging ſingle words, ſingle members, and ſingle circumſtances. But the enumeration of many particulars in the ſame period is often neceſſary: and the queſtion is, In what order ſhould they be placed? And, firſt, with reſpect to the enumerating particulars of equal rank: As there is no cauſe for preferring any one before the reſt, it is indifferent to the mind in what order they be viewed; therefore it is indifferent in what order they be named. 2dly, If a number of objects of the ſame kind, differing only in ſize, are to be ranged along a ſtraight line, the moſt agreeable order to the eye is that of an increaſing ſeries: in ſurveying a number of ſuch objects, beginning at the leaſt, and proceeding to greater and greater, the mind ſwells gradually with the ſucceſſive objects, and in its progreſs has a very ſenſible pleaſure. Preciſely for the ſame reaſon, words expreſſive of ſuch objects ought to be placed in the ſame order. The beauty of this figure, which may be termed *a climax in ſenſe*, has eſcaped lord Bolingbroke in the firſt member of the following period: "Let but one great, brave, diſintereſted, active man ariſe, and he will be received, followed, and almoſt adored." The following arrangement has ſenſibly a better effect: "Let but one brave, great, active, diſintereſted man ariſe," &c. Whether the ſame rule ought to be followed in enumerating men of different ranks, ſeems doubtful: on the one hand, a number of perſons preſented to the eye in form of an increaſing ſeries, is undoubtedly the moſt agreeable order; on the other hand, in every liſt of names, we ſet the perſon of the greateſt dignity at the top, and deſcend gradually through his inferiors. Where the purpoſe is to honour the perſons named according to their rank, the latter ought to be followed; but every one who regards himſelf only, or his reader, will chooſe the former order. 3dly, As the ſenſe of order directs the eye to deſcend from the principal to its greateſt acceſſory, and from the whole to its greateſt part, and in the ſame order through all the parts and acceſſories, till we arrive at the minuteſt; the ſame order ought to be followed in the enumeration of ſuch particulars.

When force and livelineſs of expreſſion are demanded, the rule is, to ſuſpend the thought as long as poſſible, and to bring it out full and entire at the cloſe: which cannot be done but by inverting the natural arrangement. By introducing a word or member before its time, curioſity is raiſed about what is to follow; and it is agreeable to have our curioſity gratified at the cloſe of the period: the pleaſure we feel reſembles that of ſeeing a ſtroke exerted upon a body by the whole collected force of the agent. On the other hand, where a period is ſo conſtructed as to admit more than one complete cloſe in the ſenſe, the curioſity of the reader is exhauſted at the firſt cloſe, and what follows appears languid or ſuperfluous: his diſappointment contributes alſo to that appearance, when he finds, contrary to expectation, that the period is not yet finiſhed.—Cicero, and after him Quintilian, recommend the verb to the laſt place. This method evidently tends to ſuſpend the ſenſe till the cloſe of the period: for without the verb the ſenſe cannot be complete: and when the verb happens to be the capital word, which it frequently is, it ought at any rate to be the laſt, according to another rule above laid down. The following period is placed in its natural order: "Were inſtruction an eſſential circumſtance in epic poetry, I doubt whether a ſingle inſtance could be given of this ſpecies of compoſition in any language." The period thus arranged admits a full cloſe upon the word *compoſition*; after which it goes on languidly, and cloſes without force. This blemiſh will be avoided by the following arrangement: "Were inſtruction an eſſential circumſtance in epic poetry, I doubt whether, in any language, a ſingle inſtance could be given of this ſpecies of compoſition."

"Some of our moſt eminent divines have made uſe of this Platonic notion, as far as it regards the ſubſiſtence of our paſſions after death, with great beauty and ſtrength of reaſon." *Spect.*—Better thus: "Some of our moſt eminent divines have, with great beauty and ſtrength of reaſon, made uſe of this Platonic notion," &c.

"Men of the beſt ſenſe have been touched, more or leſs, with theſe groundleſs horrors and preſages of futurity, upon ſurveying the moſt indifferent works of nature." *Ib.* Better, "Upon ſurveying the moſt indifferent works of nature, men of the beſt ſenſe," &c.

"She ſoon informed him of the place he was in; which, notwithſtanding all its horrors, appeared to him more ſweet than the bower of Mahomet, in the company of his Balſora." *Guardian.*—Better, "She ſoon, &c. which appeared to him,

in the company of his Balſora, more ſweet than the bower of Mahomet."

None of the rules for the compoſition of periods are more liable to be abuſed than thoſe laſt mentioned; witneſs many Latin writers, among the moderns eſpecially, whoſe ſtyle, by inverſions too violent, is rendered harſh and obſcure. Suſpenſion of the thought till the cloſe of the period ought never to be preferred before perſpicuity. Neither ought ſuch ſuſpenſion to be attempted in a long period, becauſe in that caſe the mind is bewildered amidſt a profuſion of words: a traveller, while he is puzzled about the road, reliſhes not the fineſt proſpect: "All the rich preſents which Aſtyages had given him at parting, keeping only ſome Median horſes, in order to propagate the breed of them in Perſia, he diſtributed among his friends whom he left at the court of Ecbatana." *Trav. of Cyrus.*

III. *Beauties from a reſemblance between Sound and Signification.* There being frequently a ſtrong reſemblance of one ſound to another, it will not be ſurpriſing to find an articulate ſound reſembling one that is not articulate: thus the ſound of a bow-ſtring is imitated by the words that expreſs it:

——————The ſtring let fly,
Twang'd ſhort and ſharp, like the ſhrill ſwallow's cry.
Odyſſey, xxi. 449.

The ſound of felling trees in a wood:

Loud ſounds the ax, redoubling ſtrokes on ſtrokes,
On all ſides round the foreſt hurls her oaks
Headlong. Deep echoing groan the thickets brown,
Then *ruſtling, crackling, craſhing*, thunder down.
Iliad, xxiii. 144.

But when loud ſurges laſh the ſounding ſhore,
The hoarſe rough verſe ſhould like the torrent roar.
Pope's Eſſay on Criticiſm, 369.

Dire Scylla there a ſcene of horror forms,
And here Charybdis fills the deep with ſtorms:
When the tide ruſhes from her rumbling caves,
The rough rock roars; tumultuous boil the waves.
Pope.

No perſon can be at a loſs about the cauſe of this beauty; it is obviouſly that of imitation.

That there is any other natural reſemblance of ſound to ſignification, muſt not be taken for granted. There is no reſemblance of ſound to motion, nor of ſound to ſentiment. We are, however, apt to be deceived by artful pronunciation: the ſame paſſage may be pronounced in many different tones, elevated or humble, ſweet or harſh, briſk or melancholy, ſo as to accord with the thought or ſentiment: ſuch concord muſt be diſtinguiſhed from that concord between ſound and ſenſe which is perceived in ſome expreſſions independent of artful pronunciation; the latter is the poet's work, the former muſt be attributed to the reader. Another thing contributes ſtill more to the deceit: in language, ſound and ſenſe being intimately connected, the properties of the one are readily communicated to the other; for example, the quality of grandeur, of ſweetneſs, or of melancholy, though belonging to the thought ſolely, is tranſferred to the words, which by that means reſemble in appearance the thought that is expreſſed by them. That there may be a reſemblance of articulate ſounds to ſome that are not articulate, is ſelf-evident; and that in fact there exiſt ſuch reſemblances ſucceſsfully employed by writers of genius, is clear from the foregoing examples, and from many others that might be given. But we may ſafely pronounce, that this natural reſemblance can be carried no farther; the objects of the different ſenſes differ ſo widely from each other, as to exclude any reſemblance; ſound in particular, whether articulate or inarticulate, reſembles not in any degree taſte, ſmell, nor motion; and as little can it reſemble any internal ſentiment, feeling, or emotion. But muſt we then admit, that nothing but ſound can be imitated by ſound? Taking imitation in its proper ſenſe, as importing a reſemblance between two objects, the propoſition muſt be admitted: and yet in many paſſages that are not deſcriptive of ſound, every one muſt be ſenſible of a peculiar concord between the ſound of the words and their meaning. As there can be no doubt of the fact, what remains is to enquire into its cauſe.

Reſembling cauſes may produce effects that have no reſemblance; and cauſes that have no reſemblance may produce reſembling effects. A magnificent building, for example, reſembles not in any degree an heroic action; and yet the emotions they produce are concordant, and bear a reſemblance to each other. We are ſtill more ſenſible of this reſemblance in a ſong, when the muſic is properly adapted to the ſentiment: there is no reſemblance between the thought and ſound; but there is the ſtrongeſt reſemblance between the emotion raiſed by muſic tender and pathetic, and that raiſed by the complaint of an unſucceſsful lover. Applying this obſervation to the preſent ſubject, it appears, that, in ſome inſtances, the ſound even of a ſingle word makes an impreſſion reſembling that which is made by the thing it ſignifies: witneſs the word *running*, compoſed of two ſhort ſyllables; and more remarkably the words *rapidity, impetuoſity, precipitation.* Brutal manners produce in the ſpectator an emotion not unlike what is produced by a harſh and rough ſound; and hence the beauty of the figurative expreſſion, *rugged* manners. Again, the word *little*, being pronounced with a very ſmall aperture of the mouth, has a weak and faint ſound, which makes an impreſſion reſembling that made by a diminutive object. This reſemblance of effects is ſtill more remarkable where a number of words are connected in a period: words pronounced in ſucceſſion make often a ſtrong impreſſion; and when this impreſſion happens to accord with that made by the ſenſe, we are ſenſible of a complex emotion, peculiarly pleaſant; one proceeding from the ſentiment, and one from the melody or ſound of the words. But the chief pleaſure proceeds from having theſe two concordant emotions combined in perfect harmony, and carried on in the mind to a full cloſe. Except in the ſingle caſe where ſound is deſcribed, all the examples given by critics of ſenſe being imitated in ſound, reſolve into a reſemblance of effects: emotions raiſed by ſound and ſignification may have a reſemblance; but ſound itſelf cannot have a reſemblance to any thing but ſound.

Proceeding now to particulars, and beginning with thoſe caſes where the emotions have the ſtrongeſt reſemblance, we obſerve, firſt, That by a number of ſyllables in ſucceſſion, an emotion is ſometimes raiſed, extremely ſimilar to that raiſed by ſucceſſive motion; which may be evident even to thoſe who are defective in taſte, from the following fact, that the term *movement* in all languages is equally applied to both. In this manner, ſucceſſive motion, ſuch as walking, running, galloping, can be imitated by a ſucceſſion of long or ſhort ſyllables, or by a due mixture of both: for example, ſlow motion may be juſtly imitated in a verſe where long ſyllables prevail; eſpecially when aided by a ſlow pronunciation:

Illi inter ſeſe magna vi brachia tollunt. *Georg.* iv. 174.

On the other hand, ſwift motion is imitated by a ſucceſſion of ſhort ſyllables:

Quadrupedante putrem ſonitu quatit ungula campum.

Again:

Radit iter liquidum, celeres neque commovet alas.

Thirdly, A line compoſed of monoſyllables makes an impreſſion by the frequency of its pauſes, ſimilar to what is made by laborious interrupted motion:

With many a weary ſtep, and many a groan,
Up the high hill he heaves a huge round ſtone.
Odyſſey, xi. 736.

Firſt march the heavy mules ſecurely ſlow;
O'er hills, o'er dales, o'er crags, o'er rocks they go.
Iliad, xxiii. 138.

Fourthly, The impreſſion made by rough ſounds in ſucceſſion, reſembles that made by rough or tumultuous motion: on the other hand, the impreſſion of ſmooth ſounds reſembles that of gentle motion. The following is an example of both:

Two craggy rocks projecting to the main,
The roaring wind's tempeſtuous rage reſtrain;
Within, the waves in ſofter murmurs glide,
And ſhips ſecure without their haulſers ride.
Odyſſey, iii. 118.

Another example of the latter:

Soft is the ſtrain when Zephyr gently blows,
And the ſmooth ſtream in ſmoother numbers flows.
Eſſay on Criticiſm, 366.

Fifthly, Prolonged motion is expreſſed in an Alexandrine line. The firſt example ſhall be of a ſlow motion prolonged:

A needleſs Alexandrine ends the ſong,
That, like a wounded ſnake, drags its ſlow length along.
Ib. 356.

The next example is of forcible motion prolonged:

The waves behind impel the waves before,
Wide-rolling, foaming high, and tumbling to the ſhore.
Iliad, xiii. 1004.

The laſt ſhall be of rapid motion prolonged:

Not ſo when ſwift Camilla ſcours the plain,
Flies o'er the unbending corn, and ſkims along the main.
Eſſay on Criticiſm, 373.

Again, ſpeaking of a rock torn from the brow of a mountain:

Still gathering force, it ſmokes, and, urg'd amain,
Whirls, leaps, and thunders down impetuous to the plain.
Iliad, xiii. 197.

Sixthly, A period conſiſting moſtly of long ſyllables, that is, of ſyllables pronounced ſlow, produceth an emotion reſembling faintly that which is produced by gravity and ſolemnity. Hence the beauty of the following verſe:

Olli ſedato reſpondet corde Latinus.

It reſembles equally an object that is inſipid and unintereſting.

Tædet quotidianarum harum formarum.
Terence.

Seventhly, A ſlow ſucceſſion of ideas is a circumſtance that belongs equally to ſettled melancholy, and to a period compoſed of polyſyllables pronounced ſlow; and hence, by ſimilarity of emotions, the latter is imitative of the former:

In theſe deep ſolitudes, and awful cells,
Where heav'nly-penſive contemplation dwells,
And ever-muſing melancholy reigns.
Pope, Eloiſa to Abelard.

Eighthly, A long ſyllable made ſhort, or a ſhort ſyllable made long, raiſes, by the difficulty of pronouncing contrary to cuſtom, a feeling ſimilar to that of hard labour:

When Ajax ſtrives ſome rock's *vaſt* weight to throw,
The line too labours, and the words move ſlow.
Eſſay on Criticiſm, 370.

Ninthly, Harſh or rough words pronounced with difficulty, excite a feeling ſimilar to that which proceeds from the labour of thought to a dull writer:

Juſt writes to make his barrenneſs appear,
And ſtrains from hard-bound brains eight lines a-year.
Pope's Epiſtle to Dr. Arbuthnot, l. 181.

We ſhall cloſe with one example more, which of all makes the fineſt figure. In the firſt ſection mention is made of a climax in ſound; and in the ſecond of a climax in ſenſe. It belongs to the preſent ſubject to obſerve, that when theſe coincide in the ſame paſſage, the concordance of ſound and ſenſe is delightful: the reader is conſcious of pleaſure not only from the two climaxes ſeparately, but of an additional pleaſure from their concordance, and from finding the ſenſe ſo juſtly imitated by the ſound. In this reſpect, no periods are more perfect than thoſe borrowed from Cicero in the firſt ſection.

The concord between ſenſe and ſound is not leſs agreeable in what may be termed an *anticlimax*, where the progreſs is from great to little; for this has the effect to make diminutive objects appear ſtill more diminutive. Horace affords a ſtriking example:

Parturiunt montes, naſcetur ridiculus mus.

The arrangement here is ſingularly artful: the firſt place is occupied by the verb, which is the capital word by its ſenſe as well as ſound: the cloſe is reſerved for the word that is the meaneſt in ſenſe as well as in ſound: and it muſt not be overlooked, that the reſembling ſounds of the two laſt ſyllables give a ludicrous air to the whole.

In this article we have mentioned none of the beauties of language but what ariſe from words taken in their proper ſenſe. Beauties that depend on the metaphorical and figurative power of words, are treated under the ſeparate articles of FIGURES, PERSONIFICATION, APOSTROPHE, HYPERBOLE, METAPHOR, &c. See alſo ORATORY.

Purity of LANGUAGE. Both the Greeks and Romans were particularly careful of preſerving the purity of their language. It ſeems amongſt the Romans to have been a point which they thought worthy the attention of the ſtate itſelf; for we find the Cumeans not daring to make uſe of the Latin language in their public acts without having firſt obtained leave in form. Tiberius himſelf would not hazard the word *monopolium* in the ſenate without making an excuſe for employing a foreign term. Seneca gives it as a certain maxim, that wherever a general falſe taſte in ſtyle and expreſſion prevails, it is an infallible ſign of a corruption of manners in that people: A liberty of introducing obſolete words, or forming new ones, is a mark, he thinks, of an equal licentiouſneſs of the moral kind. Accordingly it is obſerved, there are ſcarce more than eight or ten inſtances of new words to be produced from the moſt approved Roman writers, in the courſe of two or three centuries. If this mode of reaſoning concerning the morals of the ſtate was introduced and applied in our own country, no nation on the face of the earth could appear more abandoned; for no nation is more fond of adopting new words, though our language is ſufficiently copious. This delicacy of Seneca appears to be carried a little too far, and his manner of eſtimating the morals of the people muſt be a little fallacious. The Greeks were very remarkable for their diſcernment of provincialiſms, eſpecially

the Athenians, whoſe dialect was inconceivably ſweet and elegant.

LANGUED, in heraldry, expreſſes ſuch animals whoſe tongue, appearing out of the mouth, is borne of a different colour from the reſt of the body.

LANGUEDOC, a late province of France, bounded on the north by Querci, Rouergue, Auvergne, and Lyonois; on the eaſt by Dauphiny and Provence; on the weſt by Gaſcony; and on the ſouth by the Mediterranean and Rouſſillon. It is 225 miles in length, and 100 where broadeſt. It now forms the departments of Aude, Gard, Upper Garonne, and Herault.

LANGUET (Hubert), born at Viteaux in Burgundy in 1518, gained great reputation by his learning and virtue in the 16th century. Having read one of Melancthon's books at Bologna, he conceived ſo high an eſteem for the author, that he went to Wirtemberg purpoſely to viſit him; he arrived there in 1549, when he contracted a ſtrict friendſhip with Melancthon, and embraced the Proteſtant religion. In 1565 he was one of the firſt counſellors of Auguſtus elector of Saxony, who employed him in ſeveral important affairs and negotiations. He was afterwards admitted to the confidence of William prince of Orange; and died at Antwerp, on the 30th of September 1581. We have many of his letters written in Latin to ſir Philip Sydney, to Camerarius the father and ſon, and to Auguſtus elector of Saxony, which have been ſeveral times reprinted, in three volumes; and there is alſo attributed to him a famous treatiſe, entitled, *Vindiciæ contra Tyrannos*, and other works. His life is written by Philibert de la Mare.

Languet (John Baptiſt Joſeph), the celebrated vicar of St. Sulpice at Paris, and a doctor of the Sorbonne, was born at Dijon in 16-5. He was received into the Sorbonne in 1698; and attached himſelf to the community of St. Sulpice, to which pariſh he was of great ſervice. M. de la Chetardie the vicar, conſcious of his talents, choſe him for his curate, in which capacity he officiated near 10 years; and in 1714 ſucceeded to the vicarage. His pariſh-church being ſmall and out of repair, he conceived the deſign of building a church ſuitable to the ſize of his pariſh, which he began with the ſum of 100 crowns, but ſoon obtained conſiderable donations; and the duke of Orleans, regent of the kingdom, granted him a lottery, and laid the firſt ſtone of the porch in 1718. It was conſecrated in 1745, after M. Languet had ſpared neither labour nor expence to render it one of the fineſt churches in the world both for architecture and ornament. Another work which did him no leſs honour was the *Maiſon de l'enfant Jeſus*. This eſtabliſhment conſiſted of two parts; the firſt compoſed of about 35 poor ladies of good families, and the ſecond of more than 400 poor women and children of town and country. The order and economy in this houſe, for the education and employment of ſo many perſons, gave cardinal Fleury ſo high an idea of the vicar of St. Sulpice, that he propoſed to make him ſuperintendant-general of all the hoſpitals in the kingdom; which, however, was declined. Never man took more pains than he did to procure charitable donations and legacies, which he diſtributed with admirable diſcretion: he is ſaid from good authority to have diſburſed near a million of livres to the poor annually. When there was a general dearth in 1725, he ſold, in order to relieve the poor, his houſehold goods, pictures, and ſome curious pieces of furniture that he had procured with difficulty; and when the plague raged at Marſeilles, he ſent large ſums into Provence for the relief of the diſtreſſed. M. Languet was not only ſingular in this warm, diſintereſted, benevolent conduct, but alſo in another circumſtance equally rare; and this was in the refuſal of ſeveral biſhopries that were offered him: he reſigned even his vicarage in 1748; but continued to preach every Sunday at his own pariſh-church, and to ſupport the *Maiſon de l'enfant Jeſus*, to his death, which happened in 1750. It is obſerved, that his piety and charity did not proceed from poverty of talents; for he was ſenſible and lively in converſation, and his genius often diſcovered itſelf in his agreeable repartees.

LANGUOR, among phyſicians, ſignifies great weakneſs and loſs of ſtrength, attended with a dejection of mind; ſo that the patients can ſcarce walk or even ſtand upright, but are apt to faint away.

LANHAM. See Lavenham.

LANIARD (from *lanier*, Fr.), a ſhort piece of cord or line faſtened to ſeveral machines in a ſhip, and ſerving to ſecure them in a particular place, or to manage them more conveniently. Such are the laniards of the gun-ports, the laniard of the buoy, the laniard of the cat-hook, &c.—The principal laniards uſed in a ſhip, however, are thoſe employed to extend the ſhrouds and ſtays of the maſts by their communication with the dead-eyes, ſo as to form a ſort of mechanical power reſembling that of a tackle.—Theſe laniards are fixed in the dead-eyes as follows: one end of the laniard is thruſt through one of the holes of the upper dead-eye, and then knotted, to prevent it from drawing out: the other is then paſſed through one of the holes in the lower dead-eye, whence returning upward, it is inſerted through the ſecond hole in the upper dead-eye, and next through the ſecond in the lower dead-eye, and finally through the third holes in both dead-eyes. The end of the laniard being then directed upwards from the loweſt dead-eye, is ſtretched as ſtiff as poſſible by the application of tackles; and that the ſeveral parts of it may ſlide with more facility through the holes in the dead-eyes, it is well ſmeared with hog's-lard or tallow, ſo that the ſtrain is immediately communicated to all the turns at once.

LANIGEROUS, an appellation given to whatever bears wool.

LANISTA, in antiquity, is ſometimes uſed to ſignify an executioner; but more frequently for a maſter-gladiator, who taught the uſe of arms, and had always people under them ready to exhibit ſhows of that kind. For this purpoſe, they either purchaſed gladiators, or educated children, that had been expoſed, in that art.

LANIUS, the Shrike, or *Butcher-bird*, in ornithology; a genus belonging to the order of accipitres, the characters of which are theſe: The beak is ſomewhat ſtraight, with a tooth on each ſide towards the apex, and naked at the baſe; and the tongue is lacerated. See Plate 25. Vol. IV.

1. The *excubitor*, great cinereous ſhrike, or greater butcher-bird, is in length 10 inches. The plumage on the upper parts is of a pale aſh-colour; the under, white: through the eyes there is a black ſtripe: the ſcapulars are white: the baſe of the greater quills is white, the reſt black: the tail is ſomewhat cuneiform; the two middle feathers are black; the outmoſt on each ſide, white; thoſe between are black, with the ends more or leſs white: the legs are black. Its bill is black, one inch long, and hooked at the end; the upper mandible furniſhed with a ſharp proceſs: the noſtrils are oval, covered with black briſtles pointing downwards: the muſcles that move the bill are very thick and ſtrong; which makes the head very large. This apparatus is quite requiſite in a ſpecies whoſe method of killing its prey is ſo ſingular, and whoſe manner of devouring it is not leſs extraordinary: ſmall birds it will ſeize by the throat, and ſtrangle; which probably is the reaſon the Germans alſo call this bird *wurchangl*, or, "the ſuffocating angel." It feeds on ſmall birds, young neſtlings, beetles, and caterpillars. When it has killed the prey, it fixes them on ſome thorn, and when thus ſpitted pulls them to pieces with its bill: on this account the Germans call it *thorntraer* and *thornfreker*. When confined in a cage, they will often treat their food in much the ſame manner, ſticking it againſt the

wires before they devour it.—This bird inhabits many parts of Europe and North America. The female makes its neſt with heath and moſs, lining it with wool and goſſamer; and lays ſix eggs, about as big as thoſe of a thruſh, of a dull olive-green, ſpotted at the thickeſt end with black. In ſpring and ſummer it imitates the voices of other birds, by way of decoying them within reach, that it may deſtroy them; but beyond this, the natural note is the ſame throughout all ſeaſons. If a trap-fall be baited with a living ſmall bird, it proves a decoy, by which it may be taken in winter. It is obſerved to be mute when kept in a cage, though ſeemingly content.—In countries where they are plenty, the huſbandmen value them, on ſuppoſition of their deſtroying rats, mice, and other vermin. They are ſuppoſed to live five or ſix years: and are often trained up for catching ſmall birds in Ruſſia. In Carniola they are migratory, coming in May and departing in September; which is the caſe alſo in reſpect to the few which are met with in England.

2. The *collurio*, or leſſer butcher-bird, is ſeven inches and a half in length. The irides are hazel: the bill reſembles that of the preceding ſpecies; the head and lower part of the back are of a fine light grey: acroſs the eyes from the bill runs a broad black ſtroke: the upper part of the back, and coverts of the wings, are of a bright ferruginous colour; the breaſt, belly, and ſides, are of an elegant bloſſom-colour: the two middle feathers of the tail are longeſt, and entirely black; the lower part of the others white, and the exterior webs of the outmoſt feather on each ſide wholly ſo. In the female, the ſtroke acroſs the eyes is of a reddiſh brown; the head of a dull ruſt colour mixed with grey: the breaſt, belly, and ſides, are of a dirty white, marked with ſemicircular duſky lines: the tail is of a deep brown; the outward feather on each ſide excepted, whoſe exterior webs are white. It is rather larger than the male. This bird is much more common than the former ſpecies. Mr. Latham ſuſpects its being a bird of paſſage, never having ſeen it in winter. It lays ſix white eggs marked with a rufous brown circle towards the large end. The neſt is generally in a hedge or low buſh; near which, it is ſaid, no ſmall bird chooſes to build: for it not only feeds on inſects, but alſo on the young of other birds in the neſt, taking hold of them by the neck, and ſtrangling them, beginning to eat them firſt at the brain and eyes. It is fonder of graſshoppers and beetles than of other inſects, which it eats by morſels, and, when ſatisfied, ſticks the remainder on a thorn: when kept in a cage, it does the ſame againſt the wires of it, like the former ſpecies. It is called in the German language by a name ſignifying "great head," or "bull head," from the ſize of that part. It will alſo feed on ſheep's kidneys, if in a cage, eating a whole one every day. Like the cinereous ſhrike, it only mocks the notes of other birds, having none of its own: and this merely, like that, to decoy. It is ſaid to be in this imitative art an adept: if money is counted over at midnight in the place where one of theſe is kept, ſo as to make a jingling noiſe, it begins to imitate the ſame ſound. When ſitting on the neſt, the female is ſoon diſcovered; for, on the approach of any one, ſhe ſets up an horrible outcry.

3. The *cæruleſcens*, or fork-tailed Indian butcher-bird of Edwards, is in length about ſeven inches and a half: the bill is blackiſh brown, and bent; the upper mandible beſet with black hairs turning forwards: the plumage on the upper parts of the body is a fine black, with a gloſs of blue and in ſome lights green; the under parts are white: the greater quills and tail are of a ferruginous black: the tail is pretty much forked, and the outer feather ſpotted with dirty white. It inhabits Bengal, where it is called *ſingab*. It is called alſo by the Indians the *king of the crows*, from its purſuing theſe birds from place to place with a great noiſe, and pecking them on the back till they eſcape.

4. The *Antiguan* ſhrike (or *Pie-griеſche d'Antigue* of Sonnerat) is about the ſize of a lark. Its bill is large and black; the upper mandible very long, and the curvature ſo exceſſive that one would rather take it for a monſtroſity than common to any one ſpecies: the irides are duſky: the head is black; the back of a yellowiſh rufous colour: the throat and breaſt are white; the quills, and baſtard wing coverts, black; and the wings reach only to the beginning of the tail, which is very long and wedge-ſhaped: the two middle feathers are wholly black: the legs are duſky black. It inhabits Panay, one of the Philippine iſlands, but principally about Antigue, one of the provinces thereof.

5. The *jocoſus*, or jocoſe ſhrike, is in length ſeven inches and a half. The bill is blackiſh, rather ſtraighter than in moſt of the genus, and furniſhed only with a very fine notch near the tip: the crown of the head is black, except ſome long brown feathers, which form a kind of creſt: the ſides of the head, throat, and fore part of the neck, are white: from each corner of the mouth there is a black line, continued backwards; and under each eye is a ſmall ſpot of lively red: the upper parts of the body are brown; the under parts dirty white; the vent, roſe-colour: on the lower part of the neck and breaſt there is a kind of a brown band: the quills are brown; the tail is greatly wedge-ſhaped, and in colour brown, except the four outer feathers on each ſide, which have white tips: the legs and claws are black. This is a Chineſe bird, and called in thoſe parts by the name of *kowkai-kon*. It feeds upon rice and inſects, particularly cockroaches.

6. The *infauſtus*, or rock-ſhrike, is in length ſeven inches and three quarters. The bill is about an inch long, and blackiſh: the head and neck are of a dark aſh-colour, marked with ſmall rufous ſpots: the upper part of the back is a dark brown; the lower much paler, inclining to aſh, eſpecially towards the tail: the quills and wing-coverts are duſky, with pale margins: the breaſt, and under parts of the body, are orange, marked with ſmall ſpots, ſome white and others brown: the tail is three inches in length; the two middle feathers are brown, the others rufous: the legs are blackiſh; the wings and tail are even. This is the deſcription of the female. The male is ſaid to differ very little, except in being of a brighter colour.—This ſpecies is met with in many parts of Europe, from Italy on the one hand, to Ruſſia on the other; and is found in ſome parts of Germany, the Alpine mountains, thoſe of Tyrol, and ſuch-like places. The manners of this bird ſeem diſputed. Buffon ſays that it perches on a high ſtone, and, as ſoon as a marksman appears with his gun, removes to a greater diſtance, and ſo on as often as he approaches; which renders this ſpecies difficult to come at. Brunnich and Linnæus, on the contrary, ſay that it is a bold bird, attending the traveller while at his meal, on purpoſe to feed on his ſcraps. It has an agreeable note of its own, approaching to that of the hedge-ſparrow, and will alſo learn to imitate that of others. It makes the neſt among the holes of the rocks, &c. hiding it with great art; and lays three or four eggs, feeding the young with worms and inſects, on which it alſo feeds itſelf. It may be taken young from the neſt, and brought up as the nightingale.

7. The *fauſtus*, or white-wreathed ſhrike, is about the ſize of a common thruſh. Its bill is pale: the upper parts of the body are grey; the under ferruginous: from the eyes to the hind head there paſſes a whitiſh line, compoſed of numerous white feathers, rendering it truly characteriſtic: the wings are rounded; the quills browniſh, with grey edges, which are croſſed with numerous ſlender brown lines: the tail

is rounded, brown, and croſſed with numerous bars of darker brown: the legs are pale. This elegant ſpecies inhabits China, where it is known by the name of *whommaj*. It may be obſerved, among others, in Chineſe paper-hangings, where the white line ſeems to encompaſs the back part of the head like a wreath.

8. The *Dominican* ſhrike (or *Pie-griefche Dominiquaine* of Sonnerat) is bigger than a ſparrow, and rather longer. The bill is greyiſh, conical, and ſtrong; the baſe beſet with briſtles, pointing forwards: the head, neck, breaſt, back, wings, and tail, are black; the belly and rump white: the wings reach near an inch beyond the middle of the tail: the thighs are black. It inhabits the Philippine iſlands, and is a bold courageous bird: it flies very quick, and with great rapidity; frequently hovering in the air like a ſwallow. It is a great enemy to the raven; to whom, though much bigger, he bids defiance, and even provokes him to combat: the battle often laſts half an hour, and ends with the retreat of the raven; rather, perhaps, from being teaſed out than much injured by the little enemy.

9. The *nengeta (Guirarou*, Buff.) is in length nine or ten inches. Its bill is duſky, and beſet with briſtles at the baſe: the irides are ſapphire-coloured; and from the angles of the mouth, through the eyes, there runs a black ſtreak: the upper parts of the body are of a dark browniſh aſh-colour; the under parts cinereous white: in the middle of the wing are a few white feathers: the quills and tail are nearly black; and all the feathers of the laſt, except the two middle ones, are obliquely tipped with white: the legs are of a dark aſh-colour; the claws black.—Theſe birds are found at Surinam and Braſil. They are common likewiſe at Guiana, where they frequent watery places, and are found in great numbers together. They are obſerved, at frequent intervals, to ſet up a great cry all together; which affords a happy and certain preſage to the thirſty traveller, in the immenſe foreſts of Guiana, of water being at hand.

10. The *tyrannus*, or tyrant ſhrike, is about the ſize of a thruſh. Its bill is a blackiſh brown, beſet with briſtles at the baſe: the irides are brown: the upper parts of the plumage grey brown; the under white: the breaſt inclines to aſh-colour: the head is blackiſh on the upper part: the baſe of the feathers on that part in the male is orange, but ſeldom viſible except it erects the feathers, when there appears a ſtreak of orange down the middle of the crown: the tail is brown, marginated with ruſous: the legs and claws are black brown. The female ſcarcely differs, except in the head; the baſe of the crown feathers being yellow inſtead of orange: the colours are not quite ſo deep, and it is a trifle leſs in ſize. It inhabits Virginia.—There is a variety which inhabits St. Domingo and Jamaica. Theſe birds are called *titiri*, *pipiri*, or *quiquiri*, from their cry, which reſembles thoſe words. The firſt is called the *black-headed*, or *great lilled pipiri*; the ſecond, the *yellow-headed pipiri*, or *pipiri of paſſage*. The firſt, though in plenty, are ſeldom ſeen but in pairs; the ſecond in great troops, about the month of Auguſt, when they are very fat, and killed in great numbers for the table, as their fleſh is accounted good eating.—All authors agree in the manners of theſe birds, which are ferocious to a great degree while the hen is ſitting: no bird whatever dare approach their neſt: they will attack the firſt which comes near, without reſerve, and uſually come off conquerors. From hence by ſome they are called *king-birds*.

The *Carolina tyrant* of Cateſby is little, if at all, different from the preceding in regard to ſpecific character. But he ſays that it makes its neſt rather expoſed, on trees and buſhes, frequently on the ſaſſafras; whereas the pipiris make uſe of the hole of a tree, for the ſake of concealing it. In Carolina it is a bird of paſſage, coming in ſpring, and making one neſt in a year, which is commonly in June, and, after bringing up its young, retires in autumn. Theſe birds frequent alſo the red cedars; are ſeldom found in woods, but often in hedge rows and fences of fields, and for the moſt part within 200 yards of each other. They do not moleſt their own ſpecies; but the moment either crow, or even eagle, appears, all within reach join forces, and begin the attack in all parts of his body at once, never deſiſting till they have driven him to a great diſtance.

11. The *albus*, or white Panayan ſhrike, is about double the ſize of a lark. Its bill is black: the head, neck, back, belly, and ſhoulders, are white; the reſt of the wings and tail black; and acroſs the greater quills there is a white band: the legs are black. It inhabits the iſle of Panay.

There are above 40 other ſpecies of this genus, beſides many varieties.

LANNER or LANNAR. See FALCO.

LANSQUINET, the name of a game at cards, of French origin. It may be played at by any indiſcriminate number of people, though a ſingle pack of cards is uſed during the deal. The dealer, who poſſeſſes an advantage, ſhuffles the cards, and, after they have been cut by another of the party, deals out two cards on his left hand, turning them up, then one for himſelf, and a fourth that he places on the table for the company, which is called the *rejouiſſance*. On this card any, or all the company, the dealer excepted, may put their money, which the dealer is compelled to anſwer. The dealer continues turning the cards upwards, one by one, till two of a ſort come up, that is to ſay, two aces, two deuces, &c. which, to prevent miſtakes, or their being conſidered as ſingle cards, he places on each ſide of his own card; and as often as two, three, or the fourth ſort of a card come up, he invariably places them, as before mentioned, on each ſide of his own card. The company has a right to take and put money upon any ſingle card, unleſs the dealer's card ſhould happen to be double, which is often the caſe, by his card being the ſame as one of the two hand-cards, which he firſt dealt out on his left hand: thus he continues dealing till he brings either their cards or his own. Whilſt the dealer's own card remains undrawn, he wins; and whichever card is turned up firſt, loſes. If he deals out the two cards on his left hand, which are ſtyled the *hand-cards*, before his own, he is entitled to deal again. This advantage amounts to no more than his being exempted from loſing, when he turns up a ſimilar card to his own, immediately after he has turned up one for himſelf.

Lanſquinet is often played without the *rejouiſſance*, the dealer giving every one of the party a card to put their money upon. It is alſo often played by dealing only two cards, one for the company and the other for the dealer.

It ſhould likewiſe be obſerved, that a limitation is generally fixed for the ſum to be placed upon any card or number of cards, either in gold or ſilver, beyond which the dealer is not obliged to anſwer.

LANTANA, or INDIAN SAGE, in botany: a genus of the angioſpermia order, belonging to the didynamia claſs of plants; and in the natural method ranking under the 40th order, *Perſonatæ*. The calyx is indiſtinctly quadridentated; the ſtigma as it were broken and turned back like a hoof; the fruit is a plum with a bilocular kernel. There are ſeveral ſpecies, conſiſting of ſhrubby exotics from Africa and America for the green-houſe or ſtove; growing to the height of a yard or two, and adorned with oblong, oval, and roundiſh ſimple leaves, with monopetalous, tubular, four-parted flowers of different colours. They may be propagated either by ſeeds

or cuttings.—The camara, or wild ſage, is remarkable for the beauty of its flowers; which are yellow, tinged with red. The involucrata, or ſea-ſide ſage, has ſmall aſh-coloured leaves and a moſt agreeable ſmell. They are both natives of the Weſt Indies, the former growing wild among the buſhes, and the latter being found near the ſea. Their leaves, particularly thoſe of the ſea-ſide ſage, are uſed by the black people in teas, for colds and complaints of the ſtomach.—There are ſeven other ſpecies.

LANTERN, or LANTHORN, a contrivance to carry a candle in; being a kind of cover uſually made of tin, with faſhes of ſome tranſparent matter, as glaſs, horn, &c. to tranſmit the light.

Dark LANTERN, one with only one opening, which may alſo be cloſed up when the light is to be entirely hid, or opened when there is occaſion for the aſſiſtance of the light to diſcover ſome object.

Magic LANTERN, an optic machine, whereby little painted images are repreſented ſo much magnified, as to be accounted the effect of magic by the ignorant. See DIOPTRICS.

LANTERN, in architecture, a little dome raiſed over the roof of a building to give light, and ſerve as a crowning to the fabric. The term *lantern* is alſo uſed for a ſquare cage of carpentry, placed over the ridge of a corridor or gallery, between two rows of ſhops, to illumine them, like that of the Royal-exchange, London.

LANTERN, on ſhip-board, a well-known machine, of which there are many in a ſhip, particularly for the purpoſe of directing the courſe of other ſhips in a fleet or convoy: ſuch are the poop and top lanterns, &c.

Feaſt of LANTERNS, in China, is a celebrated feaſt held on the 15th day of the firſt month; ſo called from the infinite number of lanterns hung out of the houſes and ſtreets; which, it is ſaid, is no leſs than two hundred millions. On this day are expoſed lanterns of all prices, whereof ſome are ſaid to coſt 2000 crowns. Some of their grandees retrench ſomewhat every day out of their table, out of their dreſs, equipage, &c. to appear the more magnificent in lanterns. They are adorned with gilding, ſculpture, painting, japanning, &c. And as to their ſize, it is extravagant; ſome being from 25 to 30 feet diameter: they repreſent halls and chambers, and two or three ſuch machines together would make handſome houſes; ſo that in China they are able to eat, lodge, receive viſits, have balls, and act plays in a lantern. To illumine them, they ſhould have bonfires; but as that would be inconvenient, they content themſelves with lighting up in them an infinite number of torches or lamps, which at a diſtance have a beautiful effect. In theſe they exhibit various kinds of ſhows, to divert the people. Beſides theſe enormous lanterns, there is a multitude of others ſmaller, which uſually conſiſt of ſix faces or lights, each about four feet high, and one and a half broad, framed in wood finely gilt and adorned; over theſe they ſtretch a fine tranſparent ſilk, curiouſly painted with flowers, trees, and ſometimes human figures: the painting is very extraordinary, and the colours extremely bright; and when the torches are lighted, they appear highly beautiful and ſurpriſing.

LANTERN-*Fly*, in natural hiſtory. See FULGORA.

LANUGO, the ſoft down of plants, like that growing on the fruit of the peach-tree. See HAIR.

LAOCOON (fab. hiſt.), a ſon of Priam and Hecuba, or, according to others, of Antenor or of Capys. As being prieſt of Apollo, he was commiſſioned by the Trojans to offer a bullock to Neptune to render him propitious. During the ſacrifice two enormous ſerpents iſſued from the ſea, and attacked Laocoon's two ſons who ſtood next to the altar. The father immediately attempted to defend his ſons; but the ſerpents falling upon him ſqueezed him in their complicated writhes, and he died in the greateſt agonies. This puniſhment was ſaid to have been inflicted upon him for diſſuading the Trojans to bring into the city the fatal wooden horſe which the Greeks had conſecrated to Minerva, as alſo for his impiety in hurling a javelin againſt the ſides of the horſe as it entered within the walls. According to Hyginus, he ſuffered the above puniſhment for his marriage againſt the conſent of Apollo, or, according to others, for his polluting the temple, by his commerce with his wife Antiope, before the ſtatue of the god.

LAOCOON, in the hiſtory of the arts, is a celebrated monument of Greek ſculpture, executed in marble by Polydorus, Athenodorus, and Ageſander, the three famous artiſts of Rhodes. This remain of antiquity was found at Rome in the ruins of the palace of Titus, in the beginning of the ſixteenth century, under the pontificate of Julius II. and ſince depoſited in the Farneſe palace. Laocoon, the prieſt of Apollo and Neptune, is here repreſented with his two ſons, with two hideous ſerpents clinging round his body, gnawing it, and injecting their poiſon. Virgil has given us the following deſcription of the fact:

Serpens amplexus uterque
Implicat, & miſeros morſu depaſcitur artus:
Corripiunt, ſpiriſque ligant ingentibus: & jam
Bis medium amplexi, bis collo ſquamea circum
Terga dati, ſuperant capite & cervicibus altis.

This ſtatue exhibits the moſt aſtoniſhing dignity and tranquillity of mind in the midſt of the moſt excruciating torments: Pliny (lib. xxxvi. c. 5.) ſays of it, that it is *opus omnibus picturæ & ſtatuariæ artis præferendum.*

The Laocoon, Dr. Gillies obſerves in his *Hiſt. of Greece*, vol. ii. p. 177, may be regarded as the triumph of Grecian ſculpture; ſince bodily pain, the groſſeſt and moſt ungovernable of all our paſſions, and that pain united with anguiſh and torture of mind, are yet expreſſed with ſuch propriety and dignity, as afford leſſons of fortitude ſuperior to any taught in the ſchools of philoſophy. The horrible ſhriek which Virgil's Laocoon emits is a proper circumſtance for poetry, which ſpeaks to the fancy by images and ideas borrowed from all the ſenſes, and has a thouſand ways of ennobling its object; but the expreſſion of this ſhriek would have totally degraded the ſtatue. It is ſoftened, therefore, into a patient ſigh, with eyes turned to heaven in ſearch of relief. The intolerable agony of ſuffering nature is repreſented in the lower part, and particularly in the extremities of the body; but the manly breaſt ſtruggles againſt calamity. The contention is ſtill more plainly perceived in his furrowed forehead; and his languiſhing paternal eye demands aſſiſtance, leſs for himſelf than for his miſerable children, who look up to him for help.

LAODICÆA on the Lycus (anc. geog.), a town of Phrygia, at firſt called *Dioſpolis*, then *Rhoas*. It was built by Antiochus ſon of Stratonice, and called after his conſort *Laodice*. It was long an inconſiderable place; but increaſed toward the age of Auguſtus Cæſar, after having ſuffered in a ſiege from Mithridates. The fertility of the ſoil, and the good fortune of ſome of its citizens, raiſed it to greatneſs. Hiero, who adorned it with many offerings, left the people his heir to more than 2000 talents. After that benefactor followed Zeno, the rhetorician; and his ſon Polemo, as renowned a ſophiſt as ever lived. This perſon flouriſhed at Smyrna; but was buried here by the Syrian gate, near which were the ſepulchres or coffins of his anceſtors. Laodicea, though inland, grew more potent than the cities on the coaſt, and became one of the largeſt towns in Phrygia. It was often damaged by earthquakes, and reſtored by its own opulence, or by the munificence of the Roman emperors. Theſe reſources failed, and the city, it is pro-

bable, became early a ſcene of ruin. About the year 1097 it was poſſeſſed by the Turks, and ſubmitted to Ducas, general of the emperor Alexis. In 1120 the Turks ſacked ſome of the cities of Phrygia by the Mæander, but were defeated by the emperor John Comnenus, who took Laodicæa, and built anew or repaired the walls. About 1161 it was again unfortified. Many of the inhabitants were then killed with their biſhop, or carried with their cattle into captivity by the Turks. In 1190 the German emperor, Frederick Barbaroſſa, going by Laodicæa with his army towards Syria on a croiſade, was received ſo kindly, that he prayed on his knees for the proſperity of the people. About 1196 this region, with Caria, was dreadfully ravaged by the Turks. The Sultan, on the invaſion of the Tartars in 1255, gave Laodicæa to the Romans; but they were unable to defend it, and it ſoon returned to the Turks.—It is now totally ruined and deſerted. Several remains of its ancient grandeur are, however, ſtill to be ſeen; particularly the ruins of two theatres and an amphitheatre. The memory of this place is conſecrated in Scripture, being one of the ſeven churches to which St. John in the Apocalypſe addreſſes himſelf, commended by St. Paul.

Laodicæa on the ſea (anc. geog.), according to Strabo, was a town of Seleucis in Syria, extremely well-built, with a commodious harbour. The country about it yielded great quantities of wine. The city took its name from *Laodice*, mother of Seleucus the founder of it.

LAOMEDON, king of Troy, whoſe hiſtory is involved in fables. He was ſon of Ilus king of Troy, and married Strymo, called by ſome *Placia*, or *Leucippe*, by whom he had Podarces, afterwards known by the name of *Priam*, and Heſione. He built the walls of Troy, and was aſſiſted by Apollo and Neptune, whom Jupiter had baniſhed from heaven, and condemned to be ſubſervient to the will of Laomedon for one year. When the walls were finiſhed, Laomedon refuſed to reward the labours of the gods; and ſoon after his territories were laid waſte by the ſea or Neptune, and his ſubjects were viſited by a peſtilence ſent by Apollo. Sacrifices were offered to the offended divinities; but the calamities of the Trojans increaſed, and nothing could appeaſe the gods, according to the words of the oracle, but annually to expoſe to a ſea-monſter a Trojan virgin. Whenever the monſter appeared, the marriageable maidens were aſſembled, and the lot decided which of them was doomed to death for the good of her country. When this calamity had continued for five or ſix years, the lot fell upon Heſione, Laomedon's daughter. The king was unwilling to part with a daughter whom he loved with uncommon tenderneſs, but his refuſal would irritate more ſtrongly the wrath of the gods. In the midſt of his fear and heſitation, Hercules came and offered to deliver the Trojans from this public calamity, if Laomedon would promiſe to reward him with a number of fine horſes.—The king conſented; but when the monſter was deſtroyed, he refuſed to fulfil his engagements, and Hercules was obliged to beſiege Troy, and take it by force of arms. Laomedon was put to death after a reign of 29 years; his daughter Heſione was given in marriage to Telamon, one of the conqueror's attendants; and Podarces was ranſomed by the Trojans, and placed upon his father's throne. According to Hyginus, the wrath of Neptune and Apollo was kindled againſt Laomedon, becauſe he refuſed to offer on their altars as a ſacrifice all the firſt-born of his cattle, according to a vow he had made.

LAON, a town of France, in the department of Aiſne and late province of Soiſſonnois, with a caſtle, and lately a biſhop's ſee. Its principal trade conſiſts in corn and wine; and it is noted for excellent artichokes. It is ſeated on a mountain, 77 miles N. E. of Paris. E. lon. 3. 43. N. lat. 49. 34.

LAOS, a kingdom of Aſia beyond the Ganges; bounded on the north by China; on the eaſt, by Tonquin and Cochin-China; on the ſouth, by Cambodia; and on the weſt, by the kingdom of Siam, and by the territories of the king of Ava. This country is full of foreſts, and abounds in rice, fruits, and fiſh. The inhabitants are well made, robuſt, of an olive complection, and mild in their diſpoſition; but very ſuperſtitious, and much addicted to women. Their principal occupation is tilling the ground and fiſhing. The king ſhows himſelf but twice a year, and has large revenues from the elephants' teeth found in his dominions. Their religion is a kind of idolatry, and much the ſame as in China. Langiona is the capital town.

LAPATHUS, Lapethus, or *Lepithus* (anc. geog.), a town of Cyprus, about the middle of its north ſide, with a port or ſtation for ſhips, and a cognominal river. It was built by a colony of Phœnicians, according to Scylax; by Belus king of Tyre, according to Alexander Epheſius. According to Strabo, it was built by a colony of Spartans; and one of the nine kings reſided here, the laſt of whom was Piſiſtratus, who commanded the naval army of Alexander the Great. There was a temple here dedicated to Venus. The territory round it is called *Lapithia* by Diodorus and Ptolemy; *Lapithii*, the people, tainted with a degree of fatuity; hence *Lapathius* denotes *fatuus* (Heſychius).—Now a village called *Lapitha*; but, according to the Abbé Mariti, the longeſt and moſt extenſive in the iſland. Beſides the advantage of a fine ſituation, it furniſhes the beſt productions in the country; and though Cyprus is in general not very abundant in fruits, Lapitha ſeems a favoured ſpot in this reſpect, and may be called the *garden of the iſland*.

LAPIDARY, an artificer who cuts precious ſtones. The art of cutting precious ſtones is of great antiquity. The French have carried this art to a very great perfection, but not in any degree ſuperior to the Britiſh. There are various machines employed in the cutting of precious ſtones according to their quality. The diamond, which is extremely hard, is cut on a wheel of ſoft ſteel, turned by a mill, with diamond duſt, tempered with olive-oil, which alſo ſerves to poliſh it.

The oriental ruby, ſapphire, and topaz, are cut on a copper-wheel with diamond duſt tempered with olive-oil, and are poliſhed on another copper-wheel with tripoli and water. The hyacinth, emerald, amethyſt, garnets, agates, and other ſtones not of an equal degree of hardneſs with the other, are cut on a leaden wheel with ſmalt and water, and poliſhed on a tin wheel with tripoli. The turquois of the old and new rock, giraſol, and opal, are cut and poliſhed on a wooden wheel with tripoli alſo.

Lapidary is alſo uſed for a virtuoſo ſkilled in the nature, kinds, &c. of precious ſtones; or a merchant who deals in them.

Lapidary-*Style*, denotes the ſtyle proper for monumental or other inſcriptions. This is a kind of medium between proſe and verſe; the jejune and the brilliant are here equally to be avoided. Cicero has preſcribed the rules of it: *Accedat oportet oratio varia, vehemens, plena ſpiritus. Omnium ſententiarum gravitate, omnium verborum ponderibus, eſt utendum.* The lapidary ſtyle, which was loſt with the ancient monuments, has been retrieved at the beginning of this age by count Emanuel Teſoro: it is now uſed various ways at the beginning of books, and even epiſtles dedicatory are compoſed in it, of which we have no example among the ancients.

LAPIDESCENT, any thing which has the faculty of petrifying, or turning bodies to a ſtony nature. Naturaliſts ſpeak of a lapideſcent principle, a lapideſcent ſpirit, a lapideſcent juice, &c.

LAPIS, in general, is uſed to denote a ſtone of any kind.

Lapis, in Roman antiquity, a geographical meaſure denoting a mile; becauſe miles were diſtinguiſhed by erecting a ſtone at the end of each; from the number marked on which, the length

of way from Rome might be known. The device is by Plutarch aſcribed to Caius Gracchus. This was more accurately executed by Auguſtus, who erected a gilt pillar in the Forum, at which all the public ways of Italy, diſtinguiſhed by ſtones, were terminated. The ſame thing was done in the Roman provinces. Hence the phraſes *tertius lapis*, *centeſimus lapis*, &c. for three, a hundred, &c. miles; and ſometimes the ordinal number without *lapis*, as *ad duodecimum*, &c. at twelve miles diſtance.

Lapis *Aſſius*, in the natural hiſtory of the ancients, the name of a ſtone called alſo *ſarcophagus*, from its power of conſuming fleſh. See Sarcophagus.

Lapis *Bononienſis*, the Bolognian ſtone. See Chemistry.

Lapis *Iazuli*. See Lazuli.

Lapis *Lyncurius*. See Lyncurius.

Lapis *Mutabilis*. See Hydrophanes.

Lapis *Hepaticus*. See Liver-*Stone*.

Lapis *Lydius*. See Touch-stone, Trapp, and *Lapis* Lydius.

Lapis *Obſidianus*. See Obsidianus and Gallinaceus.

Lapis *Nephriticus*. See Jade-*Stone*.

Lapis *Specularis*. See Specularis.

LAPITHÆ (anc. geog.), a people of Theſſaly. See the next article.

LAPITHUS (fab. hiſt.), a ſon of Apollo, by Stilbe. He was brother to Centaurus; and married Orſinome, daughter of Euronymus, by whom he had Phorbas and Periphas. The name of Lapithæ was given to the numerous children of Phorbas and Periphas, or rather to the inhabitants of the country of which they had obtained the ſovereignty. The chief of the Lapithæ aſſembled to celebrate the nuptials of Perithous, one of their number. Among them were Theſeus, Dryas, Hopleus, Mopſus, Phalerus, Exadius, Prolochus, Titareſius, &c. The Centaurs were alſo invited to partake the common feſtivity; and the amuſements would have been harmleſs and innocent, had not one of the intoxicated Centaurs offered violence to Hippodamia the wife of Perithous. The Lapithæ reſented the injury, and the Centaurs ſupported their companions; upon which the quarrel became univerſal, and ended in blows and ſlaughter. Many of the Centaurs were ſlain, and they at laſt were obliged to retire. Theſeus among the Lapithæ ſhowed himſelf brave and intrepid in ſupporting the cauſe of his friends; and Neſtor alſo was not leſs active in the protection of chaſtity and innocence. Heſiod has deſcribed the battle of the Centaurs and Lapithæ; as has alſo Ovid, in a more copious manner. The invention of bits and bridles for horſes is attributed to the Lapithæ.

LAPLAND, the moſt northerly country of Europe, extending from the north cape in 71° 30′ N. lat. to the White Sea under the arctic circle, is inhabited by the ſame people, though the country is ſubject to different powers. Norwegian Lapland, under the dominion of Denmark, lies between the northern ſea, the river Pais, and the lake Enarak. Swediſh Lapland comprehends all the country from the Baltic to the mountains that ſeparate Norway from Sweden. It is divided into ſix diſtricts, denominated *marck* or territory; and theſe are diſtinguiſhed by the names of rivers, ſuch as Aungermanland, Elma, Peta, Lula, Torno, and Kiemi. The eaſtern part, ſubject to the czar of Muſcovy, ſituated between the lake Enarak and the White Sea, is divided into three diſtinct prefectures; namely, that of the ſea-coaſt towards the north, called *Murmankoi Leporie*; the Terſkoi Leporie, upon the coaſt of the White Sea; and the third, or inland, known by the name of *Bellamoreſkoi Leporie*. In Swediſh Lapland, which is the moſt conſiderable of the three, the provinces or marcks are ſubdivided into ſmaller diſtricts called *biars*, conſiſting each of a certain number of families; among which the land is parcelled out by government, or the prefect of the diſtrict appointed by the king of Sweden.

Lapland may be termed a huge congeries of frightful rocks and ſtupendous mountains; interſperſed, however, with many pleaſant valleys, watered by an infinite number of rivulets that run into the rivers and lakes, which diſcharge themſelves into the gulf of Bothnia. The names of the principal lakes in Lapland are; the Great Uma, the Great Windel, the Oreavan, the Stor-avan, the Great Lula: the lakes of Kartom, Kali, Torno, Enara, and Kimi. Some of theſe extend 60 leagues in length, and contain a great number of iſlands: Stor avan is ſaid to contain 365, and Enara contains an archipelago of iſlands ſo large, that no Laplander has lived long enough to viſit each particular iſland. The natives believe this country to be the terreſtrial paradiſe; and indeed nothing could be more enchanting than ſuch vaſt proſpects of mountains, hills, foreſts, lakes, rivers, &c. if the country was in a moderate climate; though even here, in ſummer, the roſes are ſeen blowing wild on the banks of the lakes and rivers, with all the beautiful glow of colour which appears in thoſe cultivated in our gardens. But all the intervals between the mountains are not engroſſed by theſe agreeable proſpects; great part of the flat country is covered with brown duſky foreſts of fir and pine trees: and theſe are often ſkirted by wide extended moraſſes, the ſtagnating waters of which in ſummer produce myriads of miſchievous inſects, that are more intolerable than even the cold of winter.

The cold of Lapland is very intenſe during the winter, freezing even brandy and the watery part of ſpirit of wine, if the latter is not highly rectified: all the lakes and rivers are frozen to a prodigious thickneſs; and the whole face of the country is covered with ſnow to the depth of four or five feet. While this continues looſe, it is impoſſible to travel; for a man's eyes are not only blinded with it, but if a ſtrong wind ſhould riſe he will be buried in the drifts of ſnow: yet ſhould a partial thaw take place for a few hours, the ſurface of this ſnow is formed by the ſucceeding froſt into a hard impenetrable cruſt, over which the Laplander travels in his ſledge with great celerity. While the thaw prevails, the air is ſurcharged with vapours, and the climate is rainy; but while the north wind blows, the ſky is beautifully ſerene, and the air very clear.

The heat of ſummer is almoſt as intolerable in Lapland as the cold of winter. At the northern extremity of the country the ſun never ſets for three months in ſummer, and in winter there is an uninterrupted night of the ſame duration; but this is qualified in ſuch a manner by a conſtant revolution of dawn and twilight, by a ſerene ſky, moon light, and aurora borealis, reflected from the white ſurface of the earth covered with ſnow, that the inhabitants are enabled to hunt, fiſh, and proceed with their ordinary occupations. The country abounds with excellent ſprings; and is remarkable for ſome ſurpriſing cataracts, in which the water rumbles over frightful precipices, and daſhes among rocks with amazing impetuoſity and noiſe.

The ſoil of Lapland is generally ſo chilled and barren, that it produces little or no grain or fruit-trees of any kind. This ſterility, however, is not ſo much owing to the ſoil, which is in many places of a rich mould, as to want of induſtry; for in ſome diſtricts the Swedes have tilled and manured pieces of ground that bear plentiful crops of rye. There is alſo great plenty of berries: ſuch as black currants; what is called the Norwegian mulberry, growing upon a creeping plant, and much eſteemed as an antiſcorbutic; raſp-berries, cran-berries, juniper-berries, and bilberries. The tops of the mountains are ſo much expoſed to intenſe cold, and tempeſts of ſnow and hail, that no tree will grow near the ſummit; but in parts that are more ſheltered we ſee fine woods of birch, pine, and fir, diſpoſed by nature as if they had been planted by art in rows at regular diſtances, without any undergrowth or incumbrance.

below. Beſides theſe trees, ſome parts of Lapland produce the ſervice-tree, the willow, the poplar, the elder, and the cornel. Among the plants of this country the principal is the angelica; which is greatly eſteemed by the natives, who uſe it in their food. Here is likewiſe the acetoſa or ſorrel, which grows in great plenty, and is of much ſervice on account of its antiſcorbutic properties. They have alſo other kinds of herbs peculiar to the country, different kinds of graſs, heath, fern, and moſs; which are all enumerated by Linnæus in his *Flora Lapponica*. But the vegetable which is in greateſt plenty, and of the moſt extenſive uſe among them, is the *lichen rangiferus*. The rein-deer is wholly ſuſtained in winter by this vegetable; and the Laplanders themſelves boil it in broth as a cordial and reſtorative. They likewiſe uſe one ſort of it as a ſoft, eaſy, and wholeſome bed for their new-born children.

Some ſilver and lead mines have been diſcovered in the provinces of Pitha and Lula: and two of copper, together with excellent veins of iron, in the diſtrict of Torno; but they are not at preſent worked with any conſiderable advantage. In ſome places there are veins of ſilver and gold mixed; but theſe mines are worked only for a few months in the ſummer, becauſe the froſt hinders the engines from playing. Here are found beautiful cryſtals, of a ſurpriſing magnitude, ſo hard and fine, that when poliſhed they reſemble real diamonds. In ſome places amethyſts and topazes are alſo found, but pale and cloudy; alſo a great quantity of very curious ſtones, which are too hard to be worked by the tool of the maſon. Some of theſe found on the banks of rivers and lakes, when they happen to bear the leaſt reſemblance to the figures of animals, the Laplanders remove to more conſpicuous places, and adore as deities. The province of Torno affords ſome curious ſtones of an octagonal ſhape, regular, ſhining, and poliſhed by the hand of nature. In ſome rivers they fiſh for pearls, which are generally pale; but ſome of them are as bright as the oriental pearls, and much larger and rounder. Theſe pearls are found in muſcle-ſhells; and the fiſhery is not in the ſea, but in rivers.

Lapland, as well as Norway, is infeſted with a great number of grey wolves and bears, with whom the inhabitants wage perpetual war. The moſt honourable exploit among the Laplanders is that of killing a bear; and the heroes adorn their caps with a ſmall plate of lead or pewter for every bear they have ſlain. The country abounds alſo with elks, beavers, and otters, which live here unmoleſted, and find plenty of fiſh for their ſubſiſtence. The foreſts of this country furniſh haunts to a great number of beautiful martens and ſquirrels; which laſt change their colour every winter from brown to grey. Lapland is alſo the native country of the zibeling or table, whoſe ſkin is extremely valuable. Here are likewiſe ermines, weaſels, hares, large black cats which attend the Laplanders in hunting, and little prick-eared curs trained to the game. But the moſt remarkable animal of Lapland is the rein-deer, of which an account is given in the article Cervus. Theſe animals, ſo uſeful in various reſpects to the natives, are kept at no expence. In ſummer they feed upon graſſes and alpine plants; in winter, as already mentioned, upon the *lichen rangiferus*, or rein-deer lichen, and its varieties, which are ſo abundant as in many parts almoſt totally to cover the ground for the ſpace of ſeveral miles, and which the ſagacious animal diſcovers under the ſnow by the peculiar acuteneſs of its ſmell. Moſt of thoſe uſed for draught are caſtrated when very young, and are larger and fatter than the bucks. The woods, mountains, and rivers, are well ſtocked with wild-fowl; ſuch as buſtard, partridge, groufe, heathcock, pheaſants, lapwings, ſwans, wild-geeſe, wild-ducks, and all ſorts of aquatic birds that build and breed in northern climates. In the beginning of the ſpring the ſwans go thither in numerous flights from the German ocean; the lapwings follow in ſuch ſwarms that they darken the ſky as they paſs along, and ſcream ſo loud that they may be heard at a great diſtance. The rocks and mountains are likewiſe frequented by eagles, hawks, falcons, kites, and other birds of prey.—The rivers abound with delicious ſalmon from the gulph of Bothnia, trout, bream, and perch of exquiſite flavour and amazing magnitude; and the inhabitants of Wardhus, or Daniſh Lapland, are well ſupplied with fiſh from the northern ocean.—With reſpect to inſects, the flies hatched in the moraſſes and woods in ſummer are ſo numerous, that they often obſcure the face of day; ſo venomous, troubleſome, and intolerable, that the rein-deer fly to the tops of the higheſt mountains for ſhelter, and the Laplanders betake themſelves to the ſea-ſide, which is the leaſt infeſted by theſe peſtilent vermin. M. de Maupertuis, in his account of the voyage he made to Lapland, in company with the other French mathematicians ſent thither by the king to meaſure a degree of the meridian, gives us to underſtand, that on the tops of the mountains in Torno the flies were ſo troubleſome, that even the Finland ſoldiers, who are counted the moſt hardy troops in the ſervice of Sweden, were obliged to cover their faces with the ſkirts of their coats from the attacks of theſe animals, which ſwarmed to ſuch a degree, that the moment a piece of fleſh appeared it was blackened all over. Some of theſe flies are very large, with green heads, and fetch blood from the ſkin wherever they ſtrike. The Laplanders ſhroud themſelves in the ſmoke of a large fire kindled for that purpoſe; yet even this diſagreeable expedient was not ſufficient to defend the French philoſophers: they were obliged, notwithſtanding the exceſſive heat, to wrap up their heads in garments made of the ſkins of rein-deer, called in that country *lapmudes*, and to cover themſelves with a thick rampart of fir-boughs; yet all theſe precautions proved ineffectual. M. de Maupertuis obſerved a lake quite covered with little yellowiſh grains, reſembling millet ſeed, which he ſuppoſed to be the chryſaliſes of ſome of theſe inſects.

The Laplanders are very low in ſtature, and are likewiſe remarkable for having large heads. They are alſo ill-ſhaped, and their features are harſh. They are, however, ſtrong, hardy, and robuſt, inſomuch that they will bear incredible fatigue; and it is remarked that the ſtouteſt Norwegian is not able to bend the bow of a Laplander. The women are much leſs homely than the men, and many of them are noted for a delicate and florid complexion.

Theſe people are ſimple, honeſt, hoſpitable, and timorous: their timidity, however, reſpects war alone; for to many other ſpecies of dangers they expoſe themſelves with ſurpriſing intrepidity, whether in aſcending and deſcending mountains and precipices with their ſnow-ſhoes and in ſledges, or in venturing amidſt whirlpools and cataracts in little ſlender boats made of thin fir boards, faſtened together with thongs of leather, ſinews of wild beaſts, or tough and flexible twigs of willow and oſier. Theſe boats are of different ſizes, from two to ſix yards in length, managed with oars, and caulked with moſs ſo tight as to keep out the water. The Laplanders are partly ſettled, and in part wild and roving: the latter live in tents made with coarſe cloth: the former are fixed in ſmall villages near the lakes, and chiefly follow fiſhing. They build their cottages ſomewhat in the ſhape of a cone, by placing a circle of large trees or poles aſlant in the earth, and cloſe to each other, ſo that their tops meet, and form a ſmall vent for the iſſue of the ſmoke: they cover the ground within with branches of trees. In ſpring their food conſiſts principally of the eggs of water-fowl, which are extremely plentiful in thoſe parts; in ſummer and autumn, of the birds themſelves, and of various other of the partridge-tribe; and in winter of the milk and fleſh of

the rein-deer and dried fiſh. They had till lately no bread; but in lieu thereof uſed the inner rind of the pine-tree dried and ground, and dried fiſh reduced to powder. They make confections and decoctions of berries, angelica, and ſorrel, which they juſtly reckon to be preſervatives againſt the ſcurvy. The Laplander is ſecured in the poſſeſſion of uninterrupted health by temperance and exerciſe, which, together with the ſeverity of the climate, brace his nerves to a very unuſual pitch of ſtrength, and fortify his conſtitution in ſuch a manner, that he often lives to the age of 100, without feeling the leaſt pang of diſtemper, or even perceiving his vigour in the leaſt impaired; for it is not uncommon to ſee a Laplander in extreme old age hunting, fowling, ſkaiting, and performing all the ſevereſt exerciſes with undiminiſhed agility.

The ſummer garb of the men conſiſts of a long coat of coarſe cloth, reaching down to the middle of the leg, and girded round the waiſt with a belt or girdle; from which hang a Norway knife, and a pouch containing flints, matches, tobacco, and other neceſſaries; the girdle itſelf being decorated with braſs rings and chains. Their caps are made of the ſkin of the northern diver, with the feathers on; and their ſhoes of the rein-deer ſkin, with the hair outwards. They wear no linen; but the garments of the better ſort are of a finer cloth, and they delight in a variety of colours, though red, as the moſt glaring, is the moſt agreeable. In winter they are totally caſed up in coats, caps, boots, and gloves, made of the rein-deer ſkins. In the *Flora Lapponica*, Linnæus ſays, "Perhaps the curious reader will wonder how the people in Lapland, during the terrible cold that reigns there in winter, can preſerve their lives; ſince almoſt all birds, and even ſome wild beaſts, deſert it at that time. The Laplander, not only in the day, but through the whole winter nights, is obliged to wander about in the woods with his herds of rein-deer. For the rein-deer never come under cover, nor eat any kind of fodder, but a particular kind of liverwort. On this account the herdſmen are under a neceſſity of living continually in the woods, in order to take care of their cattle, leſt they ſhould be devoured by wild beaſts. The Laplander eaſily does without more light, as the ſnow reflects the rays that come from the ſtars, and as the *Aurora Borealis* illuminates the air every night with a great variety of figures. No part of our body is more eaſily deſtroyed by cold than the extremities of the limbs, which are moſt remote from the ſun of this microcoſm, the heart. The kibes that happen to our hands and feet, ſo common in the northern parts of Sweden, prove this. In Lapland you will never ſee ſuch a thing; although, were we to judge by the ſituation of the country, we ſhould imagine juſt the contrary, eſpecially as the people wear no ſtockings, as we do, not only ſingle, but double and triple. The Laplander guards himſelf againſt the cold in the following manner: He wears breeches made of rein-deer ſkins with the hair on, reaching down to his heels, and ſhoes made of the ſame materials, the hairy part turned outwards. He puts into his ſhoes ſlender-eared broad-leafed cyperus graſs, *(carex veſicaria, Spec. Pl.* or the Bladder Carex), that is cut in ſummer and dried. This he firſt combs and rubs in his hands, and then places it in ſuch a manner that it not only covers his feet quite round, but his legs alſo; and being thus guarded, he is quite ſecured againſt the intenſe cold. With this graſs they ſtuff their gloves likewiſe, in order to preſerve their hands. As this graſs keeps off the cold in winter, ſo in ſummer it hinders the feet from ſweating, and at the ſame time preſerves them from being annoyed by ſtriking againſt ſtones, &c. for their ſhoes are very thin, being made, not of tanned leather, but the raw hide."

The women's apparel differs very little from that of the other ſex; only their girdles are more ornamented with rings, chains, needle-caſes, and toys that ſometimes weigh 20 pounds. In winter, both men and women lie in their furs; in ſummer, they cover themſelves entirely with coarſe blankets to defend them from the gnats, which are intolerable. The Laplanders are not only well diſpoſed, but naturally ingenious. They make all their own furniture, their boats, ſledges, bows and arrows. They form neat boxes of thin birch boards, and inlay them with the horn of the rein-deer. The Swedes are very fond of the Lapland baſkets made of the roots of trees, ſlit in long thin pieces, and twiſted together ſo nicely that they will hold water. Among the manufactures of this country we likewiſe number curious horn ſpoons, and moulds in which they caſt the trinkets of tin which adorn their girdles. Over and above theſe domeſtic occupations, the men within doors perform the office of cooks in dreſſing victuals for the family. The women act as taylors and embroiderers; they make clothes, ſhoes, and boots, and harneſs for the rein-deer: they ſpin thread of fur, and knit it into caps and gloves that are very ſoft and warm. They draw tin into wire through a horn; and with this they cover the thread which they uſe in embroidering the figures of beaſts, flowers, trees, and ſtars upon their caps and girdles.

The Laplanders make ſurpriſing excurſions upon the ſnow in their hunting expeditions. They provide themſelves each with a pair of ſkates, or ſnow-ſhoes, which are no other than fir-boards covered with the rough ſkin of the rein deer, turned in ſuch a manner that the hair riſes againſt the ſnow, otherwiſe they would be too ſlippery. One of theſe ſhoes is uſually as long as the perſon who wears it; the other is about a foot ſhorter. The feet ſtand in the middle, and to them the ſhoes are faſtened by thongs or withes. The Laplander thus equipped wields a long pole in his hand, near the end of which there is a round ball of wood to prevent its piercing too deep in the ſnow; and with this he ſtops himſelf occaſionally. By means of theſe accoutrements he will travel at the rate of 60 miles a-day without being fatigued; aſcending ſteep mountains, and ſliding down again with amazing ſwiftneſs.

The Laplander not only travels a-foot, but is provided with a carriage drawn by the rein-deer, in which he journeys with ſtill greater rapidity. The ſledge, called *pulka*, is made in the form of a ſmall boat, with a convex bottom, that it may ſlide the more eaſily over the ſnow: the prow is ſharp and pointed; but the ſledge is flat behind. The traveller is ſwathed in this carriage like an infant in a cradle, with a ſtick in his hand to ſteer the veſſel, and diſengage it from pieces of rock or ſtumps of trees that may chance to encounter it in the route. He muſt alſo balance the ſledge with his body, otherwiſe he will be in danger of being overturned. The traces, by which this carriage is faſtened to the rein deer, are fixed to a collar about the animal's neck, and run down over the breaſt between the fore and hind legs, to be connected with the prow of the ſledge: the reins, managed by the traveller, are tied to the horns; and the trappings are furniſhed with little bells, the ſound of which is agreeable to the animal. With this draught at his tail, it has been reported that the rein deer will fly like lightning over hill and dale at the rate of 200 miles a-day. But this repreſentation is greatly exaggerated. According to the beſt accounts, the common pace of the rein-deer is only at the rate of about four miles an hour; though, if he be preſſed, he will travel 10 or 12 Swediſh miles (70 or 84 Engliſh miles) in a day; but by ſuch hard driving is generally deſtroyed. It, however, frequently happens, that he will perſevere in his journey 50 miles without intermiſſion, and without taking any refreſhment, except occaſionally moiſtening his mouth with the ſnow. Before he ſets out, the Laplander whiſpers in his ear the way he is to follow, and the place at which he is to halt, firmly perſuaded that the beaſt underſtands his meaning: but, in ſpite of this intimation, he frequently ſtops ſhort long before he has reached the journey's end; and ſometimes he overſhoots

the mark by ſeveral leagues. In the beginning of winter the Laplanders mark the moſt frequented roads, by ſtrewing them with fir-boughs; and indeed theſe roads are no other than pathways made through the ſnow by the rein-deer and the pulkas: their being frequently covered with new ſnow, and alternately beaten by the carriage, conſolidates them into a kind of cauſeway; which is the harder if the ſurface has felt a partial thaw, and been cruſted by a ſubſequent froſt. It requires great caution to follow theſe tracks; for, if the carriage deviates to the right or left, the traveller is plunged into an abyſs of ſnow. In leſs frequented parts, where there is no ſuch beaten road, the Laplander directs his courſe by certain marks which he has made on the trees.

The chief occupation of the Laplanders is hunting, and this exerciſe they perform in various ways. In ſummer they hunt the wild beaſts with ſmall dogs, trained to the diverſion. In winter they purſue them by their tracks upon the ſnow, ſkating with ſo great velocity, that they very often run down the prey. They catch ermines in traps, and ſometimes with dogs. They kill ſquirrels, martens, and ſables, with blunt darts, to avoid wounding the ſkin. Foxes and beavers are ſlain with ſharp-pointed darts and arrows; in ſhooting which, they are accounted the beſt markſmen in the world. The larger beaſts, ſuch as bears, wolves, elks, and wild rein-deer, they either kill with fire-arms purchaſed in Sweden or Norway, or take in ſnares and pits dug in the foreſts. Their particular laws relating to the chace are obſerved with great punctuality. The beaſt becomes the property of the man in whoſe ſnare or pit he is caught; and he who diſcovers a bear's den has the excluſive privilege of hunting him to death. The conqueſt of a bear is the moſt honourable achievement that a Laplander can perform; and the fleſh of this animal they account the greateſt delicacy on earth. The bear is always diſpatched with a fuſil, ſometimes laid as a ſnare, ready cocked and primed; but more frequently in the hands of the hunter, who runs the moſt imminent riſk of his life ſhould he miſs his aim of wounding the beaſt mortally. The death of a bear is celebrated by the Laplanders as a ſignal victory. The carcaſe is drawn to the cabin or hut of the victor by a rein deer, which is kept ſacred from any other work for a whole year after this ſervice. The bear is ſurrounded by a great number of men, women, and children, reciting a particular hymn or ſong of triumph, in which they thank the vanquiſhed enemy for having allowed himſelf to be overcome; without doing any miſchief to his conqueror, and welcome his arrival: then they make an apoſtrophe to heaven, expreſſing their acknowledgment to God, that he has created beaſts for the uſe of men, and endued mankind with ſtrength and courage to overcome and attack the fierceſt of the brute creation. The hero is ſaluted by the women, who ſpit chewed elder-bark in his face. He is feaſted three days ſucceſſively, and his cap is decorated with an additional figure wrought in tin-wire.

The manner in which the young Laplander chooſes a wife is equally remarkable and ludicrous. When he has pitched upon a female, he employs ſome friends as mediators with the father; and theſe being provided with ſome bottles of brandy, the ſuitor accompanies them to the hut of his future father-in-law, who invites the mediators to enter; but the lover is left without until the liquor be drank, and the propoſal diſcuſſed: then he is called in, and entertained with ſuch fare as the hut affords; yet without ſeeing his miſtreſs, who retires and goes out on this occaſion. Having obtained leave of her parents to make his addreſſes in perſon, he puts on his beſt apparel, and is admitted to the lady, whom he ſalutes with a kiſs: then he preſents her with the tongue of a rein-deer, a piece of beaver's fleſh, or ſome other ſort of proviſion. She declines the offer, which is made in preſence of her ſiſters and relations; but makes a ſignal to the lover to follow her into the fields, where ſhe accepts the preſents. Thus encouraged, he begs her permiſſion to ſleep with her in the hut: if ſhe conſents, there is no further difficulty; if ſhe diſapproves of the propoſal, ſhe drops her preſents on the ground. When the lovers are agreed, the youth is permitted to viſit his inamorata as often as he ſhall think proper: but every time he comes he muſt purchaſe this pleaſure with a freſh bottle of brandy; a perquiſite ſo agreeable to the father, that he often poſtpones the celebration of the nuptials for two or three years. At length the ceremony is performed at church by the prieſt of the pariſh. Even after this event, the huſband is obliged to ſerve his father in-law a whole year; at the expiration of which he retires to his own habitation with his wife, and her patrimony of rein-deer, and receives preſents from all his friends and relations. From this period he ſequeſters his wife from the company of all ſtrangers, eſpecially of the male ſex, and watches over her conduct with the moſt jealous vigilance.

Many Lapland women are barren, and none of them are very fruitful. A woman, immediately after delivery, ſwallows a draught of whale-fat: the child is waſhed with ſnow or cold water, and wrapped up in a hare-ſkin. The mother is ſeldom above five days in the ſtraw, and in fourteen is generally quite recovered: then ſhe carries the child to church to be baptized. Before ſhe can reach the reſidence of the prieſt, ſhe is often obliged to traverſe large foreſts, mountains, lakes, and wide-extended waſtes of ſnow. The infant is faſtened in a hollowed piece of wood, ſtretched naked on a bed of fine moſs, covered with the ſoft ſkin of a young rein-deer, and ſlung by two ſtraps to the back of the mother, who always ſuckles her own child. At home this little cradle is hung to the roof of the hut, and the child lulled aſleep by ſwinging it from one ſide to the other. The boys from their infancy practiſe the bow; and are not allowed to break their faſt until they have hit the mark. The female children are as early initiated in the buſineſs peculiar to their ſex.

Theſe people, though for the moſt part vigorous and healthy, are not altogether exempted from diſtemper. They are ſubject to ſore eyes, and even to blindneſs, from the ſmoke of their huts, and the fire to which they are almoſt continually expoſed. Some waſte away in conſumptions; others are afflicted with rheumatic pains and the ſcurvy; and a few are ſubject to vertigo and apoplexy. For the cure of all their internal diſorders, they uſe no other medicine than the decoction of a certain ſpecies of moſs; and when this cannot be procured, they boil the ſtalk of angelica in the milk of the rein-deer. In order to remove a fixed pain, they apply a large muſhroom, burning hot, to the part affected; and this produces a bliſter, which is ſuppoſed to draw off the peccant humour. To their wounds they apply nothing but the turpentine that drops from the fir-tree. When they are froſt-bitten (though according to the above extract from Linnæus this ſeldom or never happens), we are told that they thruſt a red-hot iron into a cheeſe made of rein-deer's milk, and with the fat that drops from it anoint the frozen member, which generally recovers. When a Laplander is ſuppoſed to be on his death bed, his friends exhort him to die in the faith of Chriſt, and bear his ſufferings with reſignation, by remembering the paſſion of our Saviour. They are not, however, very ready to attend him in his laſt moments; and, as ſoon as he expires, quit the place with precipitation, apprehending ſome injury from his ſpirit or ghoſt, which they believe remains with the corpſe, and takes all opportunities of doing miſchief to the living. The deceaſed is wrapped up in woollen or linen, according to his circumſtances, and depoſited in a coffin by a perſon ſelected for that purpoſe: but this office he will not perform, unleſs he is firſt ſecured from the ill offices of the manes, by a conſecrated braſs ring fixed on his left arm.

The Chriſtian religion in this country has not yet diſpelled all the rites of heatheniſh ſuperſtition: together with the body they put into the coffin an ax, a flint, and ſteel, a flaſk of brandy, ſome dried fiſh and veniſon. With the ax the deceaſed is ſuppoſed to hew down the buſhes or boughs that may obſtruct his paſſage in the other world: the ſteel and flint are deſigned for ſtriking a light, ſhould he find himſelf in the dark at the day of judgment; and on the proviſion they think he may ſubſiſt during his journey.

The Muſcovite Laplanders obſerve other ceremonies, that bear an affinity to the ſuperſtitions of the Greek church. They not only ſupply the defunct with money, but likewiſe provide him with money for the porter of paradiſe, and a certificate ſigned by the prieſt, and directed to St. Peter, ſpecifying, that the bearer had lived like a good Chriſtian, and ought to be admitted into heaven. At the head of the coffin they place a little image of St. Nicholas, who is greatly reverenced in all parts of Muſcovy as a friend to the dead. Before the interment, the friends of the deceaſed kindle a fire of fir-boughs near the coffin, and expreſs their ſorrow in tears and lamentations. They walk in proceſſion ſeveral times round the body, demanding, in a whining tone, the reaſon of his leaving them on earth. They aſk whether he was out of humour with his wife; whether he was in want of meat, drink, clothing, or other neceſſaries; and whether he had not ſucceeded in hunting and fiſhing? Theſe, and other ſuch interrogations, to which the defunct makes no reply, are intermingled with groans and hideous howlings; and, between whiles, the prieſt ſprinkles the corpſe and the mourners alternately with holy water. Finally, the body is conveyed to the place of interment on a ſledge drawn by a rein-deer; and this, together with the clothes of the deceaſed, is left as the prieſt's perquiſite. Three days after the burial, the kinſmen and friends of the defunct are invited to an entertainment, where they eat the fleſh of the rein deer which conveyed the corpſe to the burying-ground. This being a ſacrifice to the manes, the bones are collected into a baſket and interred. Two thirds of the effects of the deceaſed are inherited by his brothers, and the remainder divided among his ſiſters: but the lands, lakes, and rivers, are held in coparceny by all the children of both ſexes, according to the diviſion made by Charles IX. of Sweden, when he aſſigned a certain tract of land to each family.

The commerce of the Laplanders is more conſiderable than one would expect in a deſert country inhabited by a ſavage ignorant people. They export great quantities of fiſh to the northern parts of Bothnia and White Ruſſia. They likewiſe trade with the neighbouring countries of Norway, Sweden, Muſcovy, and Finland, by ſelling rein-deer, fine furs, baſkets and toys of their own manufacture, dried pikes, and cheeſe made of the rein-deer's milk. In return for theſe commodities they receive rix-dollars, woollen cloths, linen, copper, tin, flour, oil, hides, needles, knives, ſpirituous liquors, tobacco, and other neceſſaries. The Laplanders march in caravans to the fairs in Finland and Norway: theſe are compoſed of a long ſtring of 30 or 40 rein-deer and pulkhas tied to one another, the foremoſt being led by a Laplander a-foot. When they have choſen a ſpot for an encampment, they form a large circle of their rein-deer and pulkhas ready yoked; and the animals lying down quietly on the ſnow, are fed with moſs by their maſters. The people kindle great fires, around which, men, women, and children ſit, and ſup on dried fiſh: but the more voluptuous ſpread out bear ſkins under their tents, where they lie at their eaſe and ſmoke tobacco.

The revenue ariſing from this country is of no great conſequence: it is paid partly in rix-dollars, but chiefly in furs; nay, ſome that can procure neither, pay the tribute in dried pikes. The produce of the mines forms likewiſe a conſiderable article. Fifty ſquirrel ſkins, or one fox ſkin, with a pair of Lapland ſhoes, are valued at one rix-dollar. Part of the taxes is allotted for the maintenance of the Lapland clergy.—The frightful aſpect of this country has been deemed a more effectual defence than artificial bulwarks and garriſons, of which here are none; or than the arms and courage of the natives, who are neither warlike in themſelves, nor in the leaſt tinctured with diſcipline.

The Laplanders call themſelves *Salme-Same*, and *Samen-Almatjeh*. Their country they denominate *Same-Landa*, or *Same-aednam*; the Swedes ſtyle it *Lapland* or *Lappmarken*, and the inhabitants *Lappar*. The natives of thoſe diſtricts under the dominion of Sweden and Denmark are Lutherans; while many of thoſe who are ſubject to Ruſſia are ſtill Pagans. Swediſh Lapland contains about eight churches, which in ſome parts lie at ſo great a diſtance from each other, that a native is frequently obliged to travel three days in order to attend divine ſervice. The Laplanders, before their converſion to Chriſtianity, which was not till lately introduced amongſt them, poſſeſſed no books or manuſcripts, though they knew many traditional hiſtories and ſongs of ancient heroes and princes who once reigned over them; but involved in great uncertainty, and mixed with the moſt fabulous accounts. They have now a tranſlation of the New Teſtament in their language; and many of the natives are able to read and write.

LAPLYSIA, or SEA-HARE: A genus of marine inſects belonging to the order of vermes molluſca. See pl. II. The body is covered with membranes reflected. It hath a ſhield-like membrane on the back, a lateral pore on the right ſide, the anus on the extremity of the back, with four feelers reſembling ears. The figure repreſents the depilans minor, which grows to two inches and a half in length, and to more than an inch in diameter: its body approaches to an oval figure, and is ſoft, punctated, of a kind of gelatinous ſubſtance, and of a pale lead colour: from the larger extremity there ariſe four oblong and thick protuberances: theſe are the tentacula; two of them ſtand nearly erect, two are thrown backward. It is not uncommon about our ſhores, eſpecially off Anglefea. It cauſes, by its poiſonous juice, the hair to fall off the hands of thoſe that touch it; and is ſo extremely fetid as to create ſickneſs at the ſtomach.—The major, or greater ſea-hare, grows to the length of eight inches.

LAPSANA, NIPPLEWORT: A genus of the polygamia æqualis order, belonging to the ſyngeneſia claſs of plants; and in the natural method ranking under the 49th order, *Compoſitæ*. The receptacle is naked; the calyx caliculated, with all the inferior ſcales canaliculated or finely channelled. There are four ſpecies, which grow commonly as weeds by the ſides of ditches. The young leaves of the common kind, called *dock-creſſes*, have the taſte of radiſhes, and are eaten raw at Conſtantinople as a ſalad. In ſome parts of England the common people boil them as greens, but they have a bitter and diſagreeable taſte.

LAPSE, in eccleſiaſtical law, a ſlip or omiſſion of a patron to preſent a clerk to a benefice within ſix months of its being void; in which caſe, the benefice is ſaid to be in *lapſe*, or *lapſed*; and the right of preſentation devolved to the ordinary.

And if the ordinary neglect to preſent during the ſame time, the right of preſentation accrues to the metropolitan, and to the king by neglect of the metropolitan. This right of lapſe was firſt eſtabliſhed in the reign of Henry II. when the biſhops firſt began to exerciſe univerſally the right of inſtitution to churches: and therefore, when there is no right of inſtitution, there is no right of lapſe; ſo that no donative can lapſe to the ordinary, unleſs it hath been augmented by the king's bounty; but no right of lapſe can accrue, when the original preſentation is in the crown. In caſe the benefice be-

comes void by death, or ceſſion through plurality of benefices, there the patron is bound to take notice of the vacancy at his own peril; but in caſe of a vacancy by reſignation or canonical deprivation, or if a clerk preſented be refuſed for inſufficiency, theſe being matters of which the biſhop alone is preſumed to be cognizant, here the law requires him to give notice thereof to the patron, otherwiſe he can take no advantage by way of lapſe; neither ſhall any lapſe accrue thereby to the metropolitan or the king. If the biſhop refuſe or neglect to examine and admit the patron's clerk, without good reaſon aſſigned or notice given, he ſhall have no title to preſent by lapſe: and if the right of preſentation be litigious or contested, and an action be brought againſt the biſhop to try the title, no lapſe ſhall occur till the queſtion of right be decided. If the biſhop be both patron and ordinary, he ſhall not have a double time allowed him to collate in: and if the biſhop doth not collate his own clerk immediately to the living, and the patron preſents, though after the ſix months are lapſed, yet the preſentation is good, and the biſhop is bound to inſtitute the patron's clerk. If the biſhop ſuffer the preſentation to lapſe to the metropolitan, the patron alſo has the ſame advantage if he preſents before the archbiſhop has filled up the benefice: yet the ordinary cannot, after lapſe to the metropolitan, collate his own clerk to the prejudice of the archbiſhop. But if the preſentation lapſes to the king, the patron ſhall never recover his right till the king has ſatisfied his turn by preſentation: for *nullum tempus occurrit regi.*

LAPWING, in ornithology. See TRINGA.

LAQUEARIUS, a kind of athleta among the ancients, who in one hand held the *laqueus*, i. e. a ſort of ſnare, wherewith to embarraſs and entangle his antagoniſt, and in the other a poignard to ſtab him.

LAQUEUS, in the old practice of ſurgery, a kind of ligature ſo contrived, that, when ſtretched by any weight or the like, it drew up cloſe. Its uſe was to extend broken or diſjointed bones, to keep them in their places while they were ſet, and to bind the parts cloſe together.

LARARIUM, was a chapel which the Romans frequently had in their houſes for the houſehold gods, called *lares*.—Spartian ſays, that Alexander the ſon of Mammeus kept in his lararium the figure of our Saviour, together with his other idols.

LAR-BOARD, among ſeamen, the left-hand ſide of the ſhip when you ſtand with your face towards the head.

LARCENY, or THEFT, by contraction for latrociny, *latrocinium*, is diſtinguiſhed by the law into two ſorts: the one called *ſimple larceny* or plain theft, unaccompanied with any other atrocious circumſtance: and *mixed* or *compound larceny*, which alſo includes in it the aggravation of a taking from one's houſe or perſon.

I. *Simple* larceny, when it is the ſtealing of goods above the value of twelvepence, is called *grand larceny*; when of goods to that value, or under, is *petit larceny*: offences, which are conſiderably diſtinguiſhed in their puniſhment, but not otherwiſe. See THEFT.

II. *Mixed*, or *compound larceny*, is ſuch as has all the properties of the former (ſee THEFT); but is accompanied with either one or both of the aggravations of a taking from one's *houſe* or *perſon*. Firſt therefore of larceny from the *houſe*, and then of larceny from the *perſon*.

1. Larceny from the *houſe*, though it might ſeem to have a higher degree of guilt than ſimple larceny, yet is not at all diſtinguiſhed from the other at common law: unleſs where it is accompanied with the circumſtance of breaking the houſe by night; and then it falls under another deſcription, viz. that of burglary (ſee BURGLARY). But now by ſeveral acts of parliament (the hiſtory of which is very ingeniouſly deduced by a learned modern writer, who hath ſhewn them to have gradually ariſen from our improvements in trade and opulence) the benefit of clergy is taken from larcenies committed in a houſe in almoſt every inſtance; except that larceny of the ſtock or utenſils of the plate-glaſs company from any of their houſes, &c. is made only ſingle felony, and liable to tranſportation for ſeven years. The multiplicity of the general acts is apt to create ſome confuſion; but upon comparing them diligently, we may collect, that the benefit of clergy is denied upon the following domeſtic aggravations of larceny; viz. firſt, in larcenies *above the value of twelvepence* committed, 1. In a church or chapel, with or without violence, or breaking the ſame: 2. In a booth or tent in a market or fair, in the day-time or in the night, by violence or breaking the ſame, the owner or ſome of his family being therein: 3. By robbing a dwelling-houſe in the day-time (which *robbing* implies a breaking), any perſon being therein: 4. In a dwelling-houſe by day or by night, without breaking the ſame, any perſon being therein and put in fear; which amounts in law to a robbery: and in both theſe laſt caſes the acceſſory before the fact is alſo excluded from his clergy. Secondly, in larcenies *to the value of five ſhillings*, committed, 1. By breaking any dwelling-houſe, or any out-houſe, ſhop, or warehouſe thereunto belonging, in the day-time, although no perſon be therein; which alſo now extends to aiders, abettors, and acceſſories before the fact: 2. By privately ſtealing goods, wares, or merchandiſe, in any ſhop, warehouſe, coach-houſe, or ſtable, by day or by night; though the ſame be not broken open, and though no perſon be therein: which likewiſe extends to ſuch as aſſiſt, hire, or command the offence to be committed. Laſtly, in larcenies *to the value of forty ſhillings* in a dwelling-houſe, or its out-houſes, although the ſame be not broken, and whether any perſon be therein or not; unleſs committed againſt their maſters by apprentices under the age of 15. This alſo extends to thoſe who aid or aſſiſt in the commiſſion of any ſuch offence.

2. Larceny from the *perſon* is either by *privately* ſtealing, or by open and violent aſſault, which is uſually called *robbery*. See ROBBERY.

The offence of *privately* ſtealing from a man's *perſon*, as by picking his pocket or the like, privily, without his knowledge, was debarred of the benefit of clergy ſo early as by the ſtatute 8 Eliz. c. 4. But then it muſt be ſuch a larceny as ſtands in need of the benefit of clergy, viz. of above the value of 12d; elſe the offender ſhall not have judgment of death.—For the ſtatute creates no new offence; but only takes away the benefit of clergy, which was a matter of grace, and leaves the thief to the regular judgment of the ancient law. This ſeverity (for a moſt ſevere law it certainly is) ſeems to be owing to the eaſe with which ſuch offences are committed, the difficulty of guarding againſt them, and the boldneſs with which they were practiſed (even in the queen's court and preſence) at the time when this ſtatute was made: beſides that this is an infringement of property in the manual occupation or corporal poſſeſſion of the owner, which was an offence even in a ſtate of nature. And therefore the *ſacculārii*, or cutpurſes, were more ſeverely puniſhed than common thieves by the Roman and Athenian laws.

LAR, a town of Perſia, in the province of Fars, with a caſtle. It carries on a great trade in ſilk; and its territory abounds in oranges, lemons, and very large tamarinds. E. lon. 54. 15. N. lat. 27. 30.

LARACHA, an ancient and ſtrong town of Africa, in the kingdom of Fez. It is ſeated at the mouth of a river of the ſame name, with a good harbour. It was once in the poſſeſſion of the Spaniards; but the Moors took it from them. W. lon. 5. 55. N. lat. 35. 0.

LARDNER (NATHANIEL), an eminent Engliſh diſſenting

divine, was born at Hawkhurſt in Kent, June 6, 1684. After a grammatical education, to which great attention muſt have been given, and in which a no leſs rapid progreſs muſt have been made, he was ſent firſt to a diſſenting academy in London, which was under the care of the Rev. Dr. Joſhua Oldfield; and thence, in his 16th year, to proſecute his ſtudies at Utrecht, under the celebrated profeſſors D'Uries, Grævius, and Burman. Here he remained ſomewhat more than three years, and then removed for a ſhort ſpace to Leyden. In 1703 he returned to England, continuing at his father's houſe to employ himſelf by cloſe and diligent preparation for the ſacred profeſſion which he had in view. Qualified as he was, it was not till 1709 that he preached his firſt ſermon, from Rom. i. 16.—"a text (his biographer remarks) than which there could not have been a more proper one for a man who was deſtined in the order of Divine Providence to be one of the ableſt advocates for the authenticity and truth of the Chriſtian revelation that ever exiſted."

A few years after this, Lardner was received into Lady Treby's family as domeſtic chaplain and tutor to her ſon, and continued in this comfortable ſituation till her ladyſhip's death in 1721. This event threw him into circumſtances of ſome perplexity, having preached to ſeveral congregations during his reſidence with lady Treby without the approbation or choice of any one congregation. Here we are told, "that it reflects no honour on the Diſſenters, that a man of ſuch merit ſhould have been ſo long neglected. But it has been obſerved upon this, that the pulpit was not the place in which Mr. Lardner was calculated either to convey improvement or acquire reputation." Dr. Kippis afterwards informs us, "that his mode of elocution was very unpleaſant; that from his early and extreme deafneſs he could have no ſuch command of his voice as to give it a due modulation; and that he greatly dropped his words." It cannot then, as his biographer adds, be matter of ſurpriſe that he was not popular; nor, it may be added, can it be any reflection on the congregations to which he occaſionally preached, that they did not chuſe for their miniſter a man, who, notwithſtanding his great learning and amiable virtues, was ſo very deficient as a public ſpeaker, that it was impoſſible to hear him with any pleaſure, and ſcarcely without pain.

Though Mr. Lardner had no church at which he officiated as miniſter, he was engaged with ſome of his diſſenting brethren in preaching a Tueſday evening lecture at the Old Jewry.—Acquainted probably with the direction of his ſtudies, they appointed him to preach on the proof of the *Credibility of the Goſpel Hiſtory*. This he diſcuſſed, we are told, in two ſermons; and proſecuting the ſubject which he had taken up in theſe diſcourſes, in Feb. 1727 he publiſhed, in two volumes octavo, *the Firſt Part of* "The Credibility of the Goſpel Hiſtory, or, the Facts *occaſionally* mentioned in the New Teſtament confirmed by Paſſages of ancient Authors, who were contemporary with our Saviour or his Apoſtles, or lived near their Time." An *Appendix* was ſubjoined, relating to the time of Herod's death.

Thus Mr. Lardner commenced author, and began his literary career with ſingular reputation. "It is ſcarcely neceſſary to ſay (obſerves Dr. Kippis), how well this work was received by the learned world. Not only was it highly approved by the proteſtant diſſenters, with whom the author was more immediately connected, but by the clergy in general of the eſtabliſhed church; and its reputation gradually extended into foreign countries. It is indeed an invaluable performance, and hath rendered the moſt eſſential ſervice to the cauſe of Chriſtianity. Whoever peruſes this work (and to him that does not peruſe it, it will be to his own loſs) will find it replete with admirable inſtruction, found learning, and juſt and candid criticiſm." Theſe two, with the ſubſequent fifteen volumes octavo, and the four thin quartos entitled *Jewiſh and Heathen Teſtimonies*, occupied him, with the interruption ariſing from ſome ſmaller productions, during the long ſpace of *forty-three years*.

Dr. Kippis gives us a particular account of the time when each volume was publiſhed, and of the ſubjects diſcuſſed in each. The following uſeful information which the doctor introduces, in ſpeaking of the "*Supplement* to the Credibility," deſerves well to be tranſcribed. "I cannot avoid ſtrongly recommending this work (ſays he) to the attention of all young divines. Indeed, I think that it ought to be read by every theological ſtudent before he quits the univerſity or academy in which he is educated. There are three other works which will be found of eminent advantage to thoſe who are intended for, or beginning to engage in, the Chriſtian miniſtry. Theſe are, Butler's Analogy, Biſhop Law's Conſiderations on the Theory of Religion, and Dr. Taylor's Key to Apoſtolical Writings, prefixed to his Paraphraſe on the Epiſtle to the Romans. Without agreeing with every circumſtance advanced in theſe works, it may be ſaid of them with the greateſt truth, that they tend to open and enlarge the mind; that they give important views of the evidence, nature, and deſign of revelation; and that they diſplay a vein of reaſoning and inquiry which may be extended to other objects beſides thoſe immediately conſidered in the books themſelves.—It muſt not be forgotten, that the Supplement to the Credibility has a place in the excellent collection of treatiſes in divinity which has lately been publiſhed by Dr. Watſon biſhop of Landaff. For a collection which cannot fail of being eminently conducive to the inſtruction and improvement of younger clergymen, and for the noble, manly, and truly evangelical preface by which it is preceded, this great prelate is entitled to the gratitude of the Chriſtian world."—It may not be improper to add, that the *Supplement to the Credibility* was ſome years ago publiſhed ſeparately by the bookſellers, under the title of *The Hiſtory of the Goſpels and Epiſtles*.

Applauded as Dr. Lardner's works were, he received little recompenſe for them. Some of the latter volumes of the Credibility were publiſhed at a loſs; and at laſt he ſold the copyright and all the remaining printed copies to the bookſellers, for the trifling ſum of 150*l*. His object, however, was not private emolument, but to ſerve the intereſts of truth and virtue; and it pleaſed Divine Providence to ſpare his life, both to complete his extenſive plan, and to ſee the laſt volume, the fourth of the *Teſtimonies*, publiſhed. This was in 1767. He was ſeized with a decline in the ſummer following; and was carried off in a few days at Hawkhurſt, the place of his nativity, where he had a paternal eſtate, in the 85th year of his age.

LAREDO, a ſea-port town of Spain, in the bay of Biſcay, with a large ſafe harbour. It is 30 miles weſt of Bilboa, and 72 north by weſt of Burgos. W. lon. 3. 45. N. lat. 43. 23.

LARENTINALIA, in antiquity, a feaſt held among the Romans on the 23d day of December, but ordered to be obſerved twice a year by Auguſtus; by ſome ſuppoſed to have been in honour of the Lares, but by others, with more probability, in honour of Acca Laurentia; and to have been the ſame with Laurentalia.

LARES, among the ancients, derived by Apuleius (*De Deo Socratis*) from *lar familiaris*; a kind of domeſtic genii, or divinities, worſhipped in houſes, and eſteemed the guardians and protectors of families; ſuppoſed to reſide more immediately in the chimney corner.

The Lares were diſtinguiſhed from the Penates; as the former were ſuppoſed to preſide over houſe-keeping, the ſervants in families, and domeſtic affairs; and the latter were the protectors of the maſters of families, their wives and children.

Accordingly the Lares were dreſſed in ſhort ſuccinct habits, to ſhow their readineſs to ſerve; and they held a ſort of cornucopia in their hands, as a ſignal of hoſpitality and good houſekeeping. According to Ovid, there were generally two of them, who were ſometimes repreſented with a dog at their feet. Plutarch diſtinguiſhes good and evil Lares, as he had before done good and evil genii. There were alſo ſome public, others private Lares. Apuleius tells us the domeſtic Lares were no more than the ſouls of departed perſons, who had lived well, and diſcharged the duties of their ſtation; whereas thoſe who had done otherwiſe, were vagabonds, wandering about and frightening people, called *Larvæ* and *Lemures*.

The Lares were alſo called *Penates*, and were worſhipped under the figures of little marmouſets, or images of wax, ſilver, or earthen ware.

The public Lares were alſo called *Compitales*, from *compitum* "a croſs-way;" and *Viales*, from *via* "a way or public road;" as being placed at the meetings of roads and in the highways, and eſteemed the patrons and protectors of travellers.

Their private Lares took care of particular houſes and families: theſe they alſo called *Præſtites*, from *præſto*; "*Quod præſtant oculis omnia tuta ſuis.*" *Ovid. Faſt.* They gave the name *Urbani*, i. e. "Lares of cities," to thoſe who had cities under their care; and *Hoſtilii*, to thoſe who were to keep their enemies off. There were alſo Lares of the country, called *Rurales*, as appears by ſeveral antique inſcriptions.

The Lares were alſo genial gods, and were ſuppoſed to take care of children from their birth. It is for this reaſon that, when Macrobius tells us the Egyptians had four gods who preſided over the birth of children, *viz.* the Genius, Fortune, Love, and Neceſſity, called *Præſtites*, ſome interpret him as if he had ſaid the Egyptians had Lares: but they have mentioned that there was a great difference between the Lares of the Romans and the Præſtites of the Egyptians. However, the learned Mr. Bryant affirms that they were the ſame.

The ancients differ extremely about the origin of the Lares. Varro and Macrobius ſay that they were the children of Mania; Ovid makes them the iſſue of Mercury, and the Naiad Lara, or Larunda; Apuleius aſſures us they were the poſterity of the Lemures; Nigridius, according to Arnobius, made them ſometimes the guardians and protectors of houſes, and ſometimes the ſame with the Curetes of Samothracia, which the Greeks call *Idæi dactyli*. Nor was Varro more conſiſtent in his opinion of theſe gods; ſometimes making them the manes of heroes, and ſometimes gods of the air.

T. Tatius, king of the Sabines, was the firſt who built a temple to the Lares. The chimney and fire-place in the houſe were particularly conſecrated to them.

Tertullian tells us, the cuſtom of worſhipping the Lares aroſe from this, that they anciently interred their dead in their houſes: whence the credulous people took occaſion to imagine their ſouls continued there alſo, and proceeded to pay them divine honours. To this it may be added, that the cuſtom being afterwards introduced of burying in the highways, they might hence take occaſion to regard them as gods of the highways.

The victim offered to the Lares in the public ſacrifices was a hog: in private, they offered them wine, incenſe, a crown of wool, and a little of what was left at the table. They alſo crowned them with flowers, particularly the violet, myrtle, and roſemary. Their ſymbol was a dog, which was uſually repreſented by their ſide, on account of its fidelity, and the ſervice it does to man in watching his houſe. They were ſometimes alſo repreſented as clothed in a dog-ſkin.

The term *Lares*, according to Mr. Bryant, was formed from *laren*, an ancient word by which the ark was repreſented; and he ſuppoſes the Lares and Manes were the ſame domeſtic deities under different names; and that by theſe terms the Hetrurians and Latins denoted the *dii arkitæ*, who were no other than their arkite anceſtors, or the perſons preſerved in the laren or ark; the genius of which was Iſis, the reputed parent of the world. He obſerves farther, that they are deſcribed as dæmons and genii, who once lived on earth, and were gifted with immortality. Arnobius ſtyles them *Lares quoſdam genios & functorum animas*; and he ſays, that according to Varro, they were the children of Mania. Huetius (Demonſt. Prop. 4. p. 139.) adds, that Mania had alſo the name of *Larunda*; and ſhe is ſtyled the mother of the dæmons. By ſome ſhe is called *Lara*, and was ſuppoſed to preſide over families; and children were offered at her altar in order to procure her favour. In lieu of theſe they in after-times offered the heads of poppies and pods of garlic.

LARGE, a ſea term applied to the wind when it croſſes the line of a ſhip's courſe in a favourable direction, particularly on the beam or quarter. Thus, if the ſhip ſteer weſt, then the wind in any point of the compaſs to the eaſtward of the ſouth or north may be called *large*, unleſs when it is directly eaſt, and then it is ſaid to be right aft. Sailing large is, therefore, advancing with a large wind, ſo as that the ſheets are ſlackened and flowing, and the bow-lines entirely diſuſed. This phraſe is generally oppoſed to ſailing cloſe-hauled.

LARGESS. See LARGITIO.

LARGITIO, in Roman antiquity, was a diſtribution of corn, proviſion, clothes, money, &c. to the people. Gracchus when tribune, to make himſelf popular, paſſed a law for ſupplying the Roman citizens with corn at a very low rate, out of the public granaries. Claudius, another tribune, with the ſame views to popular applauſe, procured it to be diſtributed *gratis*. Cato, to win the common people from Cæſar, perſuaded the ſenate to do the ſame, and 300,000 citizens ſhared in the diſtribution. Cæſar, after his triumph, extended his bounty to 150,000, giving them each a *mina*. The Roman emperors enlarged ſtill further the liſt of thoſe who were to partake of their diſtributions. Largitio is frequently taken in a bad ſenſe, to ſignify a maſked bribery; whereby candidates purchaſed votes, when they ſtood for places of honour or truſt in the ſtate. The diſtribution of money was called *congiarium*, and the diſtributors *diviſores* and *ſequeſtres*.

LARGS, a village on the weſt coaſt of Scotland, oppoſite to the iſland of Bute: rendered memorable by the defeat of the Norwegians here in their laſt invaſion of this country.—This invaſion was made in the year 1263, with a fleet of 160 ſail and an army of 20,000 men, commanded by Haquin king of Norway, whoſe ravages on the coaſt of Ayr, Bute, and Arran, reaching the Scottiſh court, an army was immediately aſſembled by Alexander III. and a bloody engagement enſued at this village, when 16,000 of the invaders were ſlain in the battle and flight, with 5000 Scots. Haquin eſcaped to the Orkneys, where he ſoon after died of grief. The entrenchments of the Norwegian camp may ſtill be traced along the ſhore of this place. The Scottiſh commanders who fell in battle were buried in a riſing field, near the village; three or four perſons were interred in one grave, on each ſide of which was a large ſtone, a third was placed acroſs the grave, ſupported at the extremities by the ſide ſtones, and in this rude manner the warriors lay entombed. Some years ago the proprietor of the field demoliſhed theſe repoſitories of the dead, leaving only one, which ſerves to give an idea of the whole.

LARINO, a town of Italy, in the kingdom of Naples, in the Capitanata, with a biſhop's ſee. E. lon. 15. 51. N. lat. 41. 48.

LARISSA, an ancient, rich, and celebrated town of Greece, in the province of Janna or Theſſaly, with an archbiſhop's ſee of the Greek church, a palace, and ſeveral handſome moſques. According to Virgil, it was the country of Achilles. It was

alſo the place where Philip the father of Alexander the Great reſided. The inhabitants carry on a conſiderable trade. The city is agreeably ſeated on the river Peneus, in E. lon. 23. 36. N. lat. 38. 51.

LARIX, the LARCH-TREE. See PINUS.

LARK, in ornithology. See ALAUDA, and BIRD-*Catching*. The lark is not only a very agreeable bird for the cage, but will live upon almoſt any food, ſo that it have once a week a freſh tuft of three-leaved graſs. The proper method of keeping them in health is this: there muſt be two pans of food, the one containing meat, the other oatmeal and hempſeed. A very good food is the following: Boil an egg very hard, to which add the crumb of a halfpenny loaf, and as much hempſeed; let the egg be chopped very ſmall, and the hempſeed bruiſed in the mortar; when theſe are mixed, the bread is to be crumbled in among the reſt, and the whole to be rolled together with a common rolling pin, and kept for uſe. There muſt be ſome fine ſmall gravel ſtrewed at the bottom of the cage, and renewed at fartheſt once in a week. This will prevent the bird's feet from getting hurt by being clogged with the dung; and his baſking in this will keep him alſo from growing louſy, after which few come to good. There muſt be a perch in the cage, and it muſt either be covered with green baize, or made of fine matting, which the lark is very fond of. When the bird is firſt taken, ſome meat muſt be ſtrewed upon the ſand in the bottom of the cage; for it will be ſometimes almoſt famiſhed before it finds the meat in the pan.

The cock-bird of this kind is known from the hen by the loudneſs and length of his call, by his tallneſs as he walks about the cage, and by his doubling his notes in the evening, as if he was going with his mate to rooſt. A better rule than all others, however, is his ſinging ſtrong; for the hen wood-lark ſings but very weakly.—Both the cock and hen of this kind are ſubject to many diſorders; the principal of theſe are cramps, giddineſs of the head, and breeding lice. Cleanlineſs is the beſt cure for the firſt and the laſt of theſe complaints; but we know of no cure for the other. A good ſtrong bird, however, will often laſt very well five or ſix years, and improve all the time.

LARKSPUR. See DELPHINIUM.

LARRIBUNDAR, a ſea-port town of Aſia, in Indoſtan; ſeated at the mouth of the river Sinda, or Indus, with a harbour capable of receiving ſhips of 200 tons burden. It is but a ſmall place, conſiſting of about 100 houſes built with wood; but has a ſtone fort, with a few guns. E. lon. 67. 0. N. lat. 25. 0.

LARVA, in natural hiſtory, a name given by Linnæus to inſects in that ſtate, called by other writers *eruca* or *caterpillar*. See *Transformation of* INSECTS.

LARVÆ, in antiquity, derived from the Hetruſcan word *lar* or *lars*, ſignifying "prince or lord," denoted the ghoſts of the deceaſed, conſidered as wicked and miſchievous. Hence is formed the term *larvatus*, i. e. *larva indutus* or *demoniac*. The ingenious Mr. Farmer urges the etymology and uſe of this term to prove, that the heathen demons were human ghoſts.—The larvæ were alſo called *lemures*.

LARVÆ, in mineralogy, the ſame with petrifactions. See PETRIFACTIONS.

LARUS, the GULL, in ornithology: A genus belonging to the order of anſeres, the characters of which are theſe: The bill is ſtraight, cultrated, a little crooked at the point, and without teeth; the inferior mandible is gibbous below the apex; the noſtrils are linear, a little broader before, and ſituated in the middle of the beak. The different ſpecies are principally diſtinguiſhed by their colour. See pl. 11.

1. The *marinus*, or black-backed gull, is in length 29 inches; in breadth five feet nine. The bill is very ſtrong and thick, and almoſt four inches long; the colour a pale yellow; but the lower mandible is marked with a red ſpot, with a black one in the middle. The head, neck, whole under-ſide, tail, and lower part of the back, are white: the upper part of the back, and wings, are black; the quill-feathers tipt with white; the legs of a pale fleſh-colour. It inhabits ſeveral parts of England, and breeds on the higheſt cliffs. The egg is blunt at each end, of a duſky olive-colour, quite black at the greater end, and the reſt of it thinly marked with duſky ſpots. It is alſo common on moſt of the northern coaſts of Europe. It frequents Greenland, but chiefly inhabits the diſtant rocks. It lays three eggs in May, placing them on the heaps of dung which the birds leave there from time to time. It is ſaid to attack other birds, and to be particularly an enemy to the eider duck. It very greedily devours carrion, though the moſt general food is fiſh. It is common alſo in America, as low as South Carolina, where it is called the *old wife*.

2. The *cataractes*, or Skua gull, is in length two feet; the extent four feet and a half; the weight three pounds: the bill is two inches one-fourth long, very much hooked at the end, and very ſharp; the upper mandible covered more than halfway with a black cere or ſkin, as in the hawk kind: the noſtrils are placed near the bend, and are pervious. The feathers on the head, neck, back, ſcapulars, and coverts of the wings, are of a deep brown, marked with ruſt colour (brighteſt in the male). The breaſt, belly and vent are ferruginous, tinged with aſh colour. The tail when ſpread is circular, of a deep brown, white at the root, and with ſhafts of the ſame colour. The legs are covered with great black ſcalons; the talons black, ſtrong, and crooked; the interior remarkably ſo.—This bird inhabits Norway, the Ferroe iſles, Shetland, and the noted rock Foula a little weſt of them. It is alſo a native of the South Sea. It is the moſt formidable of the gulls; its prey being not only fiſh, but, what is wonderful in a web-footed bird, all the leſſer ſort of water-fowl, ſuch as teal, &c. Mr. Schroter, a ſurgeon in the Ferroe iſles, relates that it likewiſe preys on ducks, poultry, and even young lambs. It has all the fierceneſs of the eagle in defending its young: when the inhabitants of thoſe iſlands viſit the neſt, it attacks them with great force, ſo that they hold a knife erect over their heads, on which the ſkua will transfix itſelf in its fall on the invaders. The Rev. Mr. Low, miniſter of Birſa in Orkney, confirmed part of the above account: On approaching the quarters of theſe birds, they attacked him and his company with moſt violent blows; and intimidated a bold dog of Mr. Low's in ſuch a manner, as to drive him for protection to his maſter. The natives are often very rudely treated by them while they are attending their ſheep on the hills; and are obliged to guard their heads by holding up their ſticks, on which the birds often kill themſelves. In Foula it is a privileged bird, becauſe it defends the flocks from the eagle, which it beats and purſues with great fury; ſo that even that rapacious bird ſeldom ventures near its quarters. The natives of Foula on this account lay a fine on any perſon who deſtroys one: they deny that it ever injures their flocks or poultry; but imagine it preys on the dung of the arctic and other larger gulls, which it perſecutes till they moot for fear.—Theſe birds are alſo frequent in many high latitudes of the ſouthern hemiſphere: our circumnavigators met with them in Falkland iſles, particularly about Port Egmont, whence called *Port Egmont hens*. In this place, and at Terra del Fuego, they were obſerved to make their neſts among the dry graſs. After breeding-time, they diſperſe over the ocean, and for the moſt part are ſeen in pairs. They are met with in Kerguelen's land, and off the Cape of Good Hope, and other parts. In all places its manners are the ſame in reſpect to ferocity; it is frequently ſeen to attack the largeſt albatroſs, beating it with great violence ſo long as it remains

on the wing; at which time this cowardly giant finds no other reſource than to ſettle on the water; upon which the ſkua flies away.

3. The *paraſiticus*, or dung-hunter, is in length 21 inches. The bill is an inch and a half long, pretty much hooked, and of a duſky colour: the noſtrils are placed in a kind of cere: the top of the head is black; the ſides of it, forehead, neck, and all beneath, white: acroſs the breaſt there is a pale duſky bar: the upper parts of the body, wings, and tail, are black; the baſe of the quills white on the inner webs; and the two middle feathers of the tail are near four inches longer than the reſt: the legs are ſcaly, not very ſtout; the colour of them is black. The female is ſaid to be entirely brown, paleſt beneath; and the middle tail feathers only two inches longer than the others. This is a northern ſpecies, and very common in the Hebrides, where it breeds on heath. It comes in May, and retires in Auguſt; and if diſturbed flies about like the lapwing, but ſoon alights. It is alſo found in the Orkneys; and on the coaſts of Yorkſhire, where it is called the *ſeaſer*. It is met with likewiſe on the northern coaſts of Sweden, Denmark, and Ruſſia, as far as Kamtchatka; and it is common in Greenland, where it frequents the open ſea as well as the bays. The female makes an artleſs neſt of graſs and moſs, on a hillock in ſome marſhy place, and lays two aſh-coloured eggs, ſpotted with black, the ſize of thoſe of a hen. This bird does not often ſwim, and flies generally in a ſlow manner, except it be in purſuit of other birds; which it often attacks, in order to make them diſgorge the fiſh or other food, which this common plunderer greedily catches up. Moſt authors have told us, that it is the dung of the birds which it ſearches after in the purſuit; but latter obſervations inform us that the circumſtance is not true; though, from the ſuppoſition of its being ſo, the bird has obtained the name of *ſtrunt jager*.

4. The *fuſcus*, or herring-gull, weighs upwards of 30 ounces; the length 23 inches, its breadth 52: the bill is yellow, and the lower mandible marked with an orange-coloured ſpot: the back and coverts of the wings are aſh-coloured; the upper part of the five firſt quill-feathers is black, marked with a white ſpot near their end; the legs of a pale fleſh colour. Theſe birds breed on the ledges of rocks that hang over the ſea: they make a large neſt of dead graſs; and lay three eggs of a dirty white, ſpotted with black. The young are aſh-coloured, ſpotted with brown. They do not come to their proper colour the firſt year: this is common to other gulls; which has greatly multiplied the ſpecies among authors who are inattentive to theſe particulars. This gull is a great devourer of fiſh, eſpecially of that from which it takes its name: it is a conſtant attendant on the nets, and ſo bold as to ſeize its prey before the fiſhermen's faces.—The herring-gull is common in this kingdom, and frequents the ſame places as the black-backed. It is alſo found in moſt of the northern parts of Europe, as well as about the Caſpian and Black ſeas, and the rivers which fall into them, and about the great lakes of Siberia. It is found likewiſe in Iceland, Greenland, and Hudſon's Bay. In winter it migrates ſouth, being found in Jamaica; and is ſaid to breed on ſome of the iſlands on the coaſt of South Carolina.

5. The *nævius*, or wagel, is a large ſpecies, being near two feet in length, and in breadth about five; weight, near three pounds. The bill is black; two inches and a half long: the irides are duſky: the whole plumage is compoſed of a mixed brown, aſh-colour, and white; the middle of each feather brown: the under parts of the body are the ſame, but paler: the quills are black: the lower part of the tail is mottled black and white; near the end is a bar of black, and beyond this the end is white: the legs are of a dirty fleſh-colour, in ſome white. This ſpecies frequents the ſea-ſhores of many parts of England, though not in any conſiderable numbers. At times it is ſeen on the banks of the Thames along with other gulls; and is there ſuppoſed to be the female of the black-backed: but this has not yet been determined ſufficiently by authors.

6. The *hybernus*, or winter gull, winter-mew, or coddy-moddy, weighs from 14 to 17 ounces: the length 18 inches, the breadth three feet nine. The irides are hazel: the bill is two inches long, but the ſlendereſt of any gull; black at the tip, and whitiſh towards the baſe. The crown of the head, and hind part and ſides of the neck, are white, marked with oblong duſky ſpots; the forehead throat, middle of the breaſt, belly, and rump, white; the back and ſcapulars of a pale grey, the laſt ſpotted with brown: the coverts of the wings are of a pale brown, edged with white; the firſt quill-feather is black, the ſucceeding ones are tipt with white: the tail is white, croſſed near the end with a black bar; the legs are of a dirty blueiſh white. This kind frequents, during winter, the moiſt meadows in the inland parts of England, remote from the ſea. The gelatinous ſubſtance, known by the name of *ſtar ſhot*, or *ſtar-gelly*, owes its origin to this bird, or ſome of the kind; being nothing but the half digeſted remains of earth-worms, which theſe birds feed on, and often diſcharge from their ſtomachs.

7. The *canus*, or common gull, is in length 16 or 17 inches; in breadth 36; weight one pound. The bill is yellow: the irides are hazel, and the eye-lids brown: the head, neck, under parts of the body, and tail, are white; the back and wings, pale grey: the outer edge of the four firſt quills, and tips of the firſt five, are black; but the fourth and fifth have a white ſpot at the tips; the reſt, except the three neareſt the body, have the ends white: the legs are of a dull greeniſh white.—This ſeems to be the moſt common of all the gulls, being found in vaſt numbers on our ſhores and rivers which are contiguous to the ſea. It is ſeen alſo very far north, as far as Iceland and the Ruſſian lakes: it is met with in the neighbourhood of the Caſpian Sea, in various ſhores of the Mediterranean, and as far ſouth as Greece: and it is found alſo in America, on the coaſt of Newfoundland. It breeds on the rocks and cliffs, like others of the genus; and the eggs are two inches and a half in length, of a deep olive brown, marked with irregular deep reddiſh blotches. It is a tame ſpecies, and may be ſeen by hundreds on the ſhores of the Thames and other rivers, in the winter and ſpring, at low tides, picking up the various worms and ſmall fiſh left by the tides; and will often follow the plough in the fields contiguous, for the ſake of worms and inſects which are turned up, particularly the cock-chafer or dorbeetle in its larva ſtate, which it joins with the rooks in devouring moſt greedily.

8. The *tridactylus*, or tarrock, is in length 14 inches, breadth 36; weight ſeven ounces. The bill is ſhort, thick, and black: the head, neck, and under parts, are white: near each ear, and under the throat, there is a black ſpot; and at the hind part of the neck a creſcent of black: the back and ſcapulars are blueiſh grey; the wing-coverts duſky edged with grey, ſome of the larger wholly grey: the exterior ſides and ends of the firſt four quills are black, tips of the two next black, all the reſt white: the ten middle feathers of the tail are white tipped with black, the two outermoſt wholly white: the legs are of a duſky aſh-colour; in lieu of the back toe, it has only a protuberance. This breeds in Scotland with the kittiwake; and inhabits other parts of northern Europe, quite to Iceland and Spitzbergen, the Baltic and White Sea, as alſo Kamtchatka. It is common in Greenland in ſummer. It comes in ſpring, and frequents the ſea-ſhores; builds in the rocky crags of the bays; in June lays two eggs of a greeniſh aſh-colour ſpotted with brown; and retires from the ſhores in autumn. It is obſerved frequently to attend the whales and ſeals, for the ſake of the fiſh which the laſt drive before them into the ſhallows, when theſe birds dart into the water ſuddenly and make them

their prey. They are very noiſy birds, eſpecially during the time of incubation. They ſwim well, and fly equally well, and for a long time together: they are often obſerved on portions of ice ſwimming in the ſea. Both the fleſh and eggs are eſteemed by the Greenlanders, and the ſkins uſed as garments.

9. The *riſſa*, or kittiwake, is in length 14 inches, in extent three feet two. When arrived at full age, the head, neck, belly and tail, are of a ſnowy whiteneſs; behind each ear is ſometimes a duſky ſpot: the back and wings are grey: the exterior edge of the firſt quill-feather, and tips of the four or five next, are black: the bill is yellow, tinged with green; and the inſide of the mouth is orange: the legs are duſky, with only a knob inſtead of the back toe. It inhabits the romantic cliffs of Flamborough-head (where it is called *petrel*), the Baſs iſle, the vaſt rocks near the caſtle of Slains in the county of Aberdeen, and Prieſtholm iſle. The young of theſe birds are a favourite diſh in North Britain, being ſerved up roaſted, a little before dinner, in order to provoke the appetite; but, from their rank taſte and ſmell, ſeem much more likely to produce a contrary effect. This bird is likewiſe met with at Newfoundland; in Groenland, Spitzbergen, Iceland, and the north of Europe; the arctic coaſt of Aſia, and Kamtchatka.—By the Icelanders it is called *ritſa*. Some authors affirm the kittiwake to be the tarrock in a ſtate of perfection; while others maintain the contrary.

10. The *ridibundus*, pewit, or black-head gull, is in length 15 inches, breadth three feet; weight ten ounces. The bill is rather ſlender, and of a blood-red: the eye-lids are red, and the irides hazel: the head and throat are duſky brown, in old birds black; and on each eye-lid is a ſmall white ſpot: the back and wings are of an aſh-colour: the neck, all the under parts, and tail, are white: the ten firſt quills are white, margined and more or leſs tipped with black; the others of an aſh colour, with white ends: the legs are of the colour of the bill, the claws black. This ſpecies breeds on the ſhores of ſome of our rivers; but full as often in the inland fens of Lincolnſhire, Cambridgeſhire, and other parts of England. They make their neſt on the ground, with ruſhes, dead graſs, and ſuch-like; and lay three eggs of a greeniſh brown marked with red-brown blotches. After the breeding ſeaſon, they again diſperſe to the ſea-coaſts. They breed alſo in Northumberland and Scotland; and are found throughout Ruſſia and Siberia, as far as Kamtchatka, but not farther to the north. They are ſeen throughout the winter at Aleppo, in great numbers; and ſo tame, that the women are ſaid to call them from the terraces of their houſes, throwing up pieces of bread, which theſe birds catch in the air. They inhabit North America, coming into New England in May and departing in Auguſt. The young birds in the neighbourhood of the Thames are thought good eating, and are called the *red-legs*. They were formerly more eſteemed, and numbers were annually taken and fattened for the table. Plott gives a marvellous account of their attachment to the lord of the ſoil they inhabit; inſomuch, that on his death they never fail to ſhift their quarters for a certain time. Whitelock, in his Annals, mentions a piece of ground near Portſmouth, which produced to the owner 40l. a year by the ſale of pewits, or this ſpecies of gull. Theſe are the *ſea-gulles* that in old times were admitted to the noblemen's tables. The note of theſe gulls is like a hoarſe laugh.

11. The *atricilla*, or laughing-gull, is in length 18 inches, breadth three feet. It differs from that bird only in the legs, which are black inſtead of red. It is found in Ruſſia on the river Don, particularly about Tſchercaſk. The note reſembles a coarſe laugh, whence the name of the bird. It is met with alſo in different parts of the continent of America; and is very numerous in the Bahama iſlands.

There are nine or ten other ſpecies of this genus.

LARYNX, in anatomy, the upper part of the windpipe. See ANATOMY.

LASCARIS (ANDREW JOHN), ſurnamed *Rhyndacenus*, of an ancient Greek family, went into Italy after the taking of Conſtantinople by the Turks in 1453. He was well received by Laurence de Medicis, a diſtinguiſhed protector of learned men; and was twice ſent to Conſtantinople to collect the beſt Greek manuſcripts, by which means numberleſs ſcarce and valuable treaſures of literature were carried into Italy. At his return Louis XII. king of France prevailed on him to ſettle in the univerſity of Paris, and ſent him twice ambaſſador to Venice. Ten years after, cardinal John de Medicis being elected pope, under the name of Leo X. John Laſcaris, his old friend, went to Rome, and had the direction of a Greek college. He died at Rome in 1535, at about the 90th year of his age. He brought into the Weſt moſt of the fine Greek manuſcripts that are now extant, and compoſed ſome epigrams in Greek and Latin.

LASCARIS (Conſtantine), one of the Greeks who were principally concerned in the revival of learning in the Weſt, retired into Italy in 1454, and taught polite literature at Milan, whither he was called by Francis Sforza; he afterwards went to Rome, where he was well received by cardinal Beſſarion. He afterwards taught rhetoric and the Greek tongue at Naples; and ended his days at Meſſina, leaving the ſenate of that city many excellent manuſcripts which he had brought from Conſtantinople. He was interred at the public expence, and the ſenate of Meſſina erected a marble tomb to his memory. He wrote ſome grammatical works.

LASERPITIUM, LAZAR-WORT: A genus of the digynia order, belonging to the pentandria claſs of plants; and in the natural method ranking under the 45th order, *Umbellatæ*. The fruit is oblong, with eight membranaceous angles; the petals inflexed, emarginated, and patent. There are nine ſpecies, none of which are at all remarkable for their beauty, ſo are only preſerved in botanic gardens for the ſake of variety. They are natives of Germany, Italy, and the ſouth of France. All of them abound with an acrid juice, which turns to an exceſſively acrimonious reſin. This was uſed by the ancients to take away black and blue ſpots that came by bruiſes or blows, as alſo to take away excreſcences: it was alſo by ſome of the ancients uſed internally; but produced ſuch violent effects, that the more prudent refrained from the uſe of it. It is generally ſuppoſed that the ſilphium of the ancients was procured from one of the ſpecies of this genus; but of this we are at preſent ignorant.

LASH, or LACE, in the ſea-language, ſignifies to bind and make faſt; as, to laſh the bonnet to the courſe, or the drabbler to the bonnets; alſo the carpenter takes care that the ſpare yards be laſhed faſt to the ſhip's ſide; and in a rolling ſea, the gunners mind that the guns be well laſhed, leſt they ſhould break looſe. Laſhes are properly thoſe ropes which bind faſt the tackles and the breechings of the ordnance, when hauled or made faſt within-board.

LASSITUDE, or WEARINESS, in medicine, a morbid ſenſation, that comes on ſpontaneouſly, without any previous motion, exerciſe, or labour. This is a frequent ſymptom in acute diſtempers: it ariſes either from an increaſe of bulk, a diminution of proper evacuation, or too great a conſumption of the fluids neceſſary to maintain the ſpring of the ſolids, or from a vitiated ſecretion of that juice.

LASSUS, or LASUS, a dithyrambic poet, born at Hermione in Peloponneſus about 500 years before Chriſt. He is reckoned among the wiſe men of Greece by ſome. He is particularly known by the anſwer he gave to a man who aſked him what could beſt render life pleaſant and comfortable? Experience. He was acquainted with muſic. Some fragments of his poetry are

to be found in Athenæus. He wrote an ode upon the Centaurs, and an hymn to Ceres, without inferting the letter S in the compoſition.

LAST, in general, ſignifies the burden or load of a ſhip. It ſignifies alſo a certain meaſure of fiſh, corn, wool, leather, &c. A laſt of codfiſh, white herrings, meal, and aſhes for ſoap, is twelve barrels; of corn or rapeſeed, ten quarters; of gunpowder, twenty-four barrels; of red herrings, twenty cades; of hides, twelve dozen; of leather, twenty dickers; of pitch and tar, fourteen barrels; of wool, twelve ſacks; of ſtock-fiſh, one thouſand; of flax or feathers, 1700lb.

LASTAGE, or LESTAGE, a duty exacted in ſome fairs and markets, for carrying things bought whither one will. It ſignifies alſo the ballaſt or lading of a ſhip; and ſometimes is uſed for garbage, rubbiſh, or ſuch-like filth.

LATERAN was originally the proper name of a man: whence it deſcended to an ancient palace in Rome, and to the buildings ſince erected in its place; particularly a church called *St. John of Lateran*, which is the principal ſee of the popedom.

Councils of the LATERAN, are thoſe held in the baſilica of the Lateran: of theſe there have been five, held in 1123, 1139, 1179, 1215, and 1513.

Canons Regular of the Congregation of the LATERAN, is a congregation of regular canons, whereof that church is the principal place or ſeat. It is pretended there has been an uninterrupted ſucceſſion of clerks, living in community from the time of the apoſtles; and that a number of theſe were eſtabliſhed in the Lateran in the time of Conſtantine. But the canons were not introduced till the time of Leo I. and theſe held the church 800 years, till the reign of Boniface, who took it from them, and placed ſecular canons in their room: 150 years after, the regulars were reinſtated.

A LATERE, a term uſed to denote the qualifications of the cardinals whom the pope ſends as legates into foreign countries. They are called *legates a latere*, as being his holineſs's aſſiſtants and counſellors in ordinary. Theſe are the moſt conſiderable of the other three kinds of legates, being ſuch as the pope commiſſions to take his place in councils; and ſo called, in regard that he never gives this office to any but his favourites and confidants, who are always *a latere*, at his ſide. A legate a-latere has the power of conferring benefices without a mandate, of legitimating baſtards to hold offices, and has a croſs carried before him as the enſign of his authority.

De LATERE, legates who are not cardinals, but yet are entruſted with an apoſtolical legation. See the article LEGATE.

LATE-WAKE, a ceremony uſed at funerals in the Highlands of Scotland. The evening after the death of any perſon, the relations and friends of the deceaſed meet at the houſe, attended by bagpipe or fiddle; the neareſt of kin, be it wife, ſon, or daughter, opens a melancholy ball, dancing, and *greeting* (i. e. crying violently) at the ſame time, and this continues till day-light; but with ſuch gambols and frolics among the younger part of the company, that the loſs which occaſioned them is often more than ſupplied by the conſequences of that night. If the corpſe remains unburied for two nights, the ſame rites are renewed. Thus, Scythian-like, they rejoice at the deliverance of their friends out of this life of miſery.

LATEEN SAIL, a long triangular ſail extended by a lateen yard, and frequently uſed by xebecs, poleacres, ſetees, and other veſſels navigated in the Mediterranean ſea.

LATH, in building, a long, thin, and narrow ſlip of wood nailed to the rafters of a roof or ceiling, in order to ſuſtain the covering.

LATH-*Bricks*, a particular ſort of bricks made in ſome parts of England, of twenty-two inches in length and ſix in breadth, which are uſed in the place of laths or ſpars, ſupported by pillars in caſts, for the drying of malt. This is an excellent contrivance; for beſides that they are not liable to fire, as the wooden laths are, they retain the heat vaſtly better; ſo that being once heated, a very ſmall quantity of fire will ſerve to keep them ſo.

LATHE, a very uſeful engine for the turning of wood, ivory, metals, and other materials (ſee TURNING). The invention of the lathe is very ancient: Diodorus Siculus ſays, the firſt who uſed it was a grandſon of Dædalus, named Talus. Pliny aſcribes it to Theodore of Samos; and mentions one Thericles, who rendered himſelf very famous by his dexterity in managing the lathe. With this inſtrument the ancients turned all kinds of vaſes, many whereof they enriched with figures and ornaments in baſſo relievo. Thus Virgil: "*Lenta quibus torno facili ſuperaddita vitis.*" The Greek and Latin authors make frequent mention of the lathe; and Cicero calls the workmen who uſed it *vaſcularii*. It was a proverb among the ancients, to ſay a thing was formed in the lathe, to expreſs its delicacy and juſtneſs.

The lathe is compoſed of two wooden cheeks or ſides, parallel to the horizon, having a groove or opening between: perpendicular to theſe are two other pieces called *puppets*, made to ſlide between the cheeks, and to be fixed down at any point at pleaſure. Theſe have two points, between which the piece to be turned is ſuſtained: the piece is turned round, backwards and forwards, by means of a ſtring put round it, and faſtened above to the end of a pliable pole, and underneath to a tredle or board moved with the foot. There is alſo a reſt which bears up the tool, and keeps it ſteady. See TURNING.

LATHRÆA, in botany: A genus of the angioſpermia order, belonging to the didynamia claſs of plants; and in the natural method ranking under the 40th order, *Perſonatæ*. The calyx is quadrifid; there is a depreſſed glandule at the baſe of the future of the germen. The capſule is unilocular.

LATHREVE, LEIDGREVE, or TRITHENGREVE, was an officer under the Saxon government, who had authority over a third part of the county; and whoſe territory was therefore called *trithing*, otherwiſe a *leid* or *leithin*, in which manner the county of Kent is ſtill divided; and the rapes in Suſſex ſeem to anſwer to the ſame. As to the juriſdiction of this officer, thoſe matters that could not be determined in the hundred court, were thence brought to the trithing; where all the principal men of the three or more hundreds being aſſembled by the *lathreve* or *trithingreve*, did debate and decide it: or if they could not, then the *lathreve* ſent it up to the county court, to be there finally determined.

LATHYRUS, CHICKLING: A genus of the decandria order, belonging to the diadelphia claſs of plants; and in the natural method ranking under the 32d order, *Papilionaceæ*. The ſtylus is plain, villous above, towards the end broader; the upper two ſegments of the calyx are ſhorter than the reſt.

The *Species* are, 1. The *latifolius*, or everlaſting pea, hath thick, fibrous, perennial roots; climbing, thick, branching annual ſtalks, having membranaceous wings between the joints, riſing upon ſupport by their cirri ſix or eight feet high; diphyllous leaves, of two ſpearſhaped lobes, terminated by claſpers; and numerous large red or purple flowers on long foot-ſtalks, appearing plentifully from June till October, ſucceeded by abundance of ſeed. 2. The *odorata*, or ſweet-ſcented pea, hath a fibrous annual root; a climbing ſtalk, riſing upon ſupport by its claſpers three or four feet high; diphyllous leaves of two oval lobes, terminated by climbing tendrils; and flowers by two's on long flower-ſtalks, of different colours in the varieties. 3. The *tangitanus*, or Tangier-pea, hath a fibrous annual root, a climbing ſtalk riſing upon ſupport for four or five feet high; diphyllous leaves, of two ſpearſhaped alternate

lobes, terminated by tendrils; and from the joints of the ſtalk large reddiſh flowers by two's on long footſtalks.

All theſe ſpecies are of hardy growth; and may be propagated by ſeed in the common ground, in patches where it is deſigned the plants ſhould flower, for they do not ſucceed ſo well by tranſplantation. They may be ſowed in ſpring; though, if ſowed in autumn, the plants will flower earlier the following year.

LATIAR, in Roman antiquity, a feaſt or ceremony inſtituted by Tarquinius Superbus, in honour of Jupiter Latiaris or Latialis.—Tarquin having made a treaty of alliance with the Latins, propoſed, in order for perpetuating it, to erect a common temple, where all the allies, the Romans, Latins, Hernici, Volſci, &c. ſhould aſſemble themſelves every year, hold a kind of fair, exchange merchandizes, feaſt, ſacrifice, and make merry together. Such was the inſtitution of the Latiar. The founder only appointed one day for this feaſt; the firſt conſul added another to it, upon concluding the peace with the Latins; and a third was added after the people who had retired to the Mons Sacer were returned to Rome; and a fourth, after appeaſing the ſedition raiſed on occaſion of the plebeians aſpiring to the conſulate. Theſe four days were called the *Latin feriæ*; and all things done during the courſe of the feriæ, as feaſts, ſacrifices, offerings, &c. were called *Latiares*.

LATICLAVE *(Laticlavium)*, in Roman antiquity, was an honourable diſtinction, peculiar, in the times of the republic, to the ſenators; but whether it was a particular kind of garment, or only an ornament upon it, the critics are not agreed: But the more general opinion is, that it was a broad ſtripe of purple ſewed upon the fore-part of their tunic, and round the middle of the breaſt. There were buttons ſet on the *latus clavus* or *laticlave*, which appeared like the heads of large nails, whence ſome think it derived its name.—The ſenators, prætors, and chief magiſtrates of colonies and municipal cities, had a right to wear it. The prætexta was always worn over it; but when the prætor pronounced ſentence of death, the prætexta was then put off, and the laticlave retained. The *laticlavium* differed from the *anguſticlavium*, but authors do not agree in what reſpect this difference conſiſted: the moſt general opinion ſeems to be, that the ſlips or ſtripes of purple were narrower in the anguſticlave.

LATIMER (Hugh), biſhop of Worceſter, was born about the year 1480 at Thurcaſton in Leiceſterſhire, the only ſon of a yeoman of that village. At the age of fourteen he was ſent to Chriſt's college, Cambridge; where he applied himſelf to the ſtudy of divinity, and in proper time took the degree of bachelor in that ſcience. At this time he was a zealous Papiſt, and was honoured with the office of keeper of the croſs to the univerſity: but when he was about thirty years of age, he became a convert to the Proteſtant religion; and being now one of the twelve licenſed preachers from Cambridge, he promulgated his opinions with great freedom. It was not long before he was accuſed of hereſy; and, being ſummoned before cardinal Wolſey, was obliged to ſubſcribe certain articles of faith, which he certainly did not believe. About the year 1529 he was preſented by the king to the rectory of Weſtkinton in Wiltſhire; to which place, after reſiding ſome time at court with his friend and patron Dr. Butts, he retired; but, reſuming his former invectives againſt the Popiſh doctrines, he was again ſummoned to anſwer certain interrogatories, and again obliged to ſubſcribe. In 1535 he was promoted to the biſhoprie of Worceſter; in the poſſeſſion of which dignity he continued till the year 1539, when, rather than aſſent to the act of the ſix articles, he reſigned his mitre, and retired into the country; but was in a ſhort time accuſed of ſpeaking againſt the ſix articles, and committed to the Tower, where he continued priſoner till the death of Henry VIII. which happened in January 1547. On the acceſſion of Edward VI. Latimer was releaſed, but not reſtored to his biſhopric, though he preached ſeveral times before the king, and continued to exerciſe his miniſterial function with unremitting zeal and reſolution. Young Edward, alas! finiſhed his ſhort reign in 1553; and Mary, of infamous memory, aſcending the throne, poor Latimer was immediately doomed to deſtruction, and, together with Cranmer and Ridley, confined in the Tower. In April 1554 they were removed to Oxford, that they might diſpute with the learned doctors of both univerſities. Latimer declining the diſputation on account of his great age and infirmities, delivered his opinion in writing; and, refuſing to ſubſcribe the Popiſh creed, was condemned for hereſy; and in October following was, together with biſhop Ridley, burnt alive. He behaved with uncommon fortitude on the occaſion, and died a real martyr to the Reformation. His general character is that of a learned, virtuous, and brave man. His works are, 1. Sermons, 1635, fol. 2. Letters; in Fox's Acts and Monum. vol. ii. fol. 1580. 3. An injunction to the prior and convent of St. Mary's in Worceſterſhire. See record at the end of Burnet's Hiſtory of the Reformation, part ii. p. 293.

LATIN, a dead language, firſt ſpoken in Latium, and afterwards at Rome; and ſtill uſed in the Romiſh church, and among many of the learned. This language is principally derived from the Greek, and particularly from the Eolic dialect of that tongue, though it has a great number of words which it borrowed from the languages of the Etruſci, Oſci, and other ancient people of Italy; and foreign commerce and wars, in courſe of time, added a great many more.

The Latin is a ſtrong nervous language, perfectly ſuitable to the character of the people who ſpoke it: we have ſtill works of every kind admirably well written in the Latin, though there are vaſt numbers loſt.

The Latin tongue was for a while confined almoſt wholly within the walls of Rome; nor would the Romans allow the common uſe of it to their neighbours, or to the nations they ſubdued: but by degrees they in time became ſenſible of the neceſſity of its being generally underſtood for the conveniency of commerce; and accordingly uſed their endeavours, that all the nations ſubject to their empire ſhould be united by one common language; ſo that at length they impoſed the uſe of it by a particular law for that purpoſe. After the tranſlation of the ſeat of the empire from Rome to Conſtantinople, the emperors of the eaſt, being always deſirous of retaining the title of Roman emperors, appointed the Latin to be ſtill uſed; but at length neglecting the empire of the weſt, they abandoned all care of the Latin tongue, and uſed the Greek. Charlemagne coming to the empire of the weſt, revived this language; but at length it gave way, and the French took place of the Latin: it was, however, prodigiouſly degenerated before it came to be laid aſide, in which condition it was found at the time of the Reformation, when Vives, Eraſmus, &c. began to open the way for its recovery: ſince which time the monkiſh latinity has been declining, and all endeavours have been uſed to retrieve the pure language of the Auguſtan age. See Language.

Latin-*Church*. See Church.

LATINS, an ancient nation of Italy. See Latium.

LATINUS, king of the Latins in Italy, was the ſon of Faunus; and, it is ſaid, began to reign about the 1216th year before the Chriſtian era. Lavinia, his only daughter, married Æneas, after that Trojan prince had killed Turnus king of the Rutuli.

LATISSIMUS, in anatomy, the name of ſeveral muſcles. See Anatomy, *Table of the Muſcles*.

LATITUDE, in aſtronomy, is the diſtance of a ſtar north or ſouth from the ecliptic. In geography it ſignifies the diſtance

of any place north or ſouth, from the equator. See ASTRONOMY and GEOGRAPHY, *paſſim*.

LATITUDINARIAN, a perſon of moderation with regard to religious opinions, who believes there is a latitude in the road to heaven, which may admit people of different perſuaſions.

LATIUM (anc. geog.), the country of the Latins, at firſt contained within very narrow bounds, but afterwards increaſed by the acceſſion of various people. The appellation, according to Virgil, is *a latendo*, from Saturn's lying hid there from the hoſtile purſuits of his ſon Jupiter; and from *Latium* comes the name *Latini*, the people, (Virgil): though Dionyſius Halicarnaſſæus derives it from king Latinus, who reigned about the time of the Trojan war. But whatever be in this, it is certain, that Latium, when under Æneas and his deſcendants, or the Alban kings, contained only the Latins, excluſive of the Æqui, Volſci, Hernici, and other people; only that Æneas reckoned the Rutuli, after their conqueſt, among the Latins. And this conſtituted the ancient *Latium*, confined to the Latins: but afterwards, under the kings, and after their time, it reached from the Tiber to Circeii. Under the conſuls, the country of the Æqui, Volſci, Hernici, &c. after long and bloody wars, was added to Latium, under the appellation *adjectitious* or *ſuperadded Latium*, as far as the river Liris, the eaſtern boundary, and to the north as far as the Marſi and Sabines. The various people, which in ſucceſſion occupied Latium, were the Aborigines, the Pelaſgi, the Arcades, the Siculi, the Arunci, the Rutuli; and beyond Circeii, the Volſci, the Oſci, the Auſones: but who firſt, who next, occupied the country, it is difficult to ſay.

LATMUS (anc. geog.), a mountain of Ionia, or on the confines of Caria, famous for the fable of Endymion, of whom the Moon was ſaid to be enamoured: hence called *Latmius Heros*, and *Latmius Venator*. In the mountain was a cave in which Endymion dwelt (Scholiaſt on Apollonius Rhodius). Suppoſed by Hecatæus to be the *Phtheiron Mons* of Homer; but by others to be *Grius Mons*, not far from Latmus (Strabo).

LATOMIA, properly ſignifies a *ſtone quarry:* But the places whence ſtones had been dug having been made uſe of ſometimes as dungeons, jails, or priſons for criminals, it is oftentimes applied as a name for a priſon. There was a place of confinement of this ſort at Rome, near the Tullianum; another at Syracuſe, in which Cicero ſays Verres had ſhut up Roman citizens.

LATONA, in mythology, a pagan goddeſs, whoſe hiſtory is very obſcure. Heſiod makes her the daughter of Titan Coëus and Phœbe his ſiſter. She was admired for her beauty, and celebrated for the favours which ſhe granted to Jupiter. Juno, always jealous of her huſband's amours, made Latona the object of her vengeance, and ſent the ſerpent Python to diſturb her peace and perſecute her. Latona wandered from place to place in the time of her pregnancy, continually alarmed for fear of Python. She was driven from heaven; and Terra, influenced by Juno, refuſed to give her a place where ſhe might reſt and bring forth. Neptune, moved with compaſſion, ſtruck with his trident and made immoveable the iſland of Delos, which before wandered in the Ægean, and appeared ſometimes above, and ſometimes below, the ſurface of the ſea. Latona, changed into a quail by Jupiter, came to Delos; where ſhe reſumed her original ſhape, and gave birth to Apollo and Diana, leaning againſt a palm tree or an olive. Her repoſe was of ſhort duration: Juno diſcovered the place of her retreat, and obliged her to fly from Delos. She wandered over the greateſt part of the world; and in Caria, where her fatigue compelled her to ſtop, ſhe was inſulted and ridiculed by the peaſants of whom ſhe aſked for water while they were weeding a marſh. Their refuſal and inſolence provoked her, and ſhe entreated Jupiter to puniſh their barbarity. They were all changed into frogs. She was alſo inſulted by Niobe; who boaſted herſelf greater than the mother of Apollo and Diana, and ridiculed the preſents which the piety of her neighbours had offered to Latona. At laſt, Latona, though perſecuted and expoſed to the reſentment of Juno, became a powerful deity, and ſaw her children receive divine honours. Her worſhip was generally eſtabliſhed where her children received adoration; particularly at Argos, Delos, &c. where ſhe had temples. She had an oracle in Egypt, celebrated for the true and deciſive anſwers which it gave. Latona, Venus, and Diana, were the three goddeſſes moſt in veneration among the Roman women.

LATRIA, in theology, a religious worſhip due only to God. The Romaniſts ſay, "They honour God with the worſhip of *latria*, and the ſaints with the worſhip of *dulia*." But the terms, however diſtinct, are uſually confounded. The worſhip of *latria*, beſides its inner characters, has its external marks to diſtinguiſh it; the principal whereof is ſacrifice, which cannot be offered to any other but God himſelf, as being a ſolemn acknowledgment or recognition of the ſovereignty of God, and our dependence on him. Mr. Daille ſeems to own, that ſome of the fathers of the fourth century allowed the diſtinction between *latria* and *dulia*.

LATRINÆ, were public houſes of office, or neceſſaries, amongſt the Romans. We do not find, in the writings or buildings that remain of antiquity, that they had any privies in their dwellings. The latrinæ were public places where the ſlaves waſhed and emptied their maſters' cloſe-ſtools. We are pretty well aſſured that the Romans had public places of convenience, which were covered over, and had a ſponge hanging up in them for cleanlineſs. Rich men had cloſe-ſtools, which were taken away occaſionally to the common ſewers.

LATRUNCULI, a game amongſt the Romans, of much the ſame nature with our cheſs. The *latrunculi* were properly the cheſs-men, called alſo *latrones* and *calculi*. They were made of glaſs, and diſtinguiſhed by black and white colours. Sometimes they were made of wax or other convenient ſubſtances. Some give the invention of this game to Palamædes when at the ſiege of Troy; Seneca attributes it to Chilon, one of the ſeven Grecian ſages; others honour Pyrrhus with the invention; and others again contend that it is of Perſian origin—but is not this *Lis de lana caprina?* Frequent alluſions to this game are met with in the Roman claſſics, and a little poem was wrote upon it addreſſed to Piſo, which ſome ſay was the work of Ovid, others of Lucan, in the end of ſome editions of whoſe works it is to be found, and to which we refer for a fuller account of the game. This game expreſſes ſo well the chance and order of war, that it is, with great appearance of probability, attributed to ſome military officer as the inventor. One Canius Julius was ſo exceedingly fond of cheſs, that after he was ſentenced to death by Caligula, he was found playing, but interrupted in his game by a call to execution. He obeyed the ſummons; but firſt deſired the centurion who brought the fatal order, to bear witneſs that he had one man upon the board more than his antagoniſt, that he might not falſely brag of victory when he ſhould be no more.

LATTEN denotes iron-plates turned over, of which teacanniſters are made. Plates of iron being prepared of a proper thinneſs, are ſmoothed by ruſting them in an acid liquor, as common water made aigre with rye. With this liquor they fill certain troughs, and then put in the plates, which they turn once or twice a day, that they may be equally ruſted over. After this they are taken out, and well ſcoured with ſand; and, to prevent their ruſting again, are immediately plunged into pure water, in which they are to be left till the inſtant they are to be tinned or blanched; the manner of doing which is this: They flux the tin in a large iron crucible, which

has the figure of an oblong pyramid with four faces, of which two oppoſite ones are leſs than the two others. The crucible is heated only from below, its upper part being luted with the furnace all round. The crucible is always deeper than the plates which are to be tinned are long; they always put them in downright, and the tin ought to ſwim over them: to this purpoſe artificers of different trades prepare plates of different ſhapes, though Mr. Reaumur thinks them all exceptionable. But the Germans uſe no ſort of preparation of the iron to make it receive the tin, more than the keeping it always ſteeped in water till the time; only when the tin is melted in the crucible, they cover it with a layer of a ſort of ſuet, which is uſually two inches thick, and the plate muſt paſs through this before it can come to the melted tin. The firſt uſe of this covering is to keep the tin from burning; for if any part ſhould take fire, the ſuet would ſoon moiſten it, and reduce it to its primitive ſtate again. The blanchers ſay, this ſuet is a compounded matter. It is indeed of a black colour; but Mr. Reaumur ſuppoſed that to be only an artifice to make it a ſecret, and that it is only coloured with ſoot or the ſmoke of a chimney: but he found it true ſo far, that the common unprepared ſuet was not ſufficient; for, after ſeveral attempts, there was always ſomething wanting to render the ſucceſs of the operation certain. The whole ſecret of blanching, therefore, was found to lie in the preparation of this ſuet; and this at length he diſcovered to conſiſt only in the firſt frying and burning it. This ſimple operation not only gives it the colour, but puts it into a condition to give the iron a diſpoſition to be tinned, which it does ſurpriſingly.

The melted tin muſt alſo have a certain degree of heat: for, if it is not hot enough, it will not ſtick to the iron; and if it is too hot, it will cover it with too thin a coat, and the plates will have ſeveral colours, as red, blue, and purple, and upon the whole will have a caſt of yellow. To prevent this, by knowing when the fire has a proper degree of heat, they might try with ſmall pieces of iron; but, in general, uſe teaches them to know the degree, and they put in the iron when the tin is at a different ſtandard of heat, according as they would give it a thicker or thinner coat. Sometimes alſo they give the plates a double layer, as they would have them very thickly covered. This they do by dipping them into the tin when very hot the firſt time, and when leſs hot the ſecond. The tin which is to give the ſecond coat muſt be freſh covered with ſuet; and that with the common ſuet, not the prepared.

Latten *Braſs*, plates of milled braſs reduced to different thickneſs, according to the uſes they are intended for.

LATTIMO, in the glaſs-trade, a name for a fine milk-white glaſs. There are ſeveral ways of making it, but the beſt of all is this: Take 400 weight of cryſtal frit, and 60 pounds of calcined tin, and two pounds and a half of prepared manganeſe; mix theſe well with the frit, and ſet them in a pot in a furnace to melt and refine. At the end of 18 hours this will be puriſied; then caſt it into water, purify it again afterwards in the furnace, and make a proof of it. If it be too clear, add 15 pounds more of calcined tin; mix it well with the metal, and let it ſtand one day to puriſy; it will then be of a whiteneſs ſurpaſſing even that of ſnow, and is fit to work into veſſels.

LAVA, a ſtream of melted minerals which runs out of the mouths, or burſts out through the ſides of burning mountains during the time of an eruption. See Ætna, Vesuvius, Hecla, Volcano, &c.

The lava at its firſt diſcharge is in a ſtate of prodigious ignition, greatly ſuperior to any thing we can have an idea of from the ſmall artificial furnaces made by us. Sir William Hamilton informs us, that the lava of Veſuvius, at the place whence it iſſued (in the year 1767), "had the appearance of a river of red-hot and liquid metal, ſuch as we ſee in the glaſs-houſes, on which were large floating cinders half lighted, and rolling over one another with great precipitation down the ſide of the mountain, forming on the whole a moſt beautiful and uncommon caſcade." Now, if we conſider the materials of which the lava conſiſts, which undoubtedly are the common matters to be found every where in the earth, namely, ſtones, metallic ores, clay, ſand, &c. we ſhall find that our hotteſt furnaces would by no means be able to bring them into any degree of fuſion; ſince the materials for glaſs cannot be melted without a great quantity of very fuſible ſalts, ſuch as alkalis, nitre, &c. mixed along with them. The heat of a volcano muſt therefore be immenſe: and beſides its heat, it is ſometimes attended with a very uncommon circumſtance; for Sir William Hamilton informs us, that "the red-hot ſtones thrown up by Veſuvius on the 31ſt of March 1766, were perfectly *tranſparent*;" and the like remark he makes on the vaſt ſtream of lava which iſſued from this volcano in 1779. (See Vesuvius.) This we cannot look upon to be the mere effect of heat: for mere heat with us will not make a ſolid body tranſparent; and theſe ſtones, we are ſure, were not in a ſtate of fuſion, or the reſiſtance of the air would have broke them all to pieces, even ſuppoſing them, which is very improbable, to have been in that ſtate detached from the reſt of the lava. For the tranſparency, therefore, we muſt have recourſe to electricity; which in ſome of our experiments hath the property of rendering opaque bodies tranſparent. Indeed it is ſcarce poſſible but the lava and every other matter thrown out of a volcano muſt be in the higheſt degree electrical, ſeeing the fire itſelf moſt probably takes its riſe from electricity, as is ſhown under the article Volcano.

The lava, after having once broke out, does not conſtantly continue running from the ſame vent, but often has intermiſſions, after which it will burſt out ſometimes at the ſame place, and ſometimes at another. No real flame ever appears to come from the lava. In the day-time its progreſs is marked by a thick white ſmoke, from which the light of the red-hot matter being reflected in the night-time, makes it appear like flame. But if, during its progreſs, it meets with trees or other combuſtible ſubſtances, which it frequently does, a bright flame immediately iſſues from its ſurface, as hath alſo been remarked by Sir William Hamilton.—This liquid ſubſtance, after having run pure for about 100 yards (more or leſs, no doubt, according to different circumſtances), begins to collect cinders, ſtones, and a ſcum is formed on the ſurface. Our author informs us, that the lava which he obſerved, with its ſcum, had the appearance of the river Thames, as he had ſeen it after a hard froſt and a great fall of ſnow, when beginning to thaw, carrying down vaſt maſſes of ſnow and ice. In ſome places it totally diſappeared, and ran in a ſubterraneous paſſage formed by the ſcum for ſeveral paces; after which it came out pure, having left the ſcum behind, though a new one was quickly formed. This lava at the fartheſt extremity from its ſource did not appear liquid, but like a heap of red-hot coals, forming a wall in ſome places ten or twelve feet high which rolling from the top ſoon formed another wall, and ſo on. —This was the appearance alſo put on by the lava which iſſued in the great eruption of 1783 in Iceland; with this difference, that the wall was at one time 210 feet high, and the general thickneſs of it was more than 100 (See Hecla.)—While a lava is in this ſtate, Sir William is of opinion, that it is very practicable to divert it into another channel, in a manner ſomewhat ſimilar to what is practiſed with rivers. This he was afterwards told had been done with ſucceſs during the great eruption of Etna in 1669: that the lava was directing its courſe towards the walls of Catania, and advancing very ſlowly, when they prepared a channel for it round the walls of the town, and turned it into the ſea. A ſucceſſion of men, covered with ſheep-ſkins wetted, were employed to cut through the

tough flanks of lava, till they made a paſſage for that in the centre, which was in perfect fuſion, to diſgorge itſelf into the channel prepared for it. But this, it is evident, can only take place in ſmall ſtreams of this burning matter; with that above mentioned it would have been impoſſible. It hath been alſo obſerved of the lavas of Etna, that they do not conſtantly fall down to the loweſt places, but will ſometimes aſcend in ſuch a manner as to make the valleys riſe into hills. On this Sir William Hamilton has the following note: "Having heard the ſame remark with regard to the lavas of Veſuvius, I determined, during an eruption of that volcano, to watch the progreſs of a current of lava, and I was ſoon enabled to comprehend this ſeeming phænomenon, though it is, I fear, very difficult to explain. Certain it is, that the lavas, while in their moſt fluid ſtate, follow always the laws of other fluids; but when at a great diſtance from their ſource, and conſequently encumbered with ſcoriæ and cinders, the air likewiſe having rendered their outward coat tough, they will ſometimes (as I have ſeen) be forced up a ſmall aſcent, the freſh matter puſhing forward that which went before it, and the exterior parts of the lava acting always as conductors (or pipes, if I may be allowed the expreſſion) for the interior parts, that have retained their fluidity from not being expoſed to the air."

From the year 1767 to 1779, this gentleman made many curious obſervations on the lavas of Veſuvius. He found, that they conſtantly formed channels in the mountain as regular as if they had been made by art; and that, whilſt in a ſtate of perfect fuſion, they continued their courſe in thoſe channels, which were ſometimes full to the brim, and at others more or leſs ſo, according to the quantity of matter thrown out. Theſe channels, after ſmall eruptions, were generally from two to five or ſix feet wide, and ſeven or eight in depth. They were often hid from the ſight by a quantity of ſcoriæ that had formed a cruſt over them, and the lava, having been conveyed in a covered way for ſome yards, came out again freſh into an open channel. Our author informs us, that he had walked in ſome of theſe ſubterraneous galleries, which were exceedingly curious, the ſides, top, and bottom being remarkably ſmooth and even: others were incruſted with what he calls very extraordinary ſcoriæ, beautifully ramified white ſalts in the form of dropping ſtalactites, &c.

On viewing a ſtream of lava while in its fluid ſtate in the month of May 1779, he perceived the operation of it in the channels above deſcribed in great perfection. After quitting them, it ſpread itſelf in the valley, and ran gently like a river that had been frozen, and had maſſes of ice floating upon it. The wind happening then to ſhift, our traveller was ſo incommoded by the ſmoke, that the guide propoſed to croſs it, which was inſtantly put in execution without any other inconvenience than the violent heat with which the legs and feet were affected. The cruſt was ſo tough, that their weight made no impreſſion upon it, and the motion ſo ſlow that they were in no danger of falling. This circumſtance, according to Sir William, points out a method of eſcape ſhould any perſon happen to be incloſed betwixt two lavas, but ought never to be tried except in caſes of real neceſſity; and indeed, if the current of melted matter was very broad, muſt undoubtedly be attended with extreme danger, both from the heat of the upper cruſt, and the chance of its breaking and falling down with the paſſenger into the burning liquid below. That which Sir William Hamilton croſſed was about 50 or 60 feet broad.

Having paſſed this burning ſtream, our travellers walked up along the ſide of it to its very ſource. Here they ſaw it boiling and bubbling violently up out of the ground, with a hiſſing and crackling noiſe like that which attends the playing off an artificial firework. An hillock of about 15 feet high was formed by the continual ſplaſhing up and cooling of the vitrified matter. Under this was an arched hollow, red-hot within, like an heated oven; the lava which ran from it being received into a regular channel raiſed upon a ſort of wall of ſcoriæ and cinders, almoſt perpendicularly, of about the height of 8 or 10 feet, and much reſembling an ancient aqueduct. On quitting this fountain of lava, they went quite up to the crater, where as uſual they found a little mountain throwing up ſtones and red-hot ſcoriæ with loud exploſions; but the ſmoke and ſmell of ſulphur were ſo intolerable, that they were obliged to quit the place with precipitation.

By the great eruption in Auguſt 1779, the curious channels above mentioned were entirely deſtroyed, the cone of the mountain was covered with a ſtratum of lava full of deep cracks, from whence continually iſſued a ſulphureous ſmoke that tinged the ſcoriæ and cinders with a deep yellow, or ſometimes white tint. The lava of this eruption appeared to be more perfectly vitrified than that of any former one he had obſerved. The pores of the freſh lava were generally full of a perfect vitrification, and the ſcoriæ themſelves, viewed through a magnifying glaſs, appeared like a confuſed heap of filaments of a foul vitrification. When a piece of the ſolid lava had been cracked in its fall, without ſeparating entirely, fibres of perfect glaſs were always obſerved reaching from ſide to ſide within the cracks. The natural ſpun glaſs which fell in ſome places along with the aſhes of this eruption, and which has likewiſe been obſerved in other places, he is of opinion muſt have proceeded from an operation of the kind juſt mentioned; the lava cracking and ſeparating in the air at the time of its emiſſion from the crater, and by that means ſpinning out the pure vitrified matter from its pores or cells; the wind at the ſame time carrying off the filaments of glaſs as faſt as they were produced.

Our author obſerved a kind of pumice-ſtone ſticking to ſome very large fragments of the new lava. On cloſe inſpection, however, he found that this ſubſtance had been forced out of the minute pores of the ſolid lava itſelf; and was a collection of fine vitreous fibres or filaments confounded together at the time of their being preſſed out by the contraction of the large fragments of lava in cooling, and which had been bent downwards by their own weight. "This curious ſubſtance (ſays he) has the lightneſs of a pumice, and reſembles it in every reſpect, except that it is of a darker colour."

When the pores of this lava were large, and filled with pure vitrified matter, the latter was ſometimes found blown into bubbles on the ſurface; probably by the air which had been forced out at the time the lava contracted itſelf in cooling; and from theſe thin bubbles it appeared, that this kind of volcanic glaſs has much the ſame tranſparency with our common glaſs bottles, and like them is of a dirty yellow colour; but when large pieces of it were broken off with a hammer, they appeared perfectly black and opaque.

In the lava of this eruption it was obſerved, that many detached pieces were in the ſhape of a barley-corn or plum-ſtone, ſmall at each end, and thick in the middle. Some of theſe did not weigh above an ounce; but others could not be leſs than 60 pounds. Our author took them to be drops from the liquid fountain of fire, which might naturally acquire ſuch a form in their fall. There were alſo many other curious vitrifications, different from any he had ſeen before, mixed with this huge ſhower of ſcoriæ and maſſes of lava.

In treating of Mount Etna, M. Houel makes mention of a piece of lava which, after having been once ejected by the volcano, was ſwallowed up, and thrown out a ſecond time. The intenſe heat to which it was then ſubjected, had ſuch an effect upon it, that it appeared all full of chinks to a conſiderable depth, and which ran at right angles to one another. He had alſo an opportunity of obſerving to great advantage ſome of

the hollow channels formed by the lavas of Etna ſimilar to thoſe deſcribed by Sir William Hamilton, but on a much larger ſcale. Here the great eruption of water in 1755 had overturned, in a vertical direction, an huge tube of this kind for the length of half a mile. The tube itſelf appeared to be compoſed of enormous maſſes, ſomewhat reſembling planks; each two feet thick and twelve or fifteen in breadth, continued in a ſtraight line through the whole of that ſpace. At the ſame time by the action of the lava a kind of walls had been formed, from ten to ſixteen feet in height, and curved at the top. Some of theſe walls appear rolled together like paper: and M. Houel is of opinion, that theſe various appearances on the ſurface of the lava when cooled muſt have ariſen from particles heterogeneous to the real lava; and which detach themſelves from it, riſing to the ſurface under a variety of forms proportioned to the ſpaces of time taken up in cooling. Theſe cruſts are formed of different kinds of ſcoriæ and dirty lava, mixed with ſand or aſhes. At the ſame place are found alſo great numbers of ſmall pieces like thoſe of ice heaped upon one another after having floated for ſome time on a river. Beneath theſe the pure lava is met with, and which has evidently been in a ſtate of perfect fuſion. This is extremely denſe; and by looking narrowly into its chinks, the compoſition of the whole appears to be merely homogeneous. "It is curious (ſays he) to obſerve, ſo near one ſpecies of lava which is very pure, another which has likewiſe arrived at the ſame place in a fluid ſtate, and has there undergone ſo great a change as ſcarce to retain an appearance of its original ſtate. It is, however, like iron droſs, in grains of unequal ſizes. We find it alſo at various diſtances, ſuch as one, two, or more hundred fathoms. It is ſometimes found in large pieces like tables, covered over with ſharp points, ſome longer and others ſhorter. All theſe pieces are quite detached from one another, as if they had been brought thither and ſcattered from a tumbril. The matter of which the cruſt of the lava is formed, ſeems to have iſſued from it in the ſame manner in which froth riſes upon ſolution of ſoap in water. It appears afterwards to have ſwelled, burſt, and aſſumed its preſent form, preſenting to the view various ſpaces filled with ſmall looſe ſtones. A great number of new lavas were likewiſe obſerved, all of them putting forth various kinds of efflorescences in great quantity.

The hardneſs, denſity, and ſolidity, of lavas no doubt proceed from the degree of heat to which they have been expoſed, and which ſeems to be greater or leſs according to their quantity. Hence the Icelandic volcanoes, which pour forth the greateſt quantities of lava, produce it alſo in the greateſt degree of liquefaction; and Dr. Von Troil obſerves, that what he ſaw muſt have been liquefied to an extreme degree.

The compoſition of the lavas of different volcanoes, and even of different parts of thoſe of the ſame volcano, is extremely different. Sir William Hamilton is of opinion, that this difference in compoſition contributes not a little to the facility or difficulty with which they afterwards receive earth capable of vegetation. "Some (ſays he) have been in a more perfect ſtate of vitrification than others, and are conſequently leſs liable to the impreſſions of time. I have often obſerved on Mount Veſuvius, when I have been cloſe to a mouth from whence the lava was diſgorging itſelf, that the quality of it varied greatly from time to time. I have ſeen it as fluid and coherent as glaſs when in fuſion; and I have ſeen it farinaceous, the particles ſeparating as they forced their way out, juſt like meal coming from under the grindſtones. A ſtream of lava of this ſort being leſs compact, and containing more earthy particles, would certainly be much ſooner fit for vegetation than one compoſed of the more perfect vitrified matter." Mr. Bergman, who has accurately analyſed ſome Icelandic lavas, informs us, that one kind is very coarſe, heavy, and hard, full of bladders, almoſt black, intermixed with white grains reſembling quartz, which in ſome places have a figure not very unlike a ſquare. This black matter is not attracted by the magnet; but if a piece of it is held againſt a compaſs, the needle viſibly moves. When tried in the crucible, it yields from ten to twelve pounds of iron in every hundred weight. It does not diſſolve in the leaſt with ſal ſodæ, and very difficultly with borax, and ſcarce at all with urinous ſalt. It ſeems to contain a great deal of clay in its compoſition, which may be extracted by all acid ſolvents. This laſt he is likewiſe, from experiments, aſſured is the caſe with the lava of Solfaterra in Italy.

The white lava, which poſſeſſes more or leſs of thoſe tranſparent grains or rays with which lavas are generally chequered, does not ſeem to be of the nature of quartz, as it cannot be attacked by ſal ſodæ; it is, however, ſoluble with ſome difficulty by borax and fuſible urinous ſalt, or microcoſmic acid. Theſe effects are perfectly ſimilar to thoſe produced upon the diamond, ruby, ſapphire, topaz, and hyacinth. The chryſolite, garnet, tourmalin, and ſhirl, can neither be diſſolved by ſal ſodæ, though they are ſomewhat attacked by it when reduced to a fine powder; and upon the two laſt-mentioned ones it produces a ſlight effervescence; on which account, ſays Mr. Bergman, it is poſſible that the precious ſtones found upon Mount Veſuvius, which are ſold at Naples, are nearer related to the real precious ſtones than is generally imagined. He found no ſuch grains in a finer kind of lava, quite porous within, and entirely burnt out, and conſiderably lighter than the former ones.

The Iceland agate is of a black or blackiſh-brown colour, a little tranſparent at the thin edges like glaſs, and gives fire with ſteel. It cannot eaſily be melted by itſelf; but becomes white, and flies in pieces. It can hardly be diſſolved in the fire by fuſible urinous ſalt; but it ſucceeds a little better with borax, though with ſome difficulty. With ſal ſodæ it diſſolves very little: though in the firſt moments ſome ebullition is perceived, and the whole maſs is afterwards reduced to powder. Hence Mr. Bergman concludes, that this agate hath been produced by an exceſſive fire out of the black lava formerly mentioned.

In the Iceland pumice ſtone, quartz and cryſtals are often found, particularly in the black and reddiſh-brown kind. The ſtones thrown out of the volcano, whether grey or burnt brown, ſeemed to conſiſt of a hardened clay, mixed with a ſiliceous earth. They were ſprinkled with rays and grains reſembling quartz, and ſome few flakes of mica. They fuſed with great difficulty in the fire; with ſal ſodæ they ſhowed ſome effervescence at firſt, but which ceaſed in a ſhort time. The parts reſembling quartz produced no motion at all; from whence Mr. Bergman concludes, that the black lava already mentioned proceeds principally from this maſs. Several other ſtones which were ſent him from Iceland, Mr. Bergman ſuppoſed to have no connection with the eruptions, but to have been produced in ſome other way.

In Mr. Ferber's Travels through Italy, we are informed, that he has ſeen a ſpecies of lava ſo exactly reſembling blue iron ſlags, that it was not to be diſtinguiſhed from them but with great difficulty. The ſame author tells us likewiſe, that "the Vicentine and Veroneſe lavas and volcanic aſhes contain encloſed ſeveral ſorts of fire-ſtriking and flint-horn-ſtones, of a red, black, white, green, and variegated colour, ſuch as jaſpers and agates; that hyacinths, chryſolites, and *pietre obſidiane*, deſcribed by Mr. Arduini in his *Giornale d'Italia*, are found at Leonedo; and that chalcedony or opal pebbles, and noduli with incloſed water drops, *(chalcedonii opali enhydri)*, are dug out of the volcanic cineritious hills near Vicenza.

M. Dolomieu conſiders the chemical analyſis of lava as but of little account. When ſubjected to the force of fire a ſecond time, they are all of them reducible to the ſame kind of glaſs;

from which it has been concluded, that all volcanic products have been formed of the ſame kind of materials, and that the ſubterraneous fire has always acted on and variouſly modified the ſame kind of ſtone. But an analyſis by fire, he juſtly obſerves, is of all others the moſt fallacious. The ſubſtances are all fuſible, and we have no proper methods of meaſuring the intenſity of our fire; ſo that the ſame ſubſtance which to-day may come out of our furnaces untouched, may to-morrow be found completely altered, even though the fire employed ſhould not appear to us to be any more violent than the former. Analyſes by different menſtrua have not been more ſucceſsful. Mr. Bergman has indeed analyſed ſome lavas with acids, and gives with aſtoniſhing preciſion the following reſult, viz. that an hundred parts of lava contain 49 of ſiliceous earth, 35 of argillaceous earth, four of calcareous earth, and 12 of iron. Theſe experiments, however, our author obſerves, give us no information with regard to lavas in general. They only ſhow the compoſition of the particular ſpecimens that he tried; and even after the deſcriptions that he has given, we are a good deal at a loſs to diſcover the ſpecies of lava which he ſubjected to analyſis. "It would be as ridiculous (ſays M. Dolomieu) to apply this analyſis to every volcanic product, as it would be to believe that the component parts of a fiſſile rock were the ſame with thoſe of every rock compoſed of laminæ or thin ſtrata." For theſe reaſons he is of opinion, that, in order to underſtand the nature of lavas, we ſhould conſider not only that of volcanoes themſelves, but of the baſes on which they reſt. Had this been done, we ſhould have found that the volcanic fires generally exiſt in beds of argillaceous ſchiſtus and horn-ſtone; frequently in a ſpecies of porphyry, the gluten of which is intermediate betwixt horn-ſtone and petroſilex; containing a large quantity of ſchorl, feldt-ſpar, and greeniſh quartz or chryſolite, in little rounded nodules. Theſe ſubſtances, he tells us, would have been found in thoſe mountains which are called primitive, and in ſtrata buried under beds of calcareous ſtone; and, among other things, would have convinced us, that the fluidity of lavas does not make them loſe the diſtinctive characters of their baſes. In the mountains called *primitive*, thoſe rocks which are aſſigned as the baſes of the more common lavas are found intermixed with micaceous ones, with gneiſs, granite, &c. and they generally reſt on maſſes of granite. Hence lavas muſt conſiſt of all theſe matters, and the fire muſt act upon them all whenever it meets with them. Our author has conſtantly obſerved, that volcanoes ſituated at the greateſt diſtance from the centre of the chain or group of mountains on which they are eſtabliſhed, produce lavas of a more homogeneous compoſition, and leſs varied, and which contain moſt iron and argillaceous earth. Thoſe, on the contrary, placed nearer the centre, are more diverſified in their products; containing ſubſtances of an infinite variety of different kinds. The ſeat of the fire, however, he obſerves, does not long continue among the granites, the inflammation being either extinguiſhed, or returning to the centre of the ſchiſtus rocks in its neighbourhood.

From this knowledge of the materials of which lavas are compoſed, we acquire alſo a conſiderable knowledge of the matters that are found in greateſt quantity in the bowels of the earth. The excavations made by mines, &c. on the ſurface of the earth, are mere ſcratches in compariſon of the depths of volcanic fires; and as he conſiders the mountains themſelves as the productions of thoſe fires, it thence follows, that by attentively examining the materials of which they are compoſed, we may thence determine what kind of ſubſtances are moſt common at theſe great depths in the earth.

Thus our author thinks it probable, that ſchoerls and porphyries, though rare on the ſurface, are very common in the internal parts of the earth. As an inſtance of the truth of his obſervations, our author informs us, that he was convinced, from no other circumſtance but merely inſpecting the lavas of Mount Etna, that in ſome parts of the iſland of Sicily there exiſted granites, porphyries, with ſchiſtus and argillaceous horn-ſtones. In this opinion he perſiſted, notwithſtanding the generally oppoſite ſentiments of the inhabitants themſelves. He ſearched in vain three-fourths of the iſland; and at laſt found that all the mountains, forming the point of Sicily, called *Pelorus*, contain rocks of the kind above mentioned. He then ſaw that the baſe of theſe mountains was produced under Mount Etna on one ſide, and under the Lipari iſlands on the other. "We muſt therefore (ſays he) believe, that theſe mountains have furniſhed the materials on which the volcanoes have, for thouſands of years, exerted their power."

By travelling among thoſe elevations called the *Neptunian Mountains*, or *Mons Pelorus*, he was enabled to diſcover the reaſon why the products of Etna and the Lipari iſlands differ from one another. This, he ſays, is the unequal diſtribution of the granite and ſchiſtus rocks among them. The iſlands reſt almoſt immediately on the granite, or are ſeparated from it by a very thin ſtratum of argillaceous rock which contains porphyry; but the Sicilian volcano is ſituated on the prolongation of the ſchiſtous rock, which it muſt pierce before it reaches the granite; and accordingly very little of its lava ſeems to have granite for its baſis. If the ſeat of the fire was ſtill more diſtant from the centre of the mountains, their lavas would be more homogeneous; becauſe the ſchiſt, which ſucceeds to the horn-ſtone, is leſs various, and hardly includes any bodies foreign to its own ſubſtance. Thus the lavas, in the extinguiſhed volcanoes of the *Val di Noto*, which lie 15 leagues to the ſouth-eaſt of Etna, contain neither granite nor porphyry; but have for their baſes ſimple rocks, with particles of chryſolite and ſome ſchorls.

To the granites which extend to Metazzo, oppoſite to Lipari, he aſcribes the formation of pumice; as they contain an immenſe quantity of ſcaly and micaceous rocks, black and white, with foſſile granites or *gneiſs*, the baſis of which is a very fuſible feldt-ſpar; and theſe he ſuppoſes to be the proper materials of the pumice, having found pieces of them almoſt untouched in pumice-ſtones. There are beds of almoſt pure feldt-ſpar; to the ſemi-vitrification of which he aſcribes an opaque enamel-like lava mentioned in other parts of his works. Few porphyries, however, he acknowledges, are to be met with among the Neptunian mountains, though theſe ſtones abound in the lavas of Etna. "They are not diſtant (ſays he) from the granites; and thoſe I have found have neither the hardneſs nor perfection of thoſe pieces which I gathered in the gullies, and which had been apparently waſhed out of the anterior parts of the mountain by water. But though the porphyries I ſaw here bear no proportion to thoſe in the products of Etna, I was ſufficiently convinced of their exiſtence, and their analogy with thoſe of volcanoes, by diſcovering that the centre of theſe mountains contains a great number of them. Porphyries, in general, are very rare on the ſurface of the earth. Nature generally conceals them from us by burying them under calcareous ſtrata, or by incloſing them in ſchiſtous rocks with which they are almoſt always mixed: but we are indebted to the labour of volcanoes for informing us that they are among the moſt common ſubſtances in the bowels of the earth; and they are never ſo much diſguiſed by the ſubterranean fire as to be miſtaken in the lavas of which they form the baſis."

In Cronſtedt's Mineralogy we find all the volcanic products claſſed under the general name of *Slags*; of which he enumerates the following ſpecies: 1. *The Achates Iſlandicus Niger*, or Iceland Agate. It is black, ſolid, and of a glaſſy texture; but in thin pieces. It is greeniſh, and ſemi-tranſparent, like bottle-glaſs which contains much iron. It is found in Iceland and

in the iſland of Aſcenſion. The jewellers employ it as an agate, though it is too ſoft to reſiſt the wear. "The moſt remarkable thing concerning this (ſays he) is, that ſuch large ſolid maſſes are found of it, that there is no poſſibility of producing the like in any glaſs houſe. In Magellan's notes on this ſubject, we find the Iceland agate claſſed among the tranſparent baſaltes. To the ſame claſs belong the *Lapis Obſidianus* of Pliny, and the *Lapis Gallinaceus* of Peru, which by its beautiful blackneſs approaches to the colour of a large blackbird of the crow kind, in that country called the *Gallinago*. 2. *Lapis molaris Rhenanus*, Rheniſh Millſtone, is blackiſh grey, porous, and perfectly reſembling a ſort of ſlag produced by Mount Veſuvius. 3. *Pumex*, the Pumice-ſtone. See PUMEX. 4. The Pearl-Slag is compounded of white and greeniſh glaſs particles, which ſeem to have been conglutinated while yet ſoft or in fuſion. It is found in the iſland of Aſcenſion. 5. Slag-ſand, or aſhes, thrown out by volcanoes in larger or ſmaller grains. "This (ſays Cronſtedt) may perhaps be the principle of the Terra Puzzolana, becauſe ſuch an earth is ſaid at this time to cover the ruins of Herculaneum near Naples, which was deſtroyed by Veſuvius." In the notes, we are informed, that if the aſhes of a volcano be plentifully moiſtened, they produce that kind of *tufa*, or *tophi*, *trass*, and *pori*, all of which are nearly of the ſame kind. Great heaps of *tufa* or *tophi* are found in Italy, forming various hills, and covering large tracts of land; from whence it is cut and carried, for making the walls, vaults, and upper-ceilings of houſes. It is a very ſoft kind of ſtone, extremely advantageous for theſe purpoſes, on account of its little weight, and being eaſily cut into any form. The inhabitants of Umbria and other parts of Italy dig with very little labour various ſubterranean excavations for the keeping of wines and proviſions of different kinds.

Mr. Kirwan is of opinion, that the lavas ought to be diſtinguiſhed from the other volcanic productions. All lavas, according to him, are magnetic, give fire with ſteel, are generally of a granular texture, and fuſible *per ſe*. They may be reduced to three varieties, *viz.* the Cellular, the Compact, and the Vitreous. The cellular appear to have undergone only the firſt degree of fuſion, being juſt mollified and heated ſufficiently to expel the fixed air contained in the argillaceous particles. Hence they abound in ſmall cavities ariſing from the expanſion of that air after it had recovered its elaſtic ſtate; and thus they are often ſo light as to float upon water, and have been miſtaken for pumice ſtones. They are of black, grey, brown, or reddiſh colours; and their cavities are even filled with cryſtallizations. Of this kind is Cronſtedt's ſecond ſpecies, the millſtone of the Rhine. Theſe contain from 45 to 50 *per cent.* of ſiliceous earth; from 15 to 20 of iron; four or five of pure calcareous earth; the remainder being argillaceous.

The compact lavas have undergone a more perfect degree of fuſion, though even theſe are not deſtitute of cavities. They contain finer cryſtals, or ſuch as are more completely vitrified than the former; they have a black or brown colour: but ſtill their fracture is obſcure and not glaſſy. Their conſtituent parts are the ſame with the preceding ones; the uſual fluxes attack them with difficulty, and the fuſible ſalt of urine has ſcarce any power over them.

The vitreous lava has been more completely melted, and forms vitrifications of different colours, generally black or aſh-coloured, but rarely blue or greeniſh. A ſpecies of this was analyſed by Mr. Bergman, as has been already mentioned, and afforded 49 *per cent.* of ſilex, 35 of argillaceous, 4 of calcareous earth, and 12 of iron. Another ſpecimen from the Lipari iſlands afforded 69 parts of ſilex, 20 of argillaceous earth, and 9 of iron. This kind of lava melts by itſelf with great difficulty. The black agate of Iceland belongs to this ſpecies, as does alſo the harder ſort of pitch-ſtone, which gives fire with ſteel. This ſtone is of various colours, grey, green, black, red, or brown; has a glaſſy appearance, being compoſed of ſemivitrified ſubſtances, and melts eaſily *per ſe*. It contains 65 *per cent.* of ſilex, 16 of argillaceous earth, and four of iron: 14 parts were diſſipated in the analyſis made by Wiegleb, as Mr. Kirwan aſſerts.

The beds of lava are deepeſt and narroweſt near the crater, and broader and ſhallower as they advance, unleſs ſome valley intervenes. Pumice-ſtones lie at a ſtill greater diſtance: and from theſe obſervations, ſays Mr. Kirwan, extinguiſhed volcanoes may be traced.

Cronſtedt conjectured that there might be a kind of circulation among the different earths, from the vegetable mould, which he ſuppoſed to occupy one extreme, to the *flags* or volcanic productions, which might be reckoned to occupy another, and back again from the flags to the vegetable mould. "It is obvious (ſays he) how the old heaps of ſlags from the iron furnaces decay, and at laſt produce vegetables, which cannot be aſcribed ſolely to a black mould carried thither by the wind. The ſame may perhaps happen with the natural ſlags in the open air." Other naturaliſts have verified this conjecture. All lavas are found to be decompoſable by long expoſure to the air, ſooner or later according to the quantity of iron and calcareous earth they contain, and according as their fuſion was more or leſs complete. Sir William Hamilton has concluded that they gain only one or two feet mould in 1000 years; from which, and Roupero's calculations, extravagant ideas have been formed of the duration of the world: but all theſe are found, when properly examined, to be built on a falſe foundation. See the article EARTH.

The quantity of matter thrown out from volcanoes under the name of *lava* is prodigious. After the great eruption of Etna in 1669, Borelli went from Piſa to Sicily to obſerve the effects of it. The matter thrown out at that time amounted to 93,830,750 cubical paces; ſo that, had it been extended in length upon the ſurface of the earth, it would have reached more than four times round the whole earth. All this matter, however, was not lava, but conſiſted alſo of ſand, ſtone, gravel, &c. The lava he computed at 6,300,000 paces, which formed a river, according to our author, ſometimes two miles broad; but according to others it was ſix or ſeven miles broad, and ſometimes 20 or 30 yards in depth. Sir William Hamilton informs us, that the lavas of Etna are very commonly 15 or 20 miles in length, ſix or ſeven in breadth, and 50 feet deep. The moſt conſiderable is ſcarce leſs than 30 miles long and 15 broad. The moſt conſiderable lavas of Veſuvius do not exceed ſeven miles in length. The ſame author, however, tells us, that the lava which iſſued from Veſuvius in 1767 was ſix miles long, two in breadth, and in moſt places 60 or 70 feet deep. In one place it had run along a hollow way made by currents of rain not leſs than 200 feet deep and 100 wide; and this vaſt hollow it had in one place filled up. He ſays, he could not have believed that ſo great a quantity of matter could have been thrown out in ſuch a ſhort time, if he had not examined the whole courſe of it himſelf. Even this quantity, however, great as it is, appears very trifling in compariſon of that thrown out in Iceland in the year 1783, which covered a ſpace of ground 90 miles in length and 42 in breadth, to the depth of more than 100 feet. Dr. Von Troil, in his Letters on Iceland, tells us, that he and his companions travelled over a tract of lava upwards of 300 miles in length: and in 1728, we are told that an eruption of lava took place, which continued for two years to run into a great lake, which it almoſt filled up.

As the lavas are thrown out from the volcanoes in the higheſt degree of ignition, it may eaſily be ſuppoſed that ſuch vaſt bodies will retain their heat for a long time. It would indeed be well worth obſerving, what length of time is required to

cool a lava perfectly; as from thence we might in some measure judge how far those philosophers are in the right, who argue concerning the length of time required to cool an ignited globe of the size of our earth or larger. Sir William Hamilton tells us, that in the month of April 1771, he thrust sticks into some of the crevices of the lava which had issued from Vesuvius in October 1767, and they immediately took fire. On Mount Etna, in 1769, he observed the lava that had been disgorged three years before to smoke in many parts. No particular observation, however, hath been made in what proportion the heat of lavas is gradually lost.

Sir William Hamilton informs us of a curious fact relating to a lava in the island called *Lacco*. Here is a cavern shut up with a door; and this cavern is made use of to cool liquors and fruit, which it does in a short time as effectually as ice. Before the door was opened, he felt the cold on his legs very sensibly; but when it was opened, the cold rushed out so as to give him pain; and within the grotto it was intolerable. He was not sensible of wind attending this cold; though upon Mount Etna and Vesuvius, where there are caverns of this kind, the cold is evidently occasioned by a subterraneous wind: the natives call such places *ventaroli*. From old lavas there also frequently happens an eruption of noxious vapours called *mofetes*. These likewise break out from wells and subterraneous places in the neighbourhood of a volcano before an eruption. Our author tells us, that the vapour affects the nostrils, throat, and stomach, just as the spirit of hartshorn or any strong volatile salt; and would soon prove fatal if you did not immediately withdraw from it. These mofetes, he says, are at all times to be met with under the ancient lavas of Vesuvius, particularly the great eruption of 1631.

Sir William Hamilton informs us, that the lavas of Etna and Vesuvius are much the same, but those of Etna rather blacker and more porous than those of Vesuvius. Some kinds of lava take a fine polish, and are frequently manufactured into boxes, tables, &c. In Naples, the inhabitants commonly make use of it for paving the streets, and even the subterraneous cities of Pompeii and Herculaneum have been paved with the same substance. A fine large cubic piece of lava is preserved in the hall of the British Museum.

LAVANDULA, LAVENDER: A genus of the angiospermia order, belonging to the didynamia class of plants; and in the natural method ranking under the 42d order, *Verticillatæ*. The calyx is ovate, and a little dentated, supported by a bractea or floral leaf; the corolla is resupinated; the stamina within the tube.

The *Species* are, 1. The *spica*, or lavender spike, hath a short shrubby stalk, rising two or three feet high; small spear-shaped entire leaves; and from the ends of the branches, numerous, long, erect, naked spikes of small ringent flowers, of different colours in the varieties. The varieties of this are: common narrow-leaved lavender, with blue flowers, and with white flowers; broad-leaved lavender; dwarf lavender: all of them flowering in July. This species is the common lavender; but the narrow-leaved variety, with blue flowers, is the sort commonly cultivated for its flowers for medicine. 2. The *stœchas*, or French lavender, hath a shrubby very branchy stalk, rising two or three feet high; very narrow, spear-shaped, pointed, hoary leaves, opposite; and all the branches terminated by short bushy spikes of purple flowers in June and July; succeeded by seeds in August. There is a variety with white flowers. 3. The *dentata*, or dentate-leaved stœchas, hath a woody stalk, branching on every side three or four feet high; leaves deeply indented in a pinnated manner; and the branches terminated by scaly four-cornered spikes of flowers, appearing most part of summer.

All the sorts are propagated plentifully by slips or cuttings of their young shoots in spring. In March or April, take off a quantity of slips or cuttings, from three or four to six inches long; strip off the under leaves; then plant them in a shady border, four inches asunder; give a good watering, repeat it occasionally in dry weather, and the plants will be well rooted in summer, and each become a good plant fit to be transplanted into any place early in autumn, that is September or October; removing them, if possible, with balls of earth; and if intended to plant them for use, set them in rows two or three feet asunder, and two feet distance in each row: if any are designed for the shrubbery, they should be stationed singly at good distances near the front. Those of the third sort being tender, should be potted to move to shelter in winter. The lavandula stœchas is also often raised from seed, sown in March or April, in a bed of light earth.

The two first species are proper for the kitchen-garden, and for medicinal and other family-uses; and to plant in the pleasure ground to adorn the front of small shrubbery compartments, where they will increase the variety very agreeably; and are finely-scented aromatics, both when growing, and their flowers when gathered, especially those of the first species, which are in great esteem for putting among clothes, and for distilling and other economical uses. The flowers of the first sort are gathered for use in July; which being the time of their perfection, cut off the spikes close in a dry day, and tie them in small bunches for use. These and the summits are ranked among the cephalics; and from them the compound spirit is distilled. The essential oil is said to destroy the *pediculi inguinales*, and other cutaneous insects.

LAVATERA, in botany: A genus of the polyandria order, belonging to the polyadelphia class of plants; and in the natural method ranking under the 37th order, *Columniferæ*. The exterior calyx is double and trifid; the arilli or seed-coats are very many and monospermous. There are several species, most of them herbaceous flowery annuals, or shrubby perennials, growing erect from two or three to eight or ten feet high, garnished with large roundish, heart-shaped, and angular leaves, and quinquepetalous flowers of the mallow kind. They are easily propagated by seed in the open ground in the spring; and thrive best when sown where they are designed to remain. The lavatera tribe affect a warm sandy situation and soil, in which they will sometimes continue to exhibit their beauties for many years; but in general they are short-lived, continuing only two or three years: this renders them peculiarly eligible to be scattered plentifully in a newly made shrubbery; they will add warmth to young plants, and will die away themselves before the spaces they occupy will be required by the surrounding shrubs.

LAVATORY, or LAVADERO, a name given to certain places in Chili and Peru, where gold is got out of earth by washing. M. Frezier gives us the following description of the *lavatories* of Chili:—They dig deep into the earth, in such places as they have reason to expect gold in; and, in order to facilitate this digging, turn a stream of water upon the spot, loosening the earth as much as possible all the time, that the current may have the greater effect, and tear up the earth more strongly. When they are got to the earth they want, they turn off the stream, and dig dry. The earth that they now get, is carried on mules, and discharged into a bason, made somewhat in the manner of a smith's bellows; into which a little rivulet of water runs with a great deal of rapidity, dissolving the parts of the earth, and carrying every thing away with it, excepting the particles of gold, which, by their great weight, precipitate to the bottom of the bason, and mix with fine black sand, where they are almost as much hidden as they were before in the earth. Sometimes they find very considerable pieces in *lavatories*, particularly pieces of 24 ounces each.—

There are ſeveral *lavatories*, where they find pepitas, or pieces of virgin gold, of a prodigious ſize. Among others, they tell of one that weighed 512 ounces, bought by the count de la Moncloa, viceroy of Peru.

Nine or ten leagues to the eaſt of Coquimbo, are the *lavatories* of Andacoll, the gold whereof is 23 carats fine.—Their works here always turn to great profit, excepting when the water fails them.—The natives maintain that the earth is creative, that is, it produces gold continually; becauſe, after having been waſhed 60 or 80 years, they find it impregnated afreſh, and draw almoſt as much out of it as at firſt.

LAUBACH, a handſome and ſtrong town of Germany, in the circle of Auſtria, and in Carniola, with a biſhop's ſee, a caſtle, and very handſome houſes. It is ſeated on a river of the ſame name, wherein are the largeſt craw-fiſh in Europe. E. lon 14. 45. N. lat. 46. 20.

LAUD (William), archbiſhop of Canterbury in the 17th century, was born at Reading in 1573, and educated in St. John's college, Oxford, of which he was afterwards a fellow and grammar-reader. In 1610 he went into orders. In 1611 he was elected preſident of St. John's college; but his election being diſputed, it was confirmed by his majeſty. The ſame year he was ſworn the king's chaplain. In 1621 he was nominated biſhop of St. David's. In 1628 he was tranſlated to the biſhopric of London. In 1630 he was elected chancellor of the univerſity of Oxford. In 1633 he attended the king into Scotland, and was ſworn a privy-counſellor for that kingdom. During his ſtay in Scotland he formed the reſolution of bringing that church to an exact conformity with the church of England. In the ſame year he ſucceeded archbiſhop Abbot in the ſee of Canterbury; and ſoon after came out his majeſty's declaration about lawful ſports on Sundays, which the archbiſhop was charged with having revived and enlarged, and that with the vexatious proſecutions of ſuch clergymen as refuſed to read it in their churches. In 1634-5 the archbiſhop was put into the great committee of trade and the king's revenue; on the 4th of March following he was appointed one of the commiſſioners of the treaſury; and on the 6th of March 1635-6 he received the ſtaff of lord high treaſurer of England. In order to prevent the printing and publiſhing what he thought improper books, he procured a decree to be paſſed in the Star-chamber, on the 11th of July 1637, whereby it was enjoined that the maſter-printers ſhould be reduced to a certain number, and that none of them ſhould print any books till they were licenſed either by the archbiſhop or the biſhop of London, or ſome of their chaplains, or by the chancellors or vice-chancellors of the two univerſities. A new parliament being ſummoned, met on the 13th of April 1640; and the convocation the day following: but the commons lanching out into complaints againſt the archbiſhop, and inſiſting upon a redreſs of grievances before they granted any ſupply, the parliament was diſſolved on the 5th of May. The convocation, however, continued ſitting; and made 17 canons, which were ſuppoſed to be formed under the immediate direction of the archbiſhop. In the beginning of the long parliament he was attacked on account of thoſe canons: and they being condemned by the houſe of commons on the 16th of December 1640, "as containing many things contrary to the king's prerogative, to the fundamental laws and ſtatutes of this realm, to the rights of parliament, to the property and liberty of the ſubject, and tending to ſedition, and of dangerous conſequence;" he was, on the 18th of December, accuſed by the commons of high treaſon, and ſent to the Tower. Being tried before the houſe of lords, for endeavouring to ſubvert the laws, and to overthrow the Proteſtant religion, he was found guilty, and beheaded on Tower hill on January 10th following, in the 72d year of his age. This learned prelate, notwithſtanding his being charged with a deſign to bring in Popery, wrote an anſwer to Dr. Fiſher, which is eſteemed one of the beſt pieces that has been printed againſt that religion. He was temperate in his diet, and regular in his private life: but his fondneſs for introducing new ceremonies, in which he ſhowed a hot and indiſcreet zeal, his encouraging of ſports on Sundays, his illegal and cruel ſeverity in the Star-chamber and High-commiſſion courts, and the fury with which he perſecuted the diſſenters, and all who preſumed to contradict his ſentiments, expoſed him to popular hatred. Beſides his Anſwer to Fiſher, he publiſhed ſeveral Sermons, and other works.

LAUDANUM. See Opium.

LAUDATIO, in a legal ſenſe, was anciently the teſtimony delivered in court of the accuſed perſon's good behaviour and integrity of life. It reſembled the cuſtom, which prevails in our trials, of calling perſons to ſpeak to the character of the priſoner. The leaſt number of the *laudatores* amongſt the Romans was ten.

LAUDER (William), a native of Scotland, was educated at the univerſity of Edinburgh, where he finiſhed his ſtudies with great reputation, and acquired a conſiderable knowledge of the Latin tongue. On May 22, 1734, he received a teſtimonial from the heads of the univerſity, certifying that he was a fit perſon to teach humanity in any ſchool or college whatever. In 1739 he publiſhed at Edinburgh an edition of Johnſton's Pſalms. In 1742 he was recommended by Mr. Patrick Cuming and Mr. Colin Maclaurin, profeſſors of church-hiſtory and mathematics, to the maſterſhip of the grammar-ſchool at Dundee, then vacant. Whether he ſucceeded in his application or not, is uncertain: but a few years afterwards we find him in London, contriving to ruin the reputation of Milton; an attempt which ended in the deſtruction of his own. His reaſon for the attack probably ſprung from the virulence of a violent party ſpirit, which triumphed over every principle of honour and honeſty. He began firſt to retail part of his deſign in The Gentleman's Magazine, 1747; and finding that his forgeries were not detected, was encouraged in 1750 to collect them, with additions, into a volume, entitled, "An Eſſay on Milton's Uſe and Imitation of the Moderns in his Paradiſe Loſt," 8vo. The fidelity of his quotations had been doubted by ſeveral people; and the falſehood of them was ſoon after demonſtrated by Dr. Douglas, in a pamphlet entitled, "Milton vindicated from the Charge of Plagiariſm brought againſt him by Lauder, and Lauder himſelf convicted of ſeveral Forgeries and groſs Impoſitions on the Public: In a Letter humbly addreſſed to the Right Honourable the Earl of Bath, 1751," 8vo. The appearance of this Detection overwhelmed Lauder with confuſion. He ſubſcribed a confeſſion, dictated by a learned friend, wherein he ingenuouſly acknowledged his offence, which he profeſſed to have been occaſioned by the injury he had received from the diſappointment of his expectations of profit from the publication of Johnſton's Pſalms. This misfortune he aſcribed to a couplet in Mr. Pope's Dunciad, book iv. ver. 3. and from thence originated his rancour againſt Milton. He afterwards imputed his conduct to other motives; abuſed the few friends who continued to countenance him; and, finding that his character was not to be retrieved, quitted the kingdom, and went to Barbadoes, where he ſome time taught a ſchool. His behaviour there was mean and deſpicable; and he paſſed the remainder of his life in univerſal contempt. "He died (ſays Mr. Nichols) ſome time about the year 1771, as my friend Mr. Reed was informed by the gentleman who read the funeral ſervice over him."

LAUDICENI, amongſt the Romans, applauders, who for reward entered the rehearſal-rooms, attended the repetition of plays, and were in waiting when orations were pronounced, in order to raiſe or increaſe the acclamation and applauſe.

LAUDOHN (Field-marſhal), a celebrated general in the Imperial ſervice, born in 1716, was a native of Livonia, and deſcended from a Scottiſh family. He made his firſt campaigns under marſhal Munich, in the war of 1738 between the Ruſſians and Turks; and was at the taking of Oczakow, Choczim, and Stawutzchane, where the Turks were entirely defeated. Frederick the Great refuſed, in 1741, to take young Laudohn into his ſervice, ſaying he did not like his countenance; though this monarch, who was conſidered as the greateſt general of his age, afterwards ſaid, that he often admired the poſitions of other generals, but that he had ever dreaded the battles of Laudohn. In 1756, when but juſt entered into the ſervice of the houſe of Auſtria, with the rank of lieutenant-colonel, he made ſuch a rapid progreſs, that within leſs than a year he was a general of artillery, and within three years commander in chief of the whole army. He reſcued Olmutz, when beſieged by the Pruſſians; beat the king himſelf at Frankfort on the Oder; at Zorndorf, took general Fouquet priſoner; carried Glatz and Schweidnitz by aſſault; and ſtopped the progreſs of Frederick in a war which might have proved fatal to the houſe of Auſtria. In 1778, when elevated to the rank of marſhal, at the head of 60,000 men he hindered Henry, brother to the king of Pruſſia, from joining his army to that of the king. At Dubicza, Novi, Gradiſca, and Belgrade, in the late war between the Emperor and the Turks, he had but to preſent himſelf before the place, and ſay with Cæſar, *Veni, vidi, vici*. But at his head-quarters in Moravia he was ſeized with a fever, in conſequence of an operation he underwent for an obſtruction in the urethra. His impatience under the medical applications, the impetuous ardour of his character, and the knowledge, above all, of his importance in the war, contributed to irritate his mind, and promote the violence of the fever. He reſiſted the application of cataplaſms, before and after the inciſions were made, with a fatal obſtinacy, which raiſed the inflammation to ſuch a height, that he expired under the acceſſion of the fever on the 14th of July 1790, in the 74th year of his age.

LAUDS, Laudes, the ſecond part of the ordinary office of the breviary, ſaid after matins; though, heretofore, it ended the office of the night. The laudes conſiſt principally of pſalms, hymns, &c. whence they took their name, from *laus, laudis*, "praiſe."

LAVENHAM, or Lanham, 61 miles from London, is a pleaſant and pretty large town of Suffolk, on a branch of the river Bret, from whence it riſes gradually to the top of a hill, where are its church, which is a very handſome Gothic ſtructure, and in which are ſeveral ancient monuments; and a ſpacious market-place, encompaſſed with nine ſtreets or diviſions, in a very healthy free air. It had formerly a very conſiderable trade in blue cloth; and had three guilds or companies, with each their hall. It has ſtill a conſiderable manufactory of ſerges, ſhalloons, ſays, ſtuffs, and ſpinning fine yarn for London; and many hundred loads of wool are delivered in a year from its wool-hall. It is governed by 6 capital burgeſſes, who are for life, and chooſe the inferior officers. The church and its ſteeple, which is 137 feet high, are reckoned the fineſt in the county. Its tenor bell, though not much more than a ton, has as deep a note as a bell of twice that weight. Here is a free-ſchool and a bridewell, part of which is a workhouſe where the poor children, &c. of the pariſh are employed in ſpinning hemp, flax, and yarn; beſides which, here are other conſiderable charities. The tenants of the manor and the other inhabitants were always exempted from ſerving at any court held for its hamlet. They have that tenure of land here which is called *Borough Engliſh*. Its markets are on Tueſday, and on Thurſday for wool. Its fairs are on Shrove-Tueſday, and October 10.

LAVENDER. See Lavandula.

LAVER, in ſcripture hiſtory, a ſacred utenſil placed in the court of the Jewiſh tabernacle, conſiſting of a baſon, whence they drew water by cocks, for waſhing the hands and feet of the officiating prieſts, and alſo the entrails and legs of the victims.

LAVERNA, in antiquity, the goddeſs of thieves and cheats among the Romans, who honoured her with public worſhip, becauſe ſhe was ſuppoſed to favour thoſe who wiſhed that their deſigns might not be diſcovered. Varro ſays, that ſhe had an altar near one of the gates of Rome; hence called *porta lavernalis*.

LAUGERIA, in botany: A genus of the monogynia order, belonging to the pentandria claſs of plants; and in the natural method ranking among thoſe of which the order is doubtful. The corolla is quinquefid; the fruit is a plum with a quinquelocular kernel.

LAUGHTER, an affection peculiar to mankind, occaſioned by ſomething that tickles the fancy. In laughter, the eyebrows are raiſed about the middle, and drawn down next the noſe; the eyes are almoſt ſhut; the mouth opens and ſhows the teeth, the corners of the mouth being drawn back and raiſed up; the cheeks ſeem puffed up, and almoſt hide the eyes; the face is uſually red, the noſtrils are open; and the eyes wet.

Authors attribute laughter to the fifth pair of nerves, which ſending branches to the eye, ear, lips, tongue, palate, and muſcles of the cheek, parts of the mouth, præcordia, &c. there hence ariſes a ſympathy, or conſent, between all theſe parts; ſo that when one of them is acted upon, the others are proportionably affected. Hence a ſavoury thing ſeen, or ſmelt, affects the glands, and parts of the mouth; a thing ſeen, or heard, that is ſhameful, affects the cheeks with bluſhes: on the contrary, if it pleaſe and tickle the fancy, it affects the præcordia, and muſcles of the mouth and face with laughter: if it cauſe ſadneſs and melancholy, it likewiſe affects the præcordia, and demonſtrates itſelf by cauſing the glands of the eyes to emit tears. Dr. Willis accounts for the pleaſure of kiſſing from the ſame cauſe; the branches of this fifth pair being ſpread to the lips, the præcordia, and the genital parts; whence ariſes a ſympathy between thoſe parts.

The affection of the mind by which laughter is produced is ſeemingly ſo very different from the other paſſions with which we are endowed, that it hath engaged the attention of very eminent perſons to find it out.—1. Ariſtotle, in the fifth chapter of his Poetics, obſerves of comedy, that "it imitates thoſe vices or meanneſſes only which partake of the ridiculous: now the ridiculous (ſays he) conſiſts of ſome fault or turpitude not attended with great pain, and not deſtructive." 2. "The paſſion of laughter (ſays Mr. Hobbes) is nothing elſe but ſudden glory ariſing from ſome ſudden conception of ſome eminency in ourſelves, by compariſon with the infirmity of others, or with our own formerly. For men (continues he) laugh at the follies of themſelves paſt, when they come ſuddenly to remembrance, except when we bring with them any ſudden diſhonour." 3. Akenſide, in the third book of his excellent poem, treats of ridicule at conſiderable length. He gives a detail of ridiculous characters; ignorant pretenders to learning, boaſtful ſoldiers, and lying travellers, hypocritical churchmen, conceited politicians, old women that talk of their charms and virtue, ragged philoſophers who rail at riches, virtuoſi intent upon trifles, romantic lovers, wits wantonly ſatirical, fops that out of vanity appear to be diſeaſed and profligate, daſtards who are aſhamed or afraid without reaſon, and fools who are ignorant of what they ought to know. Having finiſhed the detail of characters, he makes ſome general remarks on the cauſe of ridicule; and explains himſelf more fully in a proſe definition illuſtrated by examples. The definition, or rather deſcription, is in theſe

words: "That which makes objects ridiculous, is some ground of admiration or esteem connected with other more general circumstances comparatively worthless or deformed: or it is some circumstance of turpitude or deformity connected with what is in general excellent or beautiful; the inconsistent properties existing either in the objects themselves, or in the apprehension of the person to whom they relate; belonging always to the same order or class of being; implying sentiment and design, and exciting no acute or vehement commotion of the heart."—4. Hutcheson has given another account of the ludicrous quality, and seems to think that it is the contrast or opposition of dignity and meanness which occasions laughter.

All these opinions are refuted by Dr. Beattie in his Essay on Laughter and Ludicrous Composition, where he has treated the subject in a masterly manner. "To provoke laughter (says he), is not essential either to wit or humour. For though that unexpected discovery of resemblance between ideas supposed dissimilar, which is called *wit*—and that comic exhibition of singular characters, sentiments, and imagery, which is denominated *humour*,—do frequently raise laughter, they do not raise it always. Addison's poem to Sir Godfrey Kneller, in which the British kings are likened to heathen gods, is exquisitely witty, and yet not laughable. Pope's Essay on Man abounds in serious wit; and examples of serious humour are not uncommon in Fielding's History of Parson Adams, and in Addison's account of Sir Roger de Coverley. Wit, when the subject is grave, and the allusions sublime, raises admiration instead of laughter: and if the comic singularities of a good man appear in circumstances of real distress, the imitation of these singularities in the epic or dramatic comedy will form a species of humour, which, if it should force a smile, will draw forth a tear at the same time."

LAVINGTON-EAST, a town of Wilts, 4 miles south of the Devizes, and 89 miles from London. It is called in our histories Stepult-Lavington; but now Cheaping or Market-Lavington on account of its markets, which are on Monday and Wednesday, the last a great corn-market. It is supposed to have been a market-town above 200 years. Here is a charity-school for 36 children, who have books given them, and the girls are taught to knit and sew.

LAVINIUM (anc. geog.), a town of Latium, six miles to the east of Laurentum, according to an ancient map; so named from *Lavinia*, consort of Æneas, and daughter of king Latinus, and built by the Trojans. The first town of Roman original in Latium, and the seat of the Dii Penates, (Livy): situated near the river Numicus, or Numicius; between which and the Tiber Æneas landed, according to Virgil. Holstenius supposes the town to have stood on an eminence, now called *il Monte di Levano*.

LAUNCE. See LANCE.

LAUNCESTON, a town of Cornwall in England, seated on the river Tamar, 214 miles from London. It is also called *Dunhivid*, from its situation on a down. King Henry III. made it a free borough. It was composed before of two other boroughs, *viz.* Dunhivid and Newport. It has been the place for choosing knights of the shire ever since the reign of king Edward I. and the assizes-town ever since Richard II. till by a late act of parliament the lord chancellor or lord keeper was empowered to name any other place in the county for it; since which the summer assizes have been held at Bodmin. It was incorporated by queen Mary in 1555. It is governed by a mayor, recorder, and eight aldermen, has a free school which was founded by queen Elizabeth, and is a populous trading town. Its markets are on Thursday and Saturday, and it has four fairs. In the 32d of Henry VIII. an act was made for the repair of this and other decayed Cornish boroughs; and it endowed this town with the privileges of a sanctuary, though it does not appear to have used them. It had a monastery and a noble castle, which, because of its strength, was called *castle-terrible*, and was given by king Richard I. to his brother, afterwards king John. Here are two charity-schools for 48 children of both sexes, where the girls are taught to knit, sew, and make bonelace, and are allowed what they can earn. Leland says it was walled in his time, and one mile in compass. Its list of burgesses commences in the 23d of Edward I. The lower part of its ancient castle is made use of for the gaol.

LAUNCH, in the sea-language, signifies to put out; as, *Launch the ship*, that is, Put her out of dock; *launch aft*, or *forward*, speaking of things that are stowed in the hold, is, put them more forward; *launch ho!* is a term used when a yard is hoisted high enough, and signifies *hoist no more*. See also LANCH.

LAUNDER, in mineralogy, a name given in Devonshire, and other places, to a long and shallow trough, which receives the powdered ore after it comes out of the box or coffer, which is a sort of mortar, in which it is powdered with iron pestles. The powdered ore, which is washed into the launder by the water from the coffer, is always finest nearest the grate, and coarser all the way down.

LAURA, in church history, a name given to a collection of little cells at some distance from each other, in which the hermits in ancient times lived together in a wilderness. These hermits did not live in community, but each monk provided for himself in his distinct cell. The most celebrated lauras mentioned in ecclesiastical history were in Palestine: as the laura of St. Euthymus, at four or five leagues distance from Jerusalem: the laura of St. Saba, near the brook Cedron; the laura of the Towers, near the river Jordan, &c.

LAUREATE or *Poet* LAUREATE, an officer of the household of the kings of Britain, whose business consists only in composing an ode annually on his majesty's birth-day, and on the new year; sometimes also, though rarely, on occasion of any remarkable victory. Of the first institution of poets laureate, Mr. Warton has given the following account in his History of English Poetry. "Great confusion has entered into this subject, on account of the degrees in grammar, which included rhetoric and versification, anciently taken in our universities, particularly at Oxford: on which occasion, a wreath of laurel was presented to the new graduate, who was afterwards usually styled *Poeta Laureatus*. These scholastic laureations, however, seem to have given rise to the appellation in question. I will give some instances at Oxford, which at the same time will explain the nature of the studies for which our academical philologists received their rewards. About the year 1470, one John Watson, a student in grammar, obtained a concession to be graduated and laureated in that science, on condition that he composed one hundred Latin verses in praise of the university, and a Latin comedy. Another grammarian was distinguished with the same badge, after having stipulated, that, at the next public act, he would affix the same number of hexameters on the great gates of St. Mary's church, that they might be seen by the whole university. This was at that period the most convenient mode of publication. About the same time, one Maurice Byrchensaw, a scholar in rhetoric, supplicated to be admitted to read lectures, that is, to take a degree in that faculty; and his petition was granted, with a provision, that he should write one hundred verses on the glory of the university, and not suffer Ovid's Art of Love, and the Elegies of Pamphylus, to be studied in auditory. Not long afterwards, one John Bulman, another rhetorician, having complied with the terms imposed, of explaining the first book of Tully's Offices, and likewise the first of his Epistles, without any pecuniary emolument, was graduated in rhetoric; and a crown of

laurel was publicly placed on his head by the hands of the chancellor of the univerſity. About the year 1489, Skelton was laureated at Oxford, and in the year 1493 was permitted to wear his laurel at Cambridge. Robert Whittington affords the laſt inſtance of a rhetorical degree at Oxford. He was a ſecular prieſt, and eminent for his various treatiſes in grammar, and for his facility in Latin poetry: having exerciſed his art many years, and ſubmitting to the cuſtomary demand of an hundred verſes, he was honoured with the laurel in the year 1512.

"With regard to the poet-laureate of the kings of England, he is undoubtedly the ſame that is ſtyled the *king's verſifier*, and to whom 100 ſhillings were paid as his annual ſtipend in the year 1251. But when or how that title commenced, and whether this officer was ever ſolemnly crowned with laurel at his firſt inveſtiture, I will not pretend to determine, after the ſearches of the learned Selden on this queſtion have proved unſucceſsful. It ſeems moſt probable, that the barbarous and inglorious name of *verſifier* gradually gave way to an appellation of more elegance and dignity: or rather, that at length thoſe only were in general invited to this appointment, who had received academical ſanction, and had merited a crown of laurel in the univerſities for their abilities in Latin compoſition, particularly Latin verſification. Thus the *king's laureate* was nothing more than 'a *graduated* rhetorician employed in the ſervice of the king.' That he originally wrote in Latin, appears from the ancient title *verſificator*; and may be moreover collected from the two Latin poems, which Baſton and Gulielmus, who appear to have reſpectively acted in the capacity of royal poets to Richard I. and Edward II. officially compoſed on Richard's cruſade, and Edward's ſiege of Striveling caſtle.

"Andrew Bernard, ſucceſſively poet-laureate of Henry VII. and VIII affords a ſtill ſtronger proof that this officer was a Latin ſcholar. He was a native of Tholouſe, and an Auguſtine monk. He was not only the king's poet laureate, as it is ſuppoſed, but his hiſtoriographer, and preceptor in grammar to prince Arthur. He obtained many eccleſiaſtical preferments in England. All the pieces now to be found, which he wrote in the character of poet-laureate, are in Latin. Theſe are, "An *Addreſs* to Henry VIII. for the moſt auſpicious beginning of the 10th year of his reign, with an *Epithalamium* on the marriage of Francis the dauphin of France with the king's daughter;" *A New Year's Gift* for the year 1515, and, Verſes wiſhing proſperity to his majeſty's 13th year. He has left ſome Latin hymns; and many of his Latin proſe pieces, which he wrote in the quality of hiſtoriographer to both monarchs, are remaining.

"I am of opinion, that it was not cuſtomary for the royal laureate to write in Engliſh, till the reformation of religion had begun to diminiſh the veneration for the Latin language; or, rather, till the love of novelty, and a better ſenſe of things, had baniſhed the narrow pedantries of monaſtic erudition, and taught us to cultivate our native tongue."

LAUREL. See PRUNUS and LAURUS.

LAUREIS, pieces of gold coined in the year 1619, with the king's head laureated, which gave them the name of *laureis*; the 20s. pieces whereof were marked with XX. the 10s. X. and the 5s. pieces with V.

LAURENS CASTRA. See LAURENTUM.

LAURENTALIA, or LARENTALIA, called alſo *Larentinalia*, *Laurentales*, and *Larentales*, feaſts celebrated among the Romans on the 10th of the kalends of January, or 23d of December, in memory of Acca Laurentia, wife of the ſhepherd Fauſtulus, and nurſe of Romulus and Remus. Acca Laurentia, from whom the ſolemnity took its name, is repreſented as no leſs remarkable for the beauty of her perſon, than her laſciviouſneſs; on account of which, ſhe was nick-named by her neighbours *lupa*, "ſhe-wolf;" which is ſaid to have given riſe to the tradition of Romulus and Remus being ſuckled by a wolf. She afterwards married a very rich man, who brought her great wealth, which, at her death, ſhe left to the Roman people; in conſideration whereof they performed to her theſe honours; though others repreſent the feaſt as held in honour of Jupiter Latiaris. See LARENTINALIA and LARES.

LAURENTIUS, one of the firſt printers, and, according to ſome, the inventor of the art, was born at Haerlem about the year 1370, and executed ſeveral departments of magiſtracy of that city. Thoſe writers are miſtaken who aſſign to him the ſurname of *Coſter*, or aſſert that the office of ædituus was hereditary in his family. In a diploma of Albert of Bavaria in 1380, in which, among other citizens of Haerlem, our Laurentius's *father* is mentioned by the name of "*Joannes Laurentii filius*," Beroldus is called *ædituus*, who was ſurely of another family; and in 1396 and 1398, Henricus à Lunen enjoyed that office; after whoſe reſignation, count Albert conferring on the citizens the privilege of electing their ædituus, they, probably ſoon after, fixed on Laurentius; who was afterwards called *Coſter* from his office, and not from his family name, as he was deſcended from an illegitimate branch of the Gens Brederodia. His office was very lucrative; and that he was a man of great property, the elegance of his houſe may teſtify. That he was the *inventor* of printing, is aſſerted in the narrative of Junius. His firſt work was an *Horarium*, containing the Letters of the alphabet, the Lord's prayer, the Apoſtle's creed, and two or three ſhort prayers; the next was the *Speculum ſalutis*, in which he introduced *pictures* on *wooden blocks*; then *Donatus*, the larger ſize; and afterwards the ſame work in a leſs ſize. All theſe were printed on *ſeparate moveable wooden types* faſtened together by threads. If it be thought improbable, that ſo ingenious a man ſhould have proceeded no farther than the invention of *wooden types*; it may be anſwered, that he printed for profit, not for fame; and *wooden* types were not only *at that time* made ſooner and cheaper than *metal* could be, but were ſufficiently durable for the ſmall impreſſions of each book he muſt neceſſarily have printed.—His preſs was nearly ſhaped like the common wine-preſſes.—He printed ſome copies of *all* his books both on paper and vellum.—It has been very erroneouſly ſuppoſed, that he quitted the profeſſion, and died broken-hearted: but it is certain, that he did not live to ſee the art brought to perfection.—He died in 1440, aged 70; and was ſucceeded either by his ſon-in law Thomas Peter, who married his only daughter Lucia; or by their immediate deſcendants, Peter, Andrew, and Thomas; who were old enough (even if their father was dead, as it is likely he was) to conduct the buſineſs, the eldeſt being at leaſt 22 or 23. What books they printed it is not eaſy to determine; they having, after the example of Laurentius (more anxious for profit than for fame), neither added to their books their names, the place where they were printed, or the date of the year. Their firſt eſſays were new editions of *Donatus* and the *Speculum*. They afterwards reprinted the latter, with a Latin tranſlation, in which they uſed their grandfather's wooden pictures; and printed the book partly on *wooden blocks*, partly on *wooden ſeparate types*, according to Mr. Meerman, who has given an exact engraving of *each ſort*, taken from different parts of the ſame book, which was publiſhed between the years 1442 and 1450. Nor did they ſtop here: they continued to print ſeveral editions of the *Speculum*, both in Latin and in Dutch; and many other works, particularly "Hiſtoria Alexandri Magni;" "Flavii *Vedatii* [for *Vegetii*] Renati Epitome de Re Militari;" and "Opera varia a Thomas Kempis." Of each of theſe Mr. Meerman has given an engraved ſpecimen. They were all printed with *ſeparate wooden types*; and, by their great neatneſs, are a proof that the deſcendants of Laurentius were induſtrious in improv-

ing his invention. Kempis was printed at Haerlem in 1472, and was the laſt known work of Laurentius's deſcendants, who ſoon after diſpoſed of all their materials, and probably quitted the employment; as the uſe of *fuſile types* was about that time univerſally diffuſed through Holland by the ſettling of Martens at Aloſt, where he purſued the art with reputation for upwards of 60 years. See *(Hiſtory of)* PRINTING.

LAURENTUM, or LAURENS CASTRA, (anc. geog.), a town of Latium, ſuppoſed to be the royal reſidence of thoſe moſt ancient kings Latinus, Picus, and Faunus, (Virgil). Hither the emperor Commodus retired during a peſtilence. Its name was from an adjoining grove of bay-trees, midway between Oſtia and Antium. Suppoſed to have ſtood in the place now called *San Lorenzo*; which ſeems to be confirmed from the Via Laurentina leading to Rome.

LAURO (PHILIPPO), a celebrated painter, born at Rome in 1623. He learned the firſt rudiments of the art from his father Balthaſar, who was himſelf a good painter. He afterward ſtudied under Angelo Caroſello, his brother-in-law; and proved ſo great a proficient, that in a ſhort time he far ſurpaſſed his tutor in deſign, colouring, and elegance of taſte. He applied himſelf to painting hiſtorical ſubjects in a ſmall ſize, enriching the back-grounds with lively landſcapes, that afforded the eye and the judgment equal entertainment; but though his ſmall paintings are beſt approved, he finiſhed ſeveral grand compoſitions for altar-pieces that were highly eſteemed. He died in 1694; and his works are eagerly bought up at high prices all over Europe.

LAURO, or *Lauron* (anc. geog.), a town of the Hither Spain, where Cn. Pompeius, ſon of Pompey the Great, was defeated and ſlain. Now Lorigne, five leagues to the north of Lliria in Valencia.

LAURUS, the BAY-TREE. See BAY-TREE.

LAUS, or LAOS (anc. geog.), a river of Italy, ſeparating Lucania from the Bruttii, and running from eaſt to weſt into the Tuſcan ſea; with a cognominal bay, and a town, the laſt of Lucania, a little above the ſea; a colony from Sybaris, according to Strabo, Pliny, Stephanus. Both town and river are now called *Laino*, in the Calabria Citra; and the bay, called *Golfo della Scalea*, or *di Policaſtro*, two adjoining towns, is a part of the Tuſcan ſea, extending between the promontory Palinurus and the mouth of the Laus.

LAUS *Pompeia* (anc. geog.), a town of Inſubria, ſituated to the eaſt of Milan, between the rivers Addua and Lamber. A town built by the Poii after their paſſing the Alps: its ancient Gaulic name is unknown. Strabo Pompeius, father of Pompey, leading thither a colony, gave it a new name, and conferred the *Jus Latii* on the ancient inhabitants who remained there. The modern Lodi is built from its ruins, at ſome diſtance oft. E. lon. 10. 15. N. lat. 45. 22.

LAUSANNE, a large, ancient, and handſome town of Switzerland, capital of the country of Vaud, and in the canton of Berne, with a famous college and biſhop's ſee. The town-houſe and the other public buildings are magnificent. It is ſeated between three hills near the lake of Geneva, in E. lon. 6. 35. N. lat. 46. 30.—The town ſtands on an aſcent ſo ſteep, that in ſome places the horſes cannot draw up a carriage without great difficulty, and foot paſſengers aſcend to the upper part of the town by ſteps. Here is an academy for the ſtudents of the country; the profeſſors are appointed by government; and there is a pretty good public library. The church, formerly the cathedral, is a magnificent Gothic building, ſtanding on the moſt elevated part of the town. Among other ſepulchres it contains that of Amadæus VIII. duke of Savoy, ſtyled the *Solomon* of his age; beſt known by the title of *Antipope Felix V.* who exhibited the ſingular example of a man twice abdicating the ſovereignty, and retiring from regal pomp to a private ſtation.

The ſame year that the country named *Pays de Vaud* was conquered from the houſe of Savoy, the inhabitants of Lauſanne put themſelves under the protection of the canton of Berne, their biſhop having retired from the town. At that time its privileges were confirmed and augmented, and it is ſtill governed by its own magiſtrates. The citizens of the principal ſtreet have the privilege of pronouncing ſentence in criminal caſes. If the criminal is found, and acknowledges himſelf guilty, the burghers of the ſtreet aſſemble: one of the magiſtrates pleads in his behalf, and another againſt him; the court of juſtice give their opinion upon the point of law; and the majority of citizens poſſeſſing houſes in the principal ſtreet determine the penalty. In capital caſes there is no pardon, according to the letter of the law, unleſs it can be obtained within 24 hours from the ſovereign council of Berne, though it generally happens that eight days are allowed for this purpoſe. When the criminal is ſeized within the juriſdiction of the town, the fact is tried, and the burghers pronounce ſentence, from which there is no appeal; but if he happens to be taken in the diſtrict of the bailiff, there is an appeal to the government of Berne.—The late conqueſt of Switzerland by the French is expected to produce a radical change in the conſtitution and laws of this unfortunate country.

LAVORI (TERRA DI), a province of Italy, in the kingdom of Naples, bounded on the weſt by the Campagna of Rome, and by Farther Abruzzo; on the north by the Citerior Abruzzo, and by the county of Moliſſa; on the eaſt by the Ultra Principata; and on the ſouth by the Principata Citra. It is about 63 miles in length and 35 in breadth; and is fertile in corn, excellent vines, and other fruits. There are alſo ſeveral mineral ſprings and mines of ſulphur; Naples is the capital town.

L A W.

PART I. OF THE NATURE OF LAWS IN GENERAL.

LAW, in its moſt general and comprehenſive ſenſe, ſignifies a rule of action; and is applied indiſcriminately to all kinds of action, whether animate or inanimate, rational or irrational. Thus we ſay, the laws of motion, of gravitation, of optics, of mechanics, as well as the laws of nature and of nations. And it is that rule of action which is preſcribed by ſome ſuperior, and which the inferior is bound to obey.

Thus when the Supreme Being formed the univerſe, and created matter out of nothing, he impreſſed certain principles upon that matter, from which it can never depart, and without which it would ceaſe to be. When he put that matter into motion, he eſtabliſhed certain laws of motion, to which all moveable bodies muſt conform. And, to deſcend from the greateſt operations to the ſmalleſt, when a workman forms a clock, or other piece of mechaniſm, he eſtabliſhes at his own pleaſure certain arbitrary laws for its direction; as, that the hand ſhall deſcribe a given ſpace in a given time; to which law as long as the work conforms, ſo long it continues in perfection, and anſwers the end of its formation.

If we farther advance, from mere inactive matter to vegetable

and animal life, we ſhall find them ſtill governed by laws; more numerous indeed, but equally fixed and invariable. The whole progreſs of plants, from the ſeed to the root, and from thence to the ſeed again; the method of animal nutrition, digeſtion, ſecretion, and all other branches of vital economy;—are not left to chance, or the will of the creature itſelf, but are performed in a wondrous involuntary manner, and guided by unerring rules laid down by the great Creator.

This then is the general ſignification of law, a rule of action dictated by ſome ſuperior being: and, in thoſe creatures that have neither the power to think nor to will, ſuch laws muſt be invariably obeyed, ſo long as the creature itſelf ſubſiſts: for its exiſtence depends on that obedience. But laws, in their more confined ſenſe, and in which it is our preſent buſineſs to conſider them, denote the rules, not of action in general, but of *human* action or conduct: that is, the precepts by which man, the nobleſt of all ſublunary beings, a creature endowed with both reaſon and free-will, is commanded to make uſe of thoſe faculties in the general regulation of his behaviour.

Man, conſidered as a creature, muſt neceſſarily be ſubject to the laws of his Creator, for he is entirely a dependent being. A being independent of any other has no rule to purſue but ſuch as he preſcribes to himſelf: but a ſtate of dependance will inevitably oblige the inferior to take the will of him on whom he depends as the rule of his conduct; not indeed in every particular, but in all thoſe points wherein his dependance conſiſts. This principle therefore has more or leſs extent and effect, in proportion as the ſuperiority of the one and the dependance of the other is greater or leſs, abſolute or limited. And conſequently, as man depends abſolutely upon his Maker for every thing, it is neceſſary that he ſhould in all points conform to his Maker's will.

This will of his Maker is called the *law of nature*. For as God, when he created matter, and endued it with a principle of mobility, eſtabliſhed certain rules for the perpetual direction of that motion; ſo, when he created man, and endued him with freewill to conduct himſelf in all parts of life, he laid down certain immutable laws of human nature, whereby that freewill is in ſome degree regulated and reſtrained, and gave him alſo the faculty of reaſon to diſcover the purport of thoſe laws.

Conſidering the Creator only as a being of infinite power, he was able unqueſtionably to have preſcribed whatever laws he pleaſed to his creature man, however unjuſt or ſevere. But as he is alſo a Being of infinite wiſdom, he has laid down only ſuch laws as were founded in thoſe relations of juſtice that exiſted in the nature of things antecedent to any poſitive precept. Theſe are the eternal immutable laws of good and evil, to which the Creator himſelf in all his diſpenſations conforms; and which he has enabled human reaſon to diſcover, ſo far as they are neceſſary for the conduct of human actions. Such, among others, are theſe principles: That we ſhould live honeſtly, ſhould hurt nobody, and ſhould render to every one his due; to which three general precepts Juſtinian has reduced the whole doctrine of law.

But if the diſcovery of theſe firſt principles of the law of nature depended only upon the due exertion of right reaſon, and could not otherwiſe be obtained than by a chain of metaphyſical diſquiſitions, mankind would have wanted ſome inducement to have quickened their inquiries, and the greater part of the world would have reſted content in mental indolence, and ignorance its inſeparable companion. As therefore the Creator is a Being, not only of infinite power and wiſdom, but alſo of infinite goodneſs, he has been pleaſed ſo to contrive the conſtitution and frame of humanity, that we ſhould want no other prompter to inquire after and purſue the rule of right, but only our own ſelf love, that univerſal principle of action. For he has ſo intimately connected, ſo inſeparably interwoven, the laws of eternal juſtice with the happineſs of each individual, that the latter cannot be attained but by obſerving the former; and if the former be punctually obeyed, it cannot but induce the latter. In conſequence of which mutual connection of juſtice and human felicity, he has not perplexed the law of nature with a multitude of abſtracted rules and precepts, referring merely to the fitneſs or unfitneſs of things, as ſome have vainly ſurmiſed; but has graciouſly reduced the rule of obedience to this one paternal precept, "that man ſhould purſue his own happineſs." This is the foundation of what we call *ethics*, or *natural law*. For the ſeveral articles into which it is branched in our ſyſtems, amount to no more than demonſtrating, that this or that action tends to man's real happineſs; and therefore very juſtly concluding, that the performance of it is a part of the law of nature; or, on the other hand, that this or that action is deſtructive of man's real happineſs, and therefore that the law of nature forbids it.

This law of nature, being coëval with mankind, and dictated by God himſelf, is of courſe ſuperior in obligation to any other. It is binding over all the globe, in all countries, and at all times: no human laws are of any validity, if contrary to this; and ſuch of them as are valid derive all their force, and all their authority, mediately or immediately, from this original.

But in order to apply this to the particular exigencies of each individual, it is ſtill neceſſary to have recourſe to reaſon: whoſe office it is to diſcover, as was before obſerved, what the law of nature directs in every circumſtance of life; by conſidering, what method will tend the moſt effectually to our own ſubſtantial happineſs. And if our reaſon were always, as in our firſt anceſtor before his tranſgreſſion, clear and perfect, unruffled by paſſions, unclouded by prejudice, unimpaired by diſeaſe or intemperance, the taſk would be pleaſant and eaſy; we ſhould need no other guide but this. But every man now finds the contrary in his own experience; that his reaſon is corrupt, and his underſtanding full of ignorance and error.

This has given manifold occaſion for the benign interpoſition of Divine Providence; which, in compaſſion to the frailty, the imperfection, and the blindneſs of human reaſon, hath been pleaſed, at ſundry times and in divers manners, to diſcover and enforce its laws by an immediate and direct revelation. The doctrines thus delivered, we call the *revealed* or *divine law*, and they are to be found only in the Holy Scriptures. Theſe precepts, when revealed, are found upon compariſon to be really a part of the original law of nature, as they tend in all their conſequences to man's felicity. But we are not from thence to conclude, that the knowledge of theſe truths was attainable by reaſon in its preſent corrupted ſtate; ſince we find, that, until they were revealed, they were hid from the wiſdom of ages. As then the moral precepts of this law are indeed of the ſame original with thoſe of the law of nature, ſo their intrinſic obligation is of equal ſtrength and perpetuity. Yet undoubtedly the revealed law is of infinitely more authenticity than that moral ſyſtem which is framed by ethical writers, and denominated the *natural law*: becauſe one is the law of nature, expreſsly declared ſo to be by God himſelf; the other is only what, by the aſſiſtance of human reaſon, we imagine to be that law. If we could be as certain of the latter as we are of the former, both would have an equal authority: but till then they can never be put in any competition together.

Upon theſe two foundations, the law of nature and the law of revelation, depend all human laws; that is to ſay, no human laws ſhould be ſuffered to contradict theſe. There are, it is true, a great number of indifferent points, in which both the divine law and the natural leave a man at his own liberty; but which are found neceſſary, for the benefit of ſociety, to be reſtrained within certain limits. And herein it is that human

laws have their greateſt force and efficacy; for, with regard to ſuch points as are not indifferent, human laws are only declaratory of, and act in ſubordination to, the former. To inſtance in the caſe of murder: this is expreſſly forbidden by the divine, and demonſtrably by the natural, law; and from theſe prohibitions ariſes the true unlawfulneſs of this crime. Thoſe human laws that annex a puniſhment to it, do not at all increaſe its moral guilt, or ſuperadd any freſh obligation in *foro conſcientiæ* to abſtain from its perpetration. Nay, if any human law ſhould allow or enjoin us to commit it, we are bound to tranſgreſs that human law, or elſe we muſt offend both the natural and the divine. But with regard to matters that are in themſelves indifferent, and are not commanded or forbidden by thoſe ſuperior laws; ſuch, for inſtance, as exporting of wool into foreign countries; here the inferior legiſlature has ſcope and opportunity to interpoſe, and to make that action unlawful which before was not ſo.

If man were to live in a ſtate of nature, unconnected with other individuals, there would be no occaſion for any other laws than the law of nature and the law of God. Neither could any other law poſſibly exiſt: for a law always ſuppoſes ſome ſuperior who is to make it; and in a ſtate of nature we are all equal, without any other ſuperior but him who is the Author of our being. But man was formed for ſociety; and, as is demonſtrated by the writers on this ſubject, is neither capable of living alone, nor indeed has the courage to do it. However, as it is impoſſible for the whole race of mankind to be united in one great ſociety, they muſt neceſſarily divide into many; and form ſeparate ſtates, commonwealths, and nations, entirely independent of each other, and yet liable to a mutual intercourſe. Hence ariſes a third kind of law to regulate this mutual intercourſe, called *the law of nations:* which, as none of theſe ſtates will acknowledge a ſuperiority in the other, cannot be dictated by either; but depends entirely upon the rules of natural law, or upon mutual compacts, treaties, leagues, and agreements, between theſe ſeveral communities: in the conſtruction alſo of which compacts we have no other rule to reſort to but the law of nature; being the only one to which both communities are equally ſubject: and therefore the civil law very juſtly obſerves, that *quod naturalis ratio inter omnes homines conſtituit, vocatur jus gentium.*

To the conſideration, then, of the law of nature, the revealed law, and the law of nations, ſucceeds that of the municipal or civil law; that is, the rule by which particular diſtricts, communities, or nations, are governed; being thus defined by Juſtinian, "*jus civile eſt quod quiſque ſibi populus conſtituit.*" We call it *municipal* law, in compliance with common ſpeech; for though, ſtrictly, that expreſſion denotes the particular cuſtoms of one ſingle *municipium* or free town, yet it may with ſufficient propriety be applied to any one ſtate or nation which is governed by the ſame laws and cuſtoms.

Municipal law, thus underſtood, is properly defined to be "a rule of civil conduct preſcribed by the ſupreme power in a ſtate, commanding what is right, and prohibiting what is wrong." Let us endeavour to explain its ſeveral properties, as they ariſe out of this definition.

And, firſt, it is a *rule:* not a tranſient ſudden order from a ſuperior to or concerning a particular perſon; but ſomething permanent, uniform, and univerſal. Therefore a particular act of the legiſlature to confiſcate the goods of Titius, or to attaint him of high treaſon, does not enter into the idea of a municipal law: for the operation of this act is ſpent upon Titius only, and has no relation to the community in general; it is rather a ſentence than a law. But an act to declare that the crime of which Titius is accuſed ſhall be deemed high treaſon; this has permanency, uniformity, and univerſality, and therefore is properly a *rule.* It is alſo called a *rule,* to diſtinguiſh it from *advice* or *counſel,* which we are at liberty to follow or not as we ſee proper, and to judge upon the reaſonableneſs or unreaſonableneſs of the thing adviſed: whereas our obedience to the law depends not upon *our approbation,* but upon the *maker's will.* Counſel is only matter of perſuaſion, law is matter of injunction; counſel acts only upon the willing, law upon the unwilling alſo.

It is alſo called a *rule,* to diſtinguiſh it from a *compact* or *agreement*; for a compact is a promiſe proceeding from us, law is a command directed to us. The language of a compact is, "I will, or will not, do this;" that of a law is, "Thou ſhalt, or ſhalt not, do it." It is true there is an obligation which a compact carries with it, equal in point of conſcience to that of a law: but then the original of the obligation is different. In compacts, we ourſelves determine and promiſe what ſhall be done, before we are obliged to do it: in laws, we are obliged to act without ourſelves determining or promiſing any thing at all. Upon theſe accounts law is defined to be "a rule."

Municipal law is alſo "a rule of *civil conduct.*" This diſtinguiſhes municipal law from the natural or revealed: the former of which is the rule of moral conduct; the latter, not only the rule of moral conduct, but alſo of faith. Theſe regard man as a creature; and point out his duty to God, to himſelf, and to his neighbour, conſidered in the light of an individual. But municipal or civil law regards him alſo as a citizen, and bound to other duties towards his neighbour than thoſe of mere nature and religion: duties, which he has engaged in by enjoying the benefits of the common union; and which amount to no more, than that he do contribute, on his part, to the ſubſiſtence and peace of the ſociety.

It is likewiſe "a rule *preſcribed.*" Becauſe a bare reſolution, confined in the breaſt of the legiſlator, without manifeſting itſelf by ſome external ſign, can never be properly a law. It is requiſite that this reſolution be notified to the people who are to obey it. But the manner in which this notification is to be made, is matter of very great indifference. It may be notified by univerſal tradition and long practice, which ſuppoſes a previous publication, and is the caſe of the common law of England and of Scotland. It may be notified *viva voce,* by officers appointed for that purpoſe; as is done with regard to proclamations, and ſuch acts of parliament as are appointed to be publicly read in churches and other aſſemblies. It may, laſtly, be notified by writing, printing, or the like; which is the general courſe taken with all our acts of parliament. Yet, whatever way is made uſe of, it is incumbent on the promulgators to do it in the moſt public and perſpicuous manner; not like Caligula, who (according to Dio Caſſius) wrote his laws in a very ſmall character, and hung them up upon high pillars, the more effectually to enſnare the people. There is ſtill a more unreaſonable method than this, which is called making of laws *ex poſt facto*; when, after an action (indifferent in itſelf) is committed, the legiſlator then for the firſt time declares it to have been a crime, and inflicts a puniſhment upon the perſon who has committed it. Here it is impoſſible that the party could foreſee that an action, innocent when it was done, ſhould be afterwards converted to guilt by a ſubſequent law: he had therefore no reaſon to abſtain from it; and all puniſhment for not abſtaining muſt of conſequence be cruel and unjuſt. All laws ſhould be therefore made to commence *in futuro,* and be notified before their commencement; which is implied in the term "preſcribed." But when this rule is in the uſual manner notified or preſcribed, it is then the ſubject's buſineſs to be thoroughly acquainted therewith; for if ignorance of what he might know were admitted as a legitimate excuſe, the laws would be of no effect, but might always be eluded with impunity.

But further: Municipal law is "a rule of civil conduct

prescribed *by the supreme power in a state*." For legislature, as was before observed, is the greatest act of superiority that can be exercised by one being over another. Wherefore it is requisite to the very essence of a law, that it be made by the supreme power. Sovereignty and legislature are indeed convertible terms; one cannot subsist without the other.

This will naturally lead us into a short enquiry concerning the nature of society and civil government; and the natural inherent right that belongs to the sovereignty of a state, wherever that sovereignty be lodged, of making and enforcing laws.

The only true and natural foundations of society are the wants and fears of individuals. Not that we can believe, with some theoretical writers, that there ever was a time when there was no such thing as society; and that, from the impulse of reason, and through a sense of their wants and weaknesses, individuals met together in a large plain, entered into an original contract, and chose the tallest man present to be their governor. This notion, of an actually existing unconnected state of nature, is too wild to be seriously admitted; and besides, it is plainly contradictory to the revealed accounts of the primitive origin of mankind, and their preservation 2000 years afterwards; both which were effected by the means of single families. These formed the first society among themselves, which every day extended its limits; and when it grew too large to subsist with convenience in that pastoral state wherein the patriarchs appear to have lived, it necessarily subdivided itself by various migrations into more. Afterwards, as agriculture increased, which employs and can maintain a much greater number of hands, migrations became less frequent; and various tribes, which had formerly separated, reunited again; sometimes by compulsion and conquest, sometimes by accident, and sometimes perhaps by compact. But though society had not its formal beginning from any convention of individuals, actuated by their wants and their fears; yet it is the sense of their weakness and imperfection that keeps mankind together; that demonstrates the necessity of this union; and that therefore is the solid and natural foundation, as well as the cement, of society. And this is what we mean by the original contract of society; which, though perhaps in no instance it has ever been formally expressed at the first institution of a state, yet in nature and reason must always be understood and implied in the very act of associating together: namely, that the whole should protect all its parts, and that every part should pay obedience to the will of the whole; or, in other words, that the community should guard the rights of each individual member, and that (in return for this protection) each individual should submit to the laws of the community; without which submission of all, it was impossible that protection could be certainly extended to any.

For when society is once formed, government results of course, as necessary to preserve and to keep that society in order. Unless some superior be constituted, whose commands and decisions all the members are bound to obey, they would still remain as in a state of nature, without any judge upon earth to define their several rights, and redress their several wrongs. But as all the members of society are naturally equal, it may be asked, In whose hands are the reins of government to be entrusted? To this the general answer is easy; but the application of it to particular cases has occasioned one half of those mischiefs which are apt to proceed from misguided political zeal. In general, all mankind will agree, that government should be reposed in such persons, in whom those qualities are most likely to be found, the perfection of which is among the attributes of him who is emphatically styled the *Supreme Being*; the three grand requisites, namely, of wisdom, of goodness, and of power: wisdom, to discern the real interest of the community; goodness, to endeavour always to pursue that real interest; and strength or power, to carry this knowledge and intention into action. These are the natural foundations of sovereignty, and these are the requisites that ought to be found in every well constituted frame of government.

How the several forms of government we now see in the world at first actually began, is matter of great uncertainty, and has occasioned infinite disputes. It is not our business or intention to enter into any of them. However they began, or by what right soever they subsist, there is and must be in all of them a supreme, irresistible, absolute, uncontrolled authority, in which the *jura summi imperii*, or the rights of sovereignty, reside. And this authority is placed in those hands, wherein (according to the opinion of the founders of such respective states, either expressly given or collected from their tacit approbation) the qualities requisite for supremacy, wisdom, goodness, and power, are the most likely to be found.

The political writers of antiquity will not allow more than three regular forms of government: the first, when the sovereign power is lodged in an aggregate assembly consisting of all the members of a community, which is called a *democracy*; the second, when it is lodged in a council composed of select members, and then it is styled an *aristocracy*; the last, when it is entrusted in the hands of a single person, and then it takes the name of a *monarchy*. All other species of government, they say, are either corruptions of, or reducible to, these three.

By the sovereign power, as was before observed, is meant the making of laws; for wherever that power resides, all others must conform to and be directed by it, whatever appearance the outward form and administration of the government may put on. For it is at any time in the option of the legislature to alter that form and administration by a new edict or rule, and to put the execution of the laws into whatever hands it pleases: and all the other powers of the state must obey the legislative power in the execution of their several functions, or else the constitution is at an end.

In a democracy, where the right of making laws resides in the people at large, public virtue or goodness of intention is more likely to be found than either of the other qualities of government. Popular assemblies are frequently foolish in their contrivance, and weak in their execution; but generally mean to do the thing that is right and just, and have always a degree of patriotism or public spirit. In aristocracies there is more wisdom to be found than in the other forms of government; being composed, or intended to be composed, of the most experienced citizens: but there is less honesty than in a republic, and less strength than in a monarchy. A monarchy is indeed the most powerful of any, all the sinews of government being knit and united together in the hand of the prince; but then there is imminent danger of his employing that strength to improvident or oppressive purposes.

Thus these three species of government have all of them their several perfections and imperfections. Democracies are usually the best calculated to direct the end of a law; aristocracies, to invent the means by which that end shall be obtained; and monarchies, to carry those means into execution. And the ancients, as was observed, had in general no idea of any other permanent form of government but these three: for though Cicero declares himself of opinion, "*esse optime constitutam rempublicam, quæ ex tribus generibus illis, regali, optimo, et populari, sit modice confusa*;" yet Tacitus treats this notion of a mixed government, formed out of them all, and partaking of the advantages of each, as a visionary whim, and one that, if effected, could never be lasting or secure.

But, happily for us of this island, the British constitution has long remained, and we trust will long continue, a standing exception to the truth of this observation. For, as with us

the executive power of the laws is lodged in a ſingle perſon, they have all the advantages of ſtrength and diſpatch that are to be found in the moſt abſolute monarchy: and, as the legiſlature of the kingdom is entruſted to three diſtinct powers, entirely independent of each other; firſt, the king; ſecondly, the lords ſpiritual and temporal, which is an ariſtocratical aſſembly of perſons ſelected for their piety, their birth, their wiſdom, their valour, or their property; and, thirdly, the houſe of commons, freely choſen by the people from among themſelves, which makes it a kind of democracy; as this aggregate body, actuated by different ſprings and attentive to different intereſts, compoſes the Britiſh parliament, and has the ſupreme diſpoſal of every thing, there can no inconvenience be attempted by either of the three branches, but will be withſtood by one of the other two, each branch being armed with a negative power ſufficient to repel any innovation which it ſhall think inexpedient or dangerous.

Here, then, is lodged the ſovereignty of the Britiſh conſtitution; and lodged as beneficially as is poſſible for ſociety. For in no other ſhape could we be ſo certain of finding the three great qualities of government ſo well and ſo happily united. If the ſupreme power were lodged in any one of the three branches ſeparately, we muſt be expoſed to the inconveniences of either abſolute monarchy, ariſtocracy, or democracy; and ſo want two of the three principal ingredients of good polity, either virtue, wiſdom, or power. If it were lodged in any two of the branches; for inſtance, in the king and houſe of lords; our laws might be providently made and well executed, but they might not always have the good of the people in view: if lodged in the king and commons, we ſhould want that circumſpection and mediatory caution, which the wiſdom of the peers is to afford: if the ſupreme rights of legiſlature were lodged in the two houſes only, and the king had no negative upon their proceedings, they might be tempted to encroach upon the royal prerogative, or perhaps to aboliſh the kingly office, and thereby weaken (if not totally deſtroy) the ſtrength of the executive power. But the conſtitutional government of this iſland is ſo admirably tempered and compounded, that nothing can endanger or hurt it, but deſtroying the equilibrium of power between one branch of the legiſlature and the reſt. For if ever it ſhould happen, that the independence of any one of the three ſhould be loſt, or that it ſhould become ſubſervient to the views of either of the other two, there would ſoon be an end of our conſtitution. The legiſlature would be changed from that which was originally ſet up by the general conſent and fundamental act of the ſociety: and ſuch a change, however effected, is, according to Mr. Locke (who perhaps carried his theory too far), at once an entire diſſolution of the bands of government, and the people are thereby reduced to a ſtate of anarchy, with liberty to conſtitute to themſelves a new legiſlative power.

Having thus curſorily conſidered the three uſual ſpecies of government, and our own ſingular conſtitution ſelected and compounded from them all, we proceed to obſerve, that, as the power of making laws conſtitutes the ſupreme authority, ſo wherever the ſupreme authority in any ſtate reſides, it is the right of that authority to make laws; that is, in the words of our definition, *to preſcribe the rule of civil action*. And this may be diſcovered from the very end and inſtitution of civil ſtates. For a ſtate is a collective body, compoſed of a multitude of individuals, united for their ſafety and convenience, and intending to act together as one man. If it therefore is to act as one man, it ought to act by one uniform will. But, inaſmuch as political communities are made up of many natural perſons, each of whom has his particular will and inclination, theſe ſeveral wills cannot by any natural union be joined together, or tempered and diſpoſed into a laſting harmony, ſo as to conſtitute and produce that one uniform will of the whole. It can therefore be no otherwiſe produced than by a political union; by the conſent of all perſons to ſubmit their own private wills to the will of one man, or of one or more aſſemblies of men, to whom the ſupreme authority is entruſted; and this will of that one man, or aſſemblage of men, is in different ſtates, according to their different conſtitutions, underſtood to be law.

Thus far as to the right of the ſupreme power to make laws: but farther, it is its duty likewiſe. For ſince the reſpective members are bound to conform themſelves to the will of the ſtate, it is expedient that they receive directions from the ſtate declaratory of that its will. But as it is impoſſible, in ſo great a multitude, to give injunctions to every particular man, relative to each particular action, therefore the ſtate eſtabliſhes general rules, for the perpetual information and direction of all perſons in all points, whether of poſitive or negative duty: and this, in order that every man may know what to look upon as his own, what as another's; what abſolute and what relative duties are required at his hands; what is to be eſteemed honeſt, diſhoneſt, or indifferent; what degree every man retains of his natural liberty, and what he has given up as the price of the benefits of ſociety; and after what manner each perſon is to moderate the uſe and exerciſe of thoſe rights which the ſtate aſſigns him, in order to promote and ſecure the public tranquillity.

From what has been advanced, the truth of the former branch of our definition is (we truſt) ſufficiently evident; that "municipal law is a rule of civil conduct, preſcribed *by the ſupreme power in a ſtate*." We proceed now to the latter branch of it; that it is a rule ſo preſcribed, "commanding what is right, and prohibiting what is wrong."

Now, in order to do this completely, it is firſt of all neceſſary that the boundaries of right and wrong be eſtabliſhed and aſcertained by law. And when this is once done, it will follow of courſe, that it is likewiſe the buſineſs of the law, conſidered as a rule of civil conduct, to enforce theſe rights, and to reſtrain or redreſs theſe wrongs. It remains therefore only to conſider, in what manner the law is ſaid to aſcertain the boundaries of right and wrong; and the methods which it takes to command the one and prohibit the other.

For this purpoſe, every law may be ſaid to conſiſt of ſeveral parts: one, declaratory; whereby the rights to be obſerved, and the wrongs to be eſchewed, are clearly defined and laid down: another, directory; whereby the ſubject is inſtructed and enjoined to obſerve thoſe rights, and to abſtain from the commiſſion of thoſe wrongs: a third, remedial; whereby a method is pointed out to recover a man's private rights, or redreſs his private wrongs: to which may be added a fourth, uſually termed the *ſanction* or *vindicatory* branch of the law; whereby it is ſignified what evil or penalty ſhall be incurred by ſuch as commit any public wrongs, and tranſgreſs or neglect their duty.

With regard to the firſt of theſe, the *declaratory* part of the municipal law; this depends not ſo much upon the law of revelation or of nature, as upon the wiſdom and the will of the legiſlator. This doctrine, which before was ſlightly touched, deſerves a more particular explication. Thoſe rights, then, which God and nature have eſtabliſhed, and are therefore called *natural rights*, ſuch as are life and liberty, need not the aid of human laws to be more effectually inveſted in every man than they are; neither do they receive any additional ſtrength when declared by the municipal laws to be inviolable. On the contrary, no human legiſlature has power to abridge or deſtroy them, unleſs the owner ſhall himſelf commit ſome act that amounts to a forfeiture. Neither do divine or natural *duties* (ſuch as, for inſtance, the worſhip of God, the maintenance of children,

and the like) receive any ſtronger ſanction from being alſo declared to be duties by the law of the land. The caſe is the ſame as to crimes and miſdemeanors, that are forbidden by the ſuperior laws, and therefore ſtyled *mala in ſe*, ſuch as murder, theft, and perjury; which contract no additional turpitude from being declared unlawful by the inferior legiſlature. For that legiſlature in all theſe caſes acts only, as was before obſerved, in ſubordination to the Great Lawgiver, tranſcribing and publiſhing his precepts. So that, upon the whole, the declaratory part of the municipal law has no force or operation at all, with regard to actions that are naturally and intrinſically right or wrong.

But with regard to things in themſelves indifferent, the caſe is entirely altered. Theſe become either right or wrong, juſt or unjuſt, duties or miſdemeanors, according as the municipal legiſlator ſees proper, for promoting the welfare of the ſociety, and more effectually carrying on the purpoſes of civil life. Thus our own common law has declared, that the goods of the wife do inſtantly upon marriage become the property and right of the huſband; and our ſtatute law has declared all monopolies a public offence: yet that right, and this offence, have no foundation in nature; but are merely created by the law, for the purpoſes of civil ſociety. And ſometimes, where the thing itſelf has its riſe from the law of nature, the particular circumſtances and mode of doing it become right or wrong, as the laws of the land ſhall direct. Thus, for inſtance, in civil duties; obedience to ſuperiors is the doctrine of revealed as well as natural religion: but who thoſe ſuperiors ſhall be, and in what circumſtances, or to what degrees they ſhall be obeyed, is the province of human laws to determine. And ſo, as to injuries or crimes, it muſt be left to our own legiſlature to decide, in what caſes the ſeizing another's cattle ſhall amount to the crime of robbery; and where it ſhall be a juſtifiable action, as when a landlord takes them by way of diſtreſs for rent.

Thus much for the declaratory part of the municipal law: and the *directory* ſtands much upon the ſame footing; for this virtually includes the former, the declaration being uſually collected from the direction. The law that ſays, "Thou ſhalt not ſteal," implies a declaration that ſtealing is a crime. And we have ſeen, that, in things naturally indifferent, the very eſſence of right and wrong depends upon the direction of the laws to do or to omit them.

The *remedial* part of a law is ſo neceſſary a conſequence of the former two, that laws muſt be very vague and imperfect without it. For in vain would rights be declared, in vain directed to be obſerved, if there were no method of recovering and aſſerting thoſe rights when wrongfully with-held or invaded. This is what we mean properly, when we ſpeak of the protection of the law. When, for inſtance, the declaratory part of the law has ſaid, "that the field or inheritance which belonged to Titius's father is veſted by his death in Titius," and the directory part has "forbidden any one to enter on another's property without the leave of the owner;" if Gaius after this will preſume to take poſſeſſion of the land, the remedial part of the law will then interpoſe its office; will make Gaius reſtore the poſſeſſion to Titius, and alſo pay him damages for the invaſion.

With regard to the ſanction of laws, or the evil that may attend the breach of public duties; it is obſerved, that human legiſlators have for the moſt part choſen to make the ſanction of their laws rather vindicatory than remuneratory, or to conſiſt rather in puniſhments than in actual particular rewards: becauſe, in the firſt place, the quiet enjoyment and protection of all our civil rights and liberties, which are the ſure and general conſequence of obedience to the municipal law, are in themſelves the beſt and moſt valuable of all rewards: becauſe alſo, were the exerciſe of every virtue to be inforced by the propoſal of particular rewards, it were impoſſible for any ſtate to furniſh ſtock enough for ſo profuſe a bounty: and farther, becauſe the dread of evil is a much more forcible principle of human actions than the proſpect of good. For which reaſons, though a prudent beſtowing of rewards is ſometimes of exquiſite uſe, yet we find that thoſe civil laws, which enforce and enjoin our duty, do ſeldom, if ever, propoſe any privilege or gift to ſuch as obey the law; but do conſtantly come armed with a penalty denounced againſt tranſgreſſors, either expreſsly defining the nature and quantity of the puniſhment, or elſe leaving it to the diſcretion of the judges, and thoſe who are intruſted with the care of putting the laws in execution.

Of all the parts of a law the moſt effectual is the *vindicatory*. For it is but loſt labour to ſay, "Do this, or avoid that," unleſs we alſo declare, "This ſhall be the conſequence of your non-compliance." We muſt therefore obſerve, that the main ſtrength and force of a law, conſiſts in the penalty annexed to it. Herein is to be found the principal obligation of human laws.

Legiſlators and their laws are ſaid to *compel* and *oblige*: not that, by any natural violence, they ſo conſtrain a man as to render it impoſſible for him to act otherwiſe than as they direct, which is the ſtrict ſenſe of obligation; but becauſe, by declaring and exhibiting a penalty againſt offenders, they bring it to paſs that no man can eaſily chooſe to tranſgreſs the law; ſince, by reaſon of the impending correction, compliance is in a high degree preferable to diſobedience. And, even where rewards are propoſed as well as puniſhments threatened, the obligation of the law ſeems chiefly to conſiſt in the penalty: for rewards, in their nature, can only perſuade and allure; nothing is compulſory but puniſhment.

It is true, it hath been holden, and very juſtly, by the principal of our ethical writers, that human laws are binding upon men's conſciences. But if that were the only or moſt forcible obligation, the good only would regard the laws, and the bad would ſet them at defiance. And, true as this principle is, it muſt ſtill be underſtood with ſome reſtriction. It holds, we apprehend, as to *rights*; and that, when the law has determined the field to belong to Titius, it is a matter of conſcience no longer to withhold or to invade it. So alſo in regard to *natural duties*, and ſuch offences as are *mala in ſe*: here we are bound in conſcience, becauſe we are bound by ſuperior laws, before thoſe human laws were in being, to perform the one and abſtain from the other. But in relation to thoſe laws which enjoin only poſitive duties, and forbid only ſuch things as are not *mala in ſe*, but *mala prohibita* merely, without any intermixture of moral guilt, annexing a penalty to non-compliance; here ſeems to be conſcience no farther concerned, than by directing a ſubmiſſion to the penalty, in caſe of our breach of thoſe laws: for otherwiſe the multitude of penal laws in a ſtate would not only be looked upon as an impolitic, but would alſo be a very wicked, thing; if every ſuch law were a ſnare for the conſcience of the ſubject. But in theſe caſes the alternative is offered to every man; "either abſtain from this, or ſubmit to ſuch a penalty:" and his conſcience will be clear, whichever ſide of the alternative he thinks proper to embrace. Thus, by the ſtatutes for preſerving the game, a penalty is denounced againſt every unqualified perſon that kills a hare, and againſt every perſon who poſſeſſes a partridge in Auguſt. And ſo too, by other ſtatutes, pecuniary penalties are inflicted for exerciſing trades without ſerving an apprenticeſhip thereto, for erecting cottages without annexing four acres of land to each, for not burying the dead in woollen, for not performing ſtatute-work on the public roads, and for innumerable other poſitive miſdemeanors. Now theſe prohibitory laws do not make the tranſgreſſion a moral offence, or ſin: the only obligation in conſcience is to ſubmit to the pe-

nalty, if levied. It muſt, however, be obſerved, that we are here ſpeaking of laws that are ſimply and purely penal, where the thing forbidden or enjoined is wholly a matter of indifference, and where the penalty inflicted is an adequate compenſation for the civil inconvenience ſuppoſed to ariſe from the offence. But where diſobedience to the law involves in it alſo any degree of public miſchief or private injury, there it falls within our former diſtinction, and is alſo an offence againſt conſcience.

We have now gone through the definition laid down of a municipal law; and have ſhown that it is "a rule—of civil conduct—preſcribed—by the ſupreme power in a ſtate—commanding what is right, and prohibiting what is wrong:" in the explication of which we have endeavoured to interweave a few uſeful principles, concerning the nature of civil government, and the obligation of human laws. Before we conclude this part, it may not be amiſs to add a few obſervations concerning the interpretation of laws.

When any doubt aroſe upon the conſtruction of the Roman laws, the uſage was to ſtate the caſe to the emperor in writing, and take his opinion upon it. This was certainly a bad method of interpretation. To interrogate the legiſlature to decide particular diſputes, is not only endleſs, but affords great room for partiality and oppreſſion. The anſwers of the emperor were called his reſcripts, and theſe had in ſucceeding caſes the force of perpetual laws; though they ought to be carefully diſtinguiſhed, by every rational civilian, from thoſe general conſtitutions which had only the nature of things for their guide. The emperor Macrinus, as his hiſtorian Capitolinus informs us, had once reſolved to aboliſh theſe reſcripts, and retain only the general edicts: he could not bear that the haſty and crude anſwers of ſuch princes as Commodus and Caracalla ſhould be reverenced as laws. But Juſtinian thought otherwiſe, and he has preſerved them all. In like manner the canon laws, or decretal epiſtles of the popes, are all of them reſcripts in the ſtricteſt ſenſe. Contrary to all true forms of reaſoning, they argue from particulars to generals.

The faireſt and moſt rational method to interpret the will of the legiſlator, is by exploring his intentions at the time when the law was made, by ſigns the moſt natural and probable. And theſe ſigns are either the words, the context, the ſubject-matter, the effects and conſequence, or the ſpirit and reaſon of the law. Let us take a ſhort view of them all.

1. *Words* are generally to be underſtood in their uſual and moſt known ſignification; not ſo much regarding the propriety of grammar, as their general and popular uſe. Thus the law mentioned by Puffendorff, which forbad a layman to lay hands on a prieſt, was adjudged to extend to him who had hurt a prieſt with a weapon. Again: terms of art, or technical terms, muſt be taken according to the acceptation of the learned in each art, trade and ſcience. So in the act of ſettlement, where the crown of England is limited "to the princeſs Sophia, and the heirs of her body being proteſtants," it becomes neceſſary to call in the aſſiſtance of lawyers, to aſcertain the preciſe idea of the words "heirs of her body;" which in a legal ſenſe compriſe only certain of her lineal deſcendants. Laſtly, where words are clearly repugnant in two laws, the latter law takes place of the elder; *leges poſteriores priores contrarias abrogant*, is a maxim of univerſal law, as well as of our own conſtitutions. And accordingly it was laid down by a law of the twelve tables at Rome, *Quod populus poſtremum juſſit, id jus ratum eſto.*

2. If words happen to be ſtill dubious, we may eſtabliſh their meaning from the *context*; with which it may be of ſingular uſe to compare a word or a ſentence, whenever they are ambiguous, equivocal, or intricate. Thus the proëme, or preamble, is often called in to help the conſtruction of an act of parliament. Of the ſame nature and uſe is the compariſon of a law with other laws that are made by the ſame legiſlator, that have ſome affinity with the ſubject, or that expreſsly relate to the ſame point. Thus, when the law of England declares murder to be felony without benefit of clergy, we muſt reſort to the ſame law of England to learn what the benefit of clergy is: and, when the common law cenſures ſimoniacal contracts, it affords great light to the ſubject to conſider what the canon law has adjudged to be ſimony.

3. As to the *ſubject matter*, words are always to be underſtood as having a regard thereto; for that is always ſuppoſed to be in the eye of the legiſlator, and all his expreſſions directed to that end. Thus, when a law of Edward III. forbids all eccleſiaſtical perſons to purchaſe proviſions at Rome, it might ſeem to prohibit the buying of grain and other victual; but when we conſider that the ſtatute was made to repreſs the uſurpations of the papal ſee, and that the nominations to beneſices by the pope were called *proviſions*, we ſhall ſee that the reſtraint is intended to be laid upon ſuch proviſions only.

4. As to the effects and *conſequence*, the rule is, That where words bear either none, or a very abſurd ſignification, if literally underſtood, we muſt a little deviate from the received ſenſe of them. Therefore the Bolognian law, mentioned by Puffendorf, which enacted "that whoever drew blood in the ſtreets ſhould be puniſhed with the utmoſt ſeverity," was held after long debate not to extend to the ſurgeon who opened the vein of a perſon that fell down in the ſtreet with a fit.

5. But, laſtly, the moſt univerſal and effectual way of diſcovering the true meaning of a law, when the words are dubious, is by conſidering the *reaſon* and *ſpirit* of it, or the cauſe which moved the legiſlator to enact it. For when this reaſon ceaſes, the law itſelf ought likewiſe to ceaſe with it. An inſtance of this is given in a caſe put by Cicero, or whoever was the author of the rhetorical treatiſe inſcribed to Herennius: There was a law, That thoſe who in a ſtorm forſook the ſhip ſhould forfeit all property therein, and the ſhip and lading ſhould belong entirely to thoſe who ſtaid in it. In a dangerous tempeſt, all the mariners forſook the ſhip, except only one ſick paſſenger, who by reaſon of his diſeaſe was unable to get out and eſcape. By chance the ſhip came ſafe to port. The ſick man kept poſſeſſion, and claimed the benefit of the law. Now here all the learned agree, that the ſick man is not within the reaſon of the law; for the reaſon of making it was, to give encouragement to ſuch as ſhould venture their lives to ſave the veſſel: but this is a merit which he could never pretend to, who neither ſtaid in the ſhip upon that account, nor contributed any thing to its preſervation.

From this method of interpreting laws by the reaſon of them, ariſes what we call *equity*: which is thus defined by Grotius, "the correction of that, wherein the law (by reaſon of its univerſality) is deficient." For ſince in laws all caſes cannot be foreſeen or expreſſed, it is neceſſary, that, when the general decrees of the law come to be applied to particular caſes, there ſhould be ſomewhere a power veſted of defining thoſe circumſtances, which (had they been foreſeen) the legiſlator himſelf would have expreſſed. And theſe are the caſes which, according to Grotius, "*lex non exacte definit, ſed arbitrio boni viri permittit.*"

Equity thus depending, eſſentially, upon the particular circumſtances of each individual caſe, there can be no eſtabliſhed rules and fixed precepts of equity laid down, without deſtroying its very eſſence, and reducing it to a poſitive law. And, on the other hand, the liberty of conſidering all caſes in an equitable light muſt not be indulged too far; leſt thereby we deſtroy all law, and leave the deciſion of every queſtion entirely in the breaſt of the judge. And law, without equity, though hard and diſagreeable, is much more deſirable for the

public good, than equity without law; which would make every judge a legiſlator, and introduce moſt infinite confuſion: as there would then be almoſt as many different rules of action laid down in our courts, as there are differences of capacity and ſentiment in the human mind.

HAVING thus conſidered the nature of laws in general, we ſhall proceed to give a view of the particular law of our own country. The Engliſh law, however, being too extenſive to admit of detail in a body, we can only here give ſuch a ſketch of it as may be ſufficient to ſhow the connection of its parts; but the principal of theſe parts themſelves are explained at large, under their proper names, in the general alphabet.

PART II.

THE LAW OF ENGLAND.

INTRODUCTION.

THE municipal law of England, or the rule of civil conduct preſcribed to the inhabitants of that kingdom, may with ſufficient propriety be divided into two kinds: the *lex non ſcripta*, the unwritten or common law, and the *lex ſcripta*, the written or ſtatute law.

The *lex non ſcripta*, or unwritten law, includes not only general cuſtoms, or the common law properly ſo called; but alſo the particular cuſtoms of certain parts of the kingdom, and likewiſe thoſe particular laws that are by cuſtom obſerved only in certain courts and juriſdictions.

In calling theſe parts of the law *leges non ſcriptæ*, we would not be underſtood as if all thoſe laws were at preſent merely oral, or communicated from the former ages to the preſent ſolely by word of mouth. It is true indeed, that in the profound ignorance of letters which formerly overſpread the whole weſtern world, all laws were entirely traditional; for this plain reaſon, that the nations among which they prevailed had but little idea of writing. Thus the Britiſh as well as the Gallic druids committed all their laws as well as learning to memory; and it is ſaid of the primitive Saxons here, as well as their brethren on the continent, that *leges ſola memoria et uſu retinebant*. But, with us at preſent, the monuments and evidences of our legal cuſtoms are contained in the records of the ſeveral courts of juſtice, in books of reports and judicial deciſions, and in the treatiſes of learned ſages of the profeſſion, preſerved and handed down to us from the times of higheſt antiquity. However, we therefore ſtyle theſe parts of our law *leges non ſcriptæ*, becauſe their original inſtitution and authority are not ſet down in writing, as acts of parliament are; but they receive their binding power, and the force of laws, by long and immemorial uſage, and by their univerſal reception throughout the kingdom: in like manner as Aulus Gellius defines the *jus non ſcriptum* to be that which is *tacito et illiterato hominum conſenſu et moribus expreſſum*.

Our ancient lawyers, and particularly Fortéſcue, inſiſt with abundance of warmth, that theſe cuſtoms are as old as the primitive Britons, and continued down through the ſeveral mutations of government and inhabitants, to the preſent time, unchanged and unadulterated. This may be the caſe as to ſome. But in general, as Mr. Selden in his notes obſerves, this aſſertion muſt be underſtood with many grains of allowance; and ought only to ſignify, as the truth ſeems to be, that there never was any formal exchange of one ſyſtem of laws for another: though doubtleſs, by the intermixture of adventitious nations, the Romans, the Picts, the Saxons, the Danes, and the Normans, they muſt have inſenſibly introduced and incorporated many of their own cuſtoms with thoſe that were before eſtabliſhed; thereby, in all probability, improving the texture and wiſdom of the whole, by the accumulated wiſdom of divers particular countries. Our laws, ſaith Lord Bacon, are mixed as our language; and as our language is ſo much the richer, the laws are the more complete.

And indeed our antiquarians and firſt hiſtorians do all poſitively aſſure us, that our body of laws is of this compounded nature. For they tell us, that in the time of Alfred the local cuſtoms of the ſeveral provinces of the kingdom were grown ſo various, that he found it expedient to compile his dome-book, or *liber judicialis*, for the general uſe of the whole kingdom. This book is ſaid to have been extant ſo late as the reign of Edward IV. but is now unfortunately loſt. It contained, we may probably ſuppoſe, the principal maxims of the common law, the penalties for miſdemeanors, and the forms of judicial proceedings. Thus much may at leaſt be collected from that injunction to obſerve it, which we find in the laws of king Edward the elder, the ſon of Alfred. *Omnibus qui reipublicæ præſunt etiam atque etiam mando, ut omnibus æquos ſe præbeant judices, perinde ac in judiciali libro ſcriptum habetur: nec quiquam formident quin jus commune audacter libereque dicant.*

But the irruption and eſtabliſhment of the Danes in England, which followed ſoon after, introduced new cuſtoms, and cauſed this code of Alfred in many provinces to fall into diſuſe, or at leaſt to be mixed and debaſed with other laws of a coarſer alloy. So that, about the beginning of the 11th century there were three principal ſyſtems of laws prevailing in different diſtricts. 1. The *Mercen Lage*, or Mercian laws, which were obſerved in many of the inland counties, and thoſe bordering on the principality of Wales, the retreat of the ancient Britons; and therefore very probably intermixed with the Britiſh or Druidical cuſtoms. 2. The *Weſt Saxon Lage*, or laws of the Weſt Saxons, which obtained in the counties to the ſouth and weſt of the iſland, from Kent to Devonſhire. Theſe were probably much the ſame with the laws of Alfred above-mentioned, being the municipal law of the far moſt conſiderable part of his dominions, and particularly including Berkſhire, the ſeat of his peculiar reſidence. 3. The *Dane Lage*, or Daniſh law, the very name of which ſpeaks its original and compoſition. This was principally maintained in the reſt of the midland counties, and alſo on the eaſtern coaſt, the part moſt expoſed to the viſits of that piratical people. As for the very northern provinces, they were at that time under a diſtinct government.

Out of theſe three laws, Roger Hoveden and Ranulphus Ceſtrenſis inform us, king Edward the confeſſor extracted one uniform law, or digeſt of laws, to be obſerved throughout the whole kingdom; though Hoveden and the author of an old manuſcript chronicle aſſure us likewiſe, that this work was projected and begun by his grandfather king Edgar. And indeed a general digeſt of the ſame nature has been conſtantly found expedient, and therefore put in practice by other great nations, which were formed from an aſſemblage of little provinces, governed by peculiar cuſtoms. As in Portugal, under king Edward, about the beginning of the 15th century. In

Spain, under Alonzo X. who about the year 1250 executed the plan of his father St. Ferdinand, and collected all the provincial cuſtoms into one uniform law, in the celebrated code entitled *Las partidas*. And in Sweden, about the ſame era, a univerſal body of common law was compiled out of the particular cuſtoms eſtabliſhed by the laghman of every province, and entitled the *land's lagh*, being analogous to the common law of England.

Both theſe undertakings of king Edgar and Edward the confeſſor ſeem to have been no more than a new edition, or freſh promulgation, of Alfred's code or dome book, with ſuch additions and improvements as the experience of a century and an half had ſuggeſted. For Alfred is generally ſtyled by the ſame hiſtorians the *legum Anglicanarum conditor*, as Edward the confeſſor is the *reſtitutor*. Theſe, however, are the laws which our hiſtories ſo often mention under the name of the *laws of Edward the confeſſor*; which our anceſtors ſtruggled ſo hardly to maintain, under the firſt princes of the Norman line; and which ſubſequent princes ſo frequently promiſed to keep and to reſtore, as the moſt popular act they could do, when preſſed by foreign emergencies or domeſtic diſcontents. Theſe are the laws, that ſo vigorouſly withſtood the repeated attacks of the civil law; which eſtabliſhed in the 12th century a new Roman empire over the moſt of the ſtates on the continent; ſtates that have loſt, and perhaps upon that account, their political liberties; while the free conſtitution of England, perhaps upon the ſame account, has been rather improved than debaſed. Theſe, in ſhort, are the laws which gave riſe and origin to that collection of maxims and cuſtoms which is now known by the name of the *common law*. A name either given to it, in contradiſtinction to other laws, as the ſtatute law, the civil law, the law merchant, and the like; or, more probably, as a law common to all the realm, the *jus commune* or *folcright*, mentioned by king Edward the elder, after the abolition of the ſeveral provincial cuſtoms and particular laws beforementioned.

But though this is the moſt likely foundation of this collection of maxims and cuſtoms; yet the maxims and cuſtoms, ſo collected, are of higher antiquity than memory or hiſtory can reach: nothing being more difficult than to aſcertain the preciſe beginning and firſt ſpring of an ancient and long eſtabliſhed cuſtom. Whence it is, that in our law the goodneſs of a cuſtom depends upon its having been uſed time out of mind; or, in the ſolemnity of our legal phraſe, time whereof the memory of man runneth not to the contrary. This it is that gives it its weight and authority; and of this nature are the maxims and cuſtoms which compoſe the common law, or *lex non ſcripta*, of this kingdom.

This unwritten, or common law, is properly diſtinguiſhable into three kinds: 1. General cuſtoms; which are the univerſal rule of the whole kingdom, and form the common law in its ſtricter and more uſual ſignification. 2. Particular cuſtoms; which for the moſt part affect only the inhabitants of particular diſtricts. 3. Certain particular laws; which by cuſtom are adopted and uſed by ſome particular courts, of pretty general and extenſive juriſdiction.

I. As to general cuſtoms, or the common law properly ſo called; this is that law, by which proceedings and determinations in the king's ordinary courts of juſtice are guided and directed. This, for the moſt part, ſettles the courſe in which lands deſcend by inheritance; the manner and form of acquiring and transferring property; the ſolemnities and obligation of contracts; the rules of expounding wills, deeds, and acts of parliament; the reſpective remedies of civil injuries; the ſeveral ſpecies of temporal offences, with the manner and degree of puniſhment, and an infinite number of minuter particulars, which diffuſe themſelves as extenſively as the ordinary diſtribution of common juſtice requires. Thus, for example, that there ſhall be four ſuperior courts of record, the chancery, the king's bench, the common pleas, and the exchequer;—that the eldeſt ſon alone is heir to his anceſtor;—that property may be acquired and transferred by writing;—that a deed is of no validity unleſs ſealed and delivered;—that wills ſhall be conſtrued more favourably, and deeds more ſtrictly;—that money lent upon bond is recoverable by action of debt;—that breaking the public peace is an offence, and puniſhable by fine and impriſonment:—all theſe are doctrines that are not ſet down in any written ſtatute or ordinance; but depend merely upon immemorial uſage, that is, upon common law, for their ſupport.

Some have divided the common law into two principal grounds or foundations: 1. Eſtabliſhed cuſtoms; ſuch as that, where there are three brothers, the eldeſt brother ſhall be heir to the ſecond, in excluſion of the youngeſt: and, 2. Eſtabliſhed rules and maxims; as, "that the king can do no wrong, "that no man ſhall be bound to accuſe himſelf," and the like. But theſe ſeem to be one and the ſame thing. For the authority of theſe maxims reſts entirely upon general reception and uſage; and the only method of proving that this or that maxim is a rule of the common law, is by ſhowing that it hath been always the cuſtom to obſerve it.

But here a very natural, and very material, queſtion ariſes: How are theſe cuſtoms or maxims to be known, and by whom is their validity to be determined? The anſwer is, By the judges in the ſeveral courts of juſtice. They are the depoſitory of the laws; the living oracles who muſt decide in all caſes of doubt, and who are bound by an oath to decide according to the law of the land. Their knowledge of that law is derived from experience and ſtudy; from the *viginti annorum lucubrationes*, which Forteſcue mentions; and from being long perſonally accuſtomed to the judicial deciſions of their predeceſſors. And indeed theſe judicial deciſions are the principal and moſt authoritative evidence, that can be given, of the exiſtence of ſuch a cuſtom as ſhall form a part of the common law. The judgment itſelf, and all the proceedings previous thereto, are carefully regiſtered and preſerved under the name of *records*, in public repoſitories ſet apart for that particular purpoſe; and to them frequent recourſe is had, when any critical queſtion ariſes, in the determination of which former precedents may give light or aſſiſtance. And therefore, even ſo early as the conqueſt, we find the *præteritorum memoria eventorum* reckoned up as one of the chief qualifications of thoſe who were held to be *legibus patriæ optime inſtituti*. For it is an eſtabliſhed rule, to abide by former precedents, where the ſame points come again in litigation: as well to keep the ſcale of juſtice even and ſteady, and not liable to waver with every new judge's opinion; as alſo becauſe the law in that caſe being ſolemnly declared and determined, what before was uncertain, and perhaps indifferent, is now become a permanent rule, which it is not in the breaſt of any ſubſequent judge to alter or vary from according to his private ſentiments: he being ſworn to determine, not according to his own private judgement, but according to the known laws and cuſtoms of the land; not delegated to pronounce a new law, but to maintain and expound the old one. Yet this rule admits of exception, where the former determination is moſt evidently contrary to reaſon; much more if it be contrary to the divine law. But, even in ſuch caſes, the ſubſequent judges do not pretend to make a new law, but to vindicate the old one from miſrepreſentation. For if it be found that the former deciſion is manifeſtly abſurd or unjuſt, it is declared, not that ſuch a ſentence was bad law, but that it was not law; that is, that it is not the eſtabliſhed cuſtom of the realm, as has been erroneouſly determined. And hence it is that our lawyers are with juſtice ſo copious in their encomiums on the reaſon of the

common law; that they tell us, that the law is the perfection of reaſon, that it always intends to conform thereto, and that what is not reaſon is not law. Not that the particular reaſon of every rule in the law can at this diſtance of time be always preciſely aſſigned; but it is ſufficient that there be nothing in the rule flatly contradictory to reaſon, and then the law will preſume it to be well founded. And it hath been an ancient obſervation in the laws of England, that whenever a ſtanding rule of law, of which the reaſon perhaps could not be remembered or diſcerned, hath been wantonly broken in upon by ſtatutes or new reſolutions, the wiſdom of the rule hath in the end appeared from the inconveniences that have followed the innovation.

The doctrine of the law then is this: That precedents and rules muſt be followed, unleſs flatly abſurd or unjuſt: for though their reaſon be not obvious at firſt view, yet we owe ſuch a deference to former times, as not to ſuppoſe they acted wholly without conſideration. To illuſtrate this doctrine by examples. It has been determined, time out of mind, that a brother of the half blood ſhall never ſucceed as heir to the eſtate of his half brother, but it ſhall rather eſcheat to the king, or other ſuperior lord. Now this is a poſitive law, fixed and eſtabliſhed by cuſtom; which cuſtom is evidenced by judicial deciſions; and therefore can never be departed from by any modern judge without a breach of his oath and the law. For herein there is nothing repugnant to natural juſtice; though the artificial reaſon of it, drawn from the feodal law, may not be quite obvious to every body. And therefore, on account of a ſuppoſed hardſhip upon the half brother, a modern judge might wiſh it had been otherwiſe ſettled; yet it is not in his power to alter it. But if any court were now to determine, that an elder brother of the half blood might enter upon and ſeize any lands that were purchaſed by his younger brother, no ſubſequent judges would ſcruple to declare that ſuch prior determination was unjuſt, was unreaſonable, and therefore was not law. So that the law, and the opinion of the judge, are not always convertible terms, or one and the ſame thing; ſince it ſometimes may happen that the judge may miſtake the law. Upon the whole, however, we may take it as a general rule, "That the deciſions of courts of juſtice are the evidence of what is common law;" in the ſame manner as in the civil law, what the emperor had once determined was to ſerve for a guide for the future.

The deciſions therefore of courts are held in the higheſt regard, and are not only preſerved as authentic records in the treaſuries of the ſeveral courts, but are handed out to public view in the numerous volumes of reports which furniſh the lawyer's library. Theſe reports are hiſtories of the ſeveral caſes, with a ſhort ſummary of the proceedings, which are preſerved at large in the record; the arguments on both ſides, and the reaſons the court gave for its judgment; taken down in ſhort notes by perſons preſent at the determination. And theſe ſerve as indexes to, and alſo to explain, the records; which always, in matters of conſequence and nicety, the judges direct to be ſearched. The reports are extant in a regular ſeries from the reign of king Edward II. incluſive; and from his time to that of Henry VIII. were taken by the prothonotaries, or chief ſcribes of the court, at the expence of the crown, and publiſhed annually, whence they are known under the denomination of the *year-books*. And it is much to be wiſhed that this beneficial cuſtom had, under proper regulations, been continued to this day; for though king James I. at the inſtance of lord Bacon, appointed two reporters, with a handſome ſtipend, for this purpoſe; yet that wiſe inſtitution was ſoon neglected, and from the reign of Henry VIII. to the preſent time this taſk has been executed by many private and cotemporary hands; who ſometimes through haſte and inaccuracy, ſometimes through miſtake and want of ſkill, have publiſhed very crude and imperfect (perhaps contradictory) accounts of one and the ſame determination. Some of the moſt valuable of the ancient reports are thoſe publiſhed by lord chief juſtice Coke; a man of infinite learning in his profeſſion, though not a little infected with the pedantry and quaintneſs of the times he lived in, which appear ſtrongly in all his works. However, his writings are ſo highly eſteemed, that they are generally cited without the author's name.

Beſides theſe reporters, there are alſo other authors, to whom great veneration and reſpect are paid by the ſtudents of the common law. Such are Glanvil and Bracton, Britton and Fleta, Littleton and Fitzherbert, with ſome others of ancient date, whoſe treatiſes are cited as authority; and are evidence that caſes have formerly happened in which ſuch and ſuch points were determined, which are now become ſettled and firſt principles. One of the laſt of theſe methodical writers in point of time, whoſe works are of any intrinſic authority in the courts of juſtice, and do not entirely depend on the ſtrength of their quotations from older authors, is the ſame learned judge we have juſt mentioned, Sir Edward Coke; who hath written four volumes of Inſtitutes, as he is pleaſed to call them, though they have little of the inſtitutional method to warrant ſuch a title. The firſt volume is a very extenſive comment upon a little excellent treatiſe of tenures, compiled by judge Littleton in the reign of Edward IV. This comment is a rich mine of valuable common-law learning, collected and heaped together from the ancient reports and year-books, but greatly defective in method. The ſecond volume is a comment upon many old acts of parliament, without any ſyſtematical order: the third, a more methodical treatiſe of the pleas of the crown; and the fourth, an account of the ſeveral ſpecies of courts.

And thus much for the firſt ground and chief corner-ſtone of the laws of England; which is general immemorial cuſtom, or common law, from time to time declared in the deciſions of the courts of juſtice; which deciſions are preſerved among the public records, explained in the reports, and digeſted for general uſe in the authoritative writings of the venerable ſages of the law.

The Roman law, as practiſed in the times of its liberty, paid alſo a great regard to cuſtom; but not ſo much as our law: it only then adopting it when the written law was deficient. Though the reaſons alleged in the Digeſt will fully juſtify our practice in making it of equal authority with, when it is not contradicted by, the written law. "For ſince (ſays Julianus) the written law binds us for no other reaſon but becauſe it is approved by the judgment of the people, therefore thoſe laws which the people have approved without writing ought alſo to bind every body. For where is the difference, whether the people declare their aſſent to a law by ſuffrage, or by a uniform courſe of acting accordingly?" Thus did they reaſon while Rome had ſome remains of her freedom; but, when the imperial tyranny came to be fully eſtabliſhed, the civil laws ſpeak a very different language. *Quod principi placuit legis habet vigorem, cum populus ei et in eum omne ſuum imperium et poteſtatem conferat*, ſays Ulpian. *Imperator ſolus et conditor et interpres legis exiſtimatur*, ſays the code. And again, *Sacrilegii inſtar eſt reſcripto principis obviari*. And indeed it is one of the characteriſtic marks of Britiſh liberty, that the common law depends upon cuſtom; which carries this internal evidence of freedom along with it, that it probably was introduced by the voluntary conſent of the people.

II. The ſecond branch of the unwritten laws of England are particular cuſtoms, or laws which affect only the inhabitants of particular diſtricts.

Theſe particular cuſtoms, or ſome of them, are without doubt the remains of that multitude of local cuſtoms before-

mentioned, out of which the common law, as it now ſtands, was collected at firſt by king Alfred, and afterwards by king Edgar and Edward the confeſſor: each diſtrict mutually ſacrificing ſome of its own ſpecial uſages, in order that the whole kingdom might enjoy the benefit of one uniform and univerſal ſyſtem of laws. But, for reaſons that have been now long forgotten, particular counties, cities, towns, manors, and lordſhips, were very early indulged with the privilege of abiding by their own cuſtoms, in contradiſtinction to the reſt of the nation at large: which privilege is confirmed to them by ſeveral acts of parliament.

Such is the cuſtom of gavelkind in Kent and ſome other parts of the kingdom (though perhaps it was alſo general till the Norman conqueſt); which ordains, among other things, that not the eldeſt ſon only of the father ſhall ſucceed to his inheritance, but all the ſons alike; and that, though the anceſtor be attainted and hanged, yet the heir ſhall ſucceed to his eſtate, without any eſcheat to the lord.—Such is the cuſtom that prevails in divers ancient boroughs, and therefore called *borough-engliſh*, that the youngeſt ſon ſhall inherit the eſtate, in preference to all his elder brothers.—Such is the cuſtom in other boroughs, that a widow ſhall be entitled, for her dower, to all her huſband's lands; whereas at the common law ſhe ſhall be endowed of one third part only.—Such alſo are the ſpecial and particular cuſtoms of manors, of which every one has more or leſs, and which bind all the copyhold tenants that hold of the ſaid manors.—Such likewiſe is the cuſtom of holding divers inferior courts, with power of trying cauſes, in cities and trading towns; the right of holding which, when no royal grant can be ſhown, depends entirely upon immemorial and eſtabliſhed uſage.—Such, laſtly, are many particular cuſtoms within the city of London, with regard to trade, apprentices, widows, orphans, and a variety of other matters. All theſe are contrary to the general law of the land, and are good only by ſpecial uſage; though the cuſtoms of London are alſo confirmed by act of parliament.

To this head may moſt properly be referred a particular ſyſtem of cuſtoms uſed only among one ſet of the king's ſubjects, called the *cuſtom of merchants*, or *lex mercatoria*: which, however different from the general rules of the common law, is yet ingrafted into it, and made a part of it; being allowed, for the benefit of trade, to be of the utmoſt validity in all commercial tranſactions; for it is a maxim of law, that *cuilibet in ſua arte credendum eſt*.

The rules relating to particular cuſtoms regard either the *proof* of their exiſtence; their *legality* when proved; or their uſual method of *allowance*. And firſt we will conſider the rules of *proof*.

As to gavelkind, and borough engliſh, the law takes particular notice of them; and there is no occaſion to prove that ſuch cuſtoms actually exiſt, but only that the lands in queſtion are ſubject thereto. All other private cuſtoms muſt be particularly pleaded; and as well the exiſtence of ſuch cuſtoms muſt be ſhown, as that the thing in diſpute is within the cuſtom alleged. The trial in both caſes (both to ſhow the exiſtence of the cuſtom, as "that in the manor of Dale lands ſhall deſcend only to the heirs male, and never to the heirs female;" and alſo to ſhow "that the lands in queſtion are within that manor") is by a jury of 12 men, and not by the judges; except the ſame particular cuſtom has been before tried, determined, and recorded, in the ſame court.

The cuſtoms of London differ from all others in point of trial: for if the exiſtence of the cuſtom be brought in queſtion, it ſhall not be tried by a jury, but by certificate from the lord mayor and aldermen by the mouth of their recorder; unleſs it be ſuch a cuſtom as the corporation is itſelf intereſted in, as a right of taking toll, &c. for then the law permits them not to certify on their own behalf.

When a cuſtom is actually proved to exiſt, the next enquiry is into the legality of it; for if it is not a good cuſtom, it ought to be no longer uſed. *Malus uſus abolendus eſt*, is an eſtabliſhed maxim of the law. To make a particular cuſtom good, the following are neceſſary requiſites:

1. That it have been uſed ſo long, that the memory of man runneth not to the contrary. So that, if any one can ſhow the beginning of it, it is no good cuſtom. For which reaſon, no cuſtom can prevail againſt an expreſs act of parliament; ſince the ſtatute itſelf is a proof of a time when ſuch a cuſtom did not exiſt.

2. It muſt have been *continued*. Any interruption would cauſe a temporary ceaſing: the revival gives it a new beginning, which will be within time of memory, and thereupon the cuſtom will be void. But this muſt be underſtood with regard to an interruption of the right; for an interruption of the poſſeſſion only, for 10 or 20 years, will not deſtroy the cuſtom. As if the inhabitants of a pariſh have a cuſtomary right of watering their cattle at a certain pool, the cuſtom is not deſtroyed though they do not uſe it for 10 years; it only becomes more difficult to prove: but if the right be any how diſcontinued for a day, the cuſtom is quite at an end.

3. It muſt have been *peaceable*, and acquieſced in; not ſubject to contention and diſpute. For as cuſtoms owe their original to common conſent, their being immemorially diſputed, either at law or otherwiſe, is a proof that ſuch conſent was wanting.

4. Cuſtoms muſt be *reaſonable*; or rather, taken negatively, they muſt not be unreaſonable. Which is not always, as Sir Edward Coke ſays, to be underſtood of every unlearned man's reaſon; but of artificial and legal reaſon, warranted by authority of law. Upon which account a cuſtom may be good, though the particular reaſon of it cannot be aſſigned; for it ſufficeth, if no good legal reaſon can be aſſigned againſt it. Thus a cuſtom in a pariſh, that no man ſhall put his heaſts into the common till the third of October, would be good; and yet it would be hard to ſhow the reaſon why that day in particular is fixed upon, rather than the day before or after. But a cuſtom, that no cattle ſhall be put in till the lord of the manor has firſt put in his, is unreaſonable, and therefore bad: for peradventure the lord will never put in his, and then the tenants will loſe all their profits.

5. Cuſtoms ought to be *certain*. A cuſtom, that lands ſhall deſcend to the moſt worthy of the owner's blood, is void; for how ſhall this worth be determined? But a cuſtom to deſcend to the next male of the blood, excluſive of females, is certain, and therefore good. A cuſtom to pay two-pence an acre in lieu of tythes, is good; but to pay ſometimes two-pence and ſometimes three-pence, as the occupier of the land pleaſes, is bad for its uncertainty. Yet a cuſtom, to pay a year's improved value for a fine on a copyhold eſtate, is good; though the value is a thing uncertain: for the value may at any time be aſcertained; and the maxim of law is, *Id certum eſt quod certum reddi poteſt*.

6. Cuſtoms, though eſtabliſhed by conſent, muſt be (when eſtabliſhed) *compulſory*: and not left to the option of every man, whether he will uſe them or no. Therefore a cuſtom, that all the inhabitants ſhall be rated toward the maintenance of a bridge, will be good; but a cuſtom, that every man is to contribute thereto at his own pleaſure, is idle and abſurd, and indeed no cuſtom at all.

7. Laſtly, cuſtoms muſt be *conſiſtent* with each other. One cuſtom cannot be ſet up in oppoſition to another. For if both are really cuſtoms, then both are of equal antiquity, and both

eſtabliſhed by mutual conſent: which to ſay of contradictory cuſtoms, is abſurd. Therefore, if one man preſcribes that by cuſtom he has a right to have windows looking into another's garden, the other cannot claim a right by cuſtom to ſtop up or obſtruct thoſe windows: for theſe two contradictory cuſtoms cannot both be good, nor both ſtand together. He ought rather to deny the exiſtence of the former cuſtom.

Next, as to the *allowance* of ſpecial cuſtoms. Cuſtoms, in derogation of the common law, muſt be conſtrued ſtrictly. Thus, by the cuſtom of gavelkind, an infant of 15 years may by one ſpecies of conveyance (called *a deed of feoffment*) convey away his lands in fee ſimple, or for ever. Yet this cuſtom does not empower him to uſe any other conveyance, or even to leaſe them for ſeven years; for the cuſtom muſt be ſtrictly purſued. And, moreover, all ſpecial cuſtoms muſt ſubmit to the king's prerogative. Therefore, if the king purchaſes lands of the nature of gavelkind, where all the ſons inherit equally; yet, upon the king's demiſe, his eldeſt ſon ſhall ſucceed to thoſe lands alone. And thus much for the ſecond part of the *leges non ſcriptæ*, or thoſe particular cuſtoms which affect particular perſons or diſtricts only.

III. The third branch are thoſe peculiar laws which by cuſtom are adopted and uſed only in certain peculiar courts and juriſdictions. And by theſe are underſtood the civil and canon laws.

It may ſeem a little improper, at firſt view, to rank theſe laws under the head of *leges non ſcriptæ*, or unwritten laws, ſeeing they are ſet forth by authority in their pandects, their codes, and their inſtitutions; their councils, decrees, and decretals; and enforced by an immenſe number of expoſitions, deciſions, and treatiſes of the learned in both branches of the law. But this is done after the example of Sir Matthew Hale, becauſe it is moſt plain, that it is not on account of their being written laws, that either the canon law, or the civil law, have any obligation within this kingdom: neither do their force and efficacy depend upon their own intrinſic authority; which is the caſe of our written laws or acts of parliament. They bind not the ſubjects of England, becauſe their materials were collected from popes or emperors; were digeſted by Juſtinian, or declared to be authentic by Gregory. Theſe conſiderations give them no authority here; for the legiſlature of England doth not, nor ever did, recognize any foreign power as ſuperior or equal to it in this kingdom; or as having the right to give law to any the meaneſt of its ſubjects. But all the ſtrength that either the papal or imperial laws have obtained in this realm (or indeed in any other kingdom in Europe) is only becauſe they have been admitted and received by immemorial uſage and cuſtom in ſome particular caſes, and ſome particular courts; and then they form a branch of the *leges non ſcriptæ*, or cuſtomary law: or elſe, becauſe they are in ſome other caſes introduced by conſent of parliament, and then they owe their validity to the *leges ſcriptæ*, or ſtatute law. This is expreſſly declared in thoſe remarkable words of the ſtatute 25 Hen. VIII. c. 21. addreſſed to the king's royal majeſty—"This your grace's realm, recognizing no ſuperior under God but only your grace, hath been and is free from ſubjection to any man's laws, but only to ſuch as have been deviſed, made, and ordained within this realm, for the wealth of the ſame; or to ſuch other as, by ſufferance of your grace and your progenitors, the people of this your realm have taken at their free liberty, by their own conſent, to be uſed among them; and have bound themſelves by long uſe and cuſtom to the obſervance of the ſame: not as to the obſervance of the laws of any foreign prince, potentate, or prelate; but as to the cuſtomed and ancient laws of this realm, originally eſtabliſhed as laws of the ſame, by the ſaid ſufferance, conſents, and cuſtom; and none otherwiſe."

1. By the civil law, abſolutely taken, is generally underſtood the civil or municipal law of the Roman empire, as compriſed in the inſtitutes, the code, and the digeſt of the emperor Juſtinian, and the novel conſtitutions of himſelf and ſome of his ſucceſſors.

The Roman law (founded firſt upon the regal conſtitutions of their ancient kings, next upon the 12 tables of the decemviri, then upon the laws or ſtatutes enacted by the ſenate or people, the edicts of the prætor, and the *reſponſa prudentum* or opinions of learned lawyers, and laſtly upon the imperial decrees or conſtitutions of ſucceſſive emperors) had grown to ſo great a bulk, or, as Livy expreſſes it, *tam immenſus aliarum ſuper alias acervatarum legum cumulus*, that they were compared to be many camels load by an author who preceded Juſtinian. This was in part remedied by the collections of three private lawyers, Gregorius, Hermogenes, and Papirius; and then by the emperor Theodoſius the younger, by whoſe orders a code was compiled, A. D. 438, being a methodical collection of all the imperial conſtitutions then in force: which Theodoſian code was the only book of civil law received as authentic in the weſtern part of Europe, till many centuries after; and to this it is probable that the Franks and Goths might frequently pay ſome regard, in framing legal conſtitutions for their newly erected kingdoms. For Juſtinian commanded only in the eaſtern remains of the empire; and it was under his auſpices that the preſent body of civil law was compiled and finiſhed by Tribonian and other lawyers, about the year 533.

This conſiſts of, 1. The inſtitutes; which contain the elements or firſt principles of the Roman law, in four books. 2. The digeſts or pandects, in 50 books; containing the opinions and writings of eminent lawyers, digeſted in a ſyſtematical method. 3. A new code, or collection of imperial conſtitutions; the lapſe of a whole century having rendered the former code of Theodoſius imperfect. 4. The novels, or new conſtitutions, poſterior in time to the other books, and amounting to a ſupplement to the code; containing new decrees of ſucceſſive emperors, as new queſtions happened to ariſe. Theſe form the body of Roman law, or *corpus juris civilis*, as publiſhed about the time of Juſtinian: which, however, fell ſoon into neglect and oblivion, till about the year 1130, when a copy of the digeſts was found at Amalfi in Italy; which accident, concurring with the policy of the Roman eccleſiaſtics, ſuddenly gave new vogue and authority to the civil law, introduced it into ſeveral nations, and occaſioned that mighty inundation of voluminous comments, with which this ſyſtem of law, more than any other, is now loaded.

2. The canon law is a body of Roman eccleſiaſtical law, relative to ſuch matters as that church either has, or pretends to have, the proper juriſdiction over. This is compiled from the opinions of the ancient Latin fathers, the decrees of general councils, the decretal epiſtles and bulls of the holy ſee. All which lay in the ſame diſorder and confuſion as the Roman civil law; till, about the year 1151, one Gratian an Italian monk, animated by the diſcovery of Juſtinian's pandects, reduced the eccleſiaſtical conſtitutions alſo into ſome method, in three books; which he entitled *Concordia diſcordantium canonum*, but which are generally known by the name of *Decretum Gratiani*. Theſe reached as low as the time of pope Alexander III. The ſubſequent papal decrees, to the pontificate of Gregory IX. were publiſhed in much the ſame method under the auſpices of that pope, about the year 1230, in five books; entitled *Decretalia Gregorii noni*. A ſixth book was added by Boniface VIII. about the year 1298, which is called *Sextus Decretalium*. The Clementine conſtitutions, or decrees of Clement V. were in like manner authenticated in 1317 by his ſucceſſor John XXII.; who alſo publiſhed 20 conſtitutions of

his own, called *Extravagantes Joannis:* all which in ſome meaſure anſwer to the novels of the civil law. To theſe have been ſince added ſome decrees of later popes, in five books, called *Extravagantes Communes.* And all theſe together, Gratian's decree, Gregory's decretals, the ſixth decretal, the Clementine conſtitutions, and the Extravagants of John and his ſucceſſors, form the *corpus juris canonici,* or body of the Roman canon law.

Beſides theſe pontifical collections, which during the times of popery were received as authentic in this iſland, as well as in other parts of Chriſtendom, there is alſo a kind of national canon law, compoſed of legatine and provincial conſtitutions, and adapted only to the exigencies of this church and kingdom. The legatine conſtitutions were eccleſiaſtical laws, enacted in national ſynods, held under the cardinals Otho and Othobon, legates from pope Gregory IX. and pope Clement IV. in the reign of king Henry III. about the years 1220 and 1268. The provincial conſtitutions are principally the decrees of provincial ſynods, held under divers archbiſhops of Canterbury, from Stephen Langton in the reign of Henry III. to Henry Chichele in the reign of Henry V.; and adopted alſo by the province of York in the reign of Henry VI. At the dawn of the reformation, in the reign of king Henry VIII. it was enacted in parliament, that a review ſhould be had of the canon law; and till ſuch review ſhould be made, all canons, conſtitutions, ordinances, and ſynodals provincial, being then already made, and not repugnant to the law of the land or the king's prerogative, ſhould ſtill be uſed and executed. And, as no ſuch review has yet been perfected, upon this ſtatute now depends the authority of the canon law in England.

As for the canons enacted by the clergy under James I. in the year 1603, and never confirmed in parliament, it has been ſolemnly adjudged upon the principles of law and the conſtitution, that where they are not merely declaratory of the ancient canon law, but are introductory of new regulations, they do not bind the laity, whatever regard the clergy may think proper to pay them.

There are four ſpecies of courts, in which the civil and canon laws are permitted, under different reſtrictions, to be uſed. 1. The courts of the archbiſhops and biſhops, and their derivative officers; uſually called *courts Chriſtian, (curiæ Chriſtianitatis),* or the *eccleſiaſtical courts.* 2. The military courts. 3. The courts of admiralty. 4. The courts of the two univerſities. In all, their reception in general, and the different degrees of that reception, are grounded entirely upon cuſtom; corroborated in the latter inſtance by act of parliament, ratifying thoſe charters which confirm the cuſtomary law of the univerſities. The more minute conſideration of them will fall under their proper articles. It will ſuffice at preſent to remark a few particulars relative to them all, which may ſerve to inculcate more ſtrongly the doctrine laid down concerning them.

1. And firſt, the courts of common law have the ſuperintendency over theſe courts; to keep them within their juriſdictions; to determine wherein they exceed them; to reſtrain and prohibit ſuch exceſs; and (in caſe of contumacy) to puniſh the officer who executes, and, in ſome caſes, the judge who enforces, the ſentence ſo declared to be illegal.

2. The common law has reſerved to itſelf the expoſition of all ſuch acts of parliament as concern either the extent of theſe courts, or the matters depending before them. And, therefore, if theſe courts either refuſe to allow theſe acts of parliament, or will expound them in any other ſenſe than what the common law puts upon them, the king's courts at Weſtminſter will grant prohibitions to reſtrain and controul them.

3. An appeal lies from all theſe courts to the king, in the laſt reſort; which proves that the juriſdiction exerciſed in them is derived from the crown of England, and not from any ſoreign potentate, or intrinſic authority of their own.—And, from theſe three ſtrong marks and enſigns of ſuperiority, it appears beyond a doubt, that the civil and canon laws, though admitted in ſome caſes by cuſtom in ſome courts, are only ſubordinate and *leges ſub graviori lege*; and that thus admitted, reſtrained, altered, new-modelled, and amended, they are by no means with us a diſtinct independent ſpecies of laws, but are inferior branches of the cuſtomary or unwritten laws of England, properly called the *king's eccleſiaſtical, the king's military, the king's maritime, or the king's academical, laws.*

Let us next proceed to the *leges ſcriptæ,* the written laws of the kingdom: which are ſtatutes, acts, or edicts, made by the king's majeſty, by and with the advice of the lords ſpiritual and temporal and commons in parliament aſſembled. The oldeſt of theſe now extant, and printed in our ſtatute books, is the famous *magna charta,* as confirmed in parliament 9 Hen. III. though doubtleſs there were many acts before that time, the records of which are now loſt, and the determinations of them perhaps at preſent currently received for the maxims of the old common law.

The manner of making theſe ſtatutes being explained under the articles BILL and PARLIAMENT, we ſhall here only take notice of the different kinds of ſtatutes; and of ſome general rules with regard to their conſtruction.

Firſt, as to their ſeveral kinds. Statutes are either *general* or *ſpecial,* public or private. A general or public act is an univerſal rule that regards the whole community: and of this the courts of law are bound to take notice judicially and *ex officio,* without the ſtatute being particularly pleaded, or formally ſet forth, by the party who claims an advantage under it. Special or private acts are rather exceptions than rules, being thoſe which only operate upon particular perſons and private concerns; ſuch as the Romans entitled *ſenatus decreta,* in contradiſtinction to the *ſenatus conſulta,* which regarded the whole community; and of theſe the judges are not bound to take notice, unleſs they be formally ſhewn and pleaded. Thus, to ſhew the diſtinction, the ſtatute 13 Eliz. c. 10. to prevent ſpiritual perſons from making leaſes for longer terms than 21 years or three lives, is a public act; it being a rule preſcribed to the whole body of ſpiritual perſons in the nation: but an act to enable the biſhop of Cheſter to make a leaſe to A. B. for 60 years, is an exception to this rule; it concerns only the parties and the biſhop's ſucceſſors, and is therefore a private act.

Statutes alſo are either *declaratory* of the common law, or *remedial* of ſome defects therein. Declaratory, where the old cuſtom of the kingdom is almoſt fallen into diſuſe, or become diſputable; in which caſe the parliament has thought proper, *in perpetuum rei teſtimonium,* and for avoiding all doubts and difficulties, to declare what the common law is and ever hath been. Thus the ſtatute of treaſons, 25 Edw. III. cap. 2. doth not make any new ſpecies of treaſons; but only, for the benefit of the ſubject, declares and enumerates thoſe ſeveral kinds of offence which before were treaſon at the common law. Remedial ſtatutes are thoſe which are made to ſupply ſuch defects, and abridge ſuch ſuperfluities, in the common law, as ariſe either from the general imperfection of all human laws, from change of time and circumſtances, from the miſtakes and unadviſed determinations of unlearned judges, or from any other cauſe whatſoever. And this being done, either by enlarging the common law where it was too narrow and circumſcribed, or by reſtraining it where it was too lax and luxuriant, hath occaſioned another ſubordinate diviſion of remedial acts of parliament into *enlarging* and *reſtraining* ſtatutes. To inſtance again in the caſe of treaſon. Clipping the current coin of the kingdom was an offence not ſufficiently guarded againſt by the common law: therefore it was thought expedient by

ſtatute 5 Eliz. c. 11. to make it high treaſon, which it was not at the common law: ſo that this was an *enlarging* ſtatute. At common law, alſo, ſpiritual corporations might leaſe out their eſtates for any term of years, till prevented by the ſtatute 13 Eliz. before-mentioned: this was therefore a *reſtraining* ſtatute.

Secondly, the rules to be obſerved with regard to the conſtruction of ſtatutes are principally theſe which follow:

1. There are three points to be conſidered in the conſtruction of all remedial ſtatutes; the old law, the miſchief, and the remedy; that is, how the common law ſtood at the making of the act; what the miſchief was, for which the common law did not provide; and what remedy the parliament hath provided to cure this miſchief. And it is the buſineſs of the judges ſo to conſtrue the act, as to ſuppreſs the miſchief and advance the remedy. Let us inſtance again in the ſame reſtraining ſtatute of 13 Eliz. c. 10. By the common law, eccleſiaſtical corporations might let as long leaſes as they thought proper: the miſchief was, that they let long and unreaſonable leaſes, to the impoveriſhment of their ſucceſſors: the remedy applied by the ſtatute was by making void all leaſes by eccleſiaſtical bodies for longer terms than three lives or 21 years. Now in the conſtruction of this ſtatute it is held, that leaſes, though for a longer term, if made by a biſhop, are not void during the biſhop's continuance in his ſee; or, if made by a dean and chapter, they are not void during the continuance of the dean; for the act was made for the benefit and protection of the ſucceſſor. The miſchief is therefore ſufficiently ſuppreſſed by vacating them after the determination of the intereſt of the granters; but the leaſes, during their continuance, being not within the miſchief, are not within the remedy.

2. A ſtatute, which treats of things or perſons of an inferior rank, cannot by any *general words* be extended to thoſe of a ſuperior. So a ſtatute, treating of "deans, prebendaries, parſons, vicars, *and others having ſpiritual promotion*," is held not to extend to biſhops, though they have ſpiritual promotion; deans being the higheſt perſons named, and biſhops being of a ſtill higher order.

3. Penal ſtatutes muſt be conſtrued ſtrictly. Thus the ſtatute 1 Edw. VI. c. 12. having enacted that thoſe who are convicted of ſtealing *horſes* ſhould not have the benefit of clergy, the judges conceived that this did not extend to him who ſhould ſteal but one *horſe*, and therefore procured a new act for that purpoſe in the following year. And, to come nearer to our own times, by the ſtatute 14 Geo. II. c. 6. ſtealing ſheep *or other cattle* was made felony without benefit of clergy. But theſe general words, "or other cattle," being looked upon as much too looſe to create a capital offence, the act was held to extend to nothing but mere ſheep. And therefore, in the next ſeſſions, it was found neceſſary to make another ſtatute, 15 Geo. II. c. 34. extending the former to bulls, cows, oxen, ſteers, bullocks, heifers, calves, and lambs, by name.

4. Statutes againſt frauds are to be liberally and beneficially expounded. This may ſeem a contradiction to the laſt rule; moſt ſtatutes againſt frauds being in their conſequences penal. But this difference is here to be taken: where the ſtatute acts upon the offender, and inflicts a penalty, as the pillory, or a fine, it is then to be taken ſtrictly; but when the ſtatute acts upon the offence, by ſetting aſide the fraudulent tranſaction, here it is to be conſtrued liberally. Upon this footing the ſtatute of 13 Eliz. c. 5. which voids all gifts of goods, &c. made to defraud creditors *and others*, was held to extend by the general words to a gift made to defraud the queen of a forfeiture.

5. One part of a ſtatute muſt be ſo conſtrued by another, that the whole may (if poſſible) ſtand: *ut res magis valeat quam pereat.* As if land be veſted in the king and his heirs by act of parliament, ſaving the right of A; and A has at that time a leaſe of it for three years; here A ſhall hold it for his term of three years, and afterwards it ſhall go to the king. For this interpretation furniſhes matter for every clauſe of the ſtatute to work and operate upon. But,

6. A ſaving totally repugnant to the body of the act is void. If therefore an act of parliament veſts land in the king and his heirs, ſaving the right of all perſons whatſoever; or veſts the land of A in the king, ſaving the right of A: in either of theſe caſes the ſaving is totally repugnant to the body of the ſtatute, and (if good) would render the ſtatute of no effect or operation; and therefore the ſaving is void, and the land veſts abſolutely in the king.

7. Where the common law and a ſtatute differ, the common law gives place to the ſtatute; and an old ſtatute gives place to a new one. And this upon the general principle laid down in the laſt ſection, that *leges poſteriores priores contrarias abrogant.* But this is to be underſtood only when the latter ſtatute is couched in negative terms, or by its matter neceſſarily implies a negative. As if a former act ſays, that a juror upon ſuch a trial ſhall have twenty pounds a-year, and a new ſtatute comes and ſays he ſhall have twenty merks; here the latter ſtatute, though it does not expreſs, yet neceſſarily implies, a negative, and virtually repeals the former. For if twenty merks be made qualification ſufficient, the former ſtatute which requires twenty pounds is at an end. But if both the acts be merely affirmative, and the ſubſtance ſuch that both may ſtand together, here the latter does not repeal the former, but they ſhall both have a concurrent efficacy. If by a former law an offence be indictable at the quarter ſeſſions, and a later law makes the ſame offence indictable at the aſſizes; here the juriſdiction of the ſeſſions is not taken away, but both have a concurrent juriſdiction, and the offender may be proſecuted at either: unleſs the new ſtatute ſubjoins expreſs negative words; as, that the offence ſhall be indictable at the aſſizes, *and not elſewhere.*

8. If a ſtatute, that repeals another, is itſelf repealed afterwards, the firſt ſtatute is hereby revived, without any formal words for that purpoſe. So when the ſtatutes of 26 and 35 Hen. VIII. declaring the king to be the ſupreme head of the church, were repealed by a ſtatute 1 and 2 Philip and Mary, and this latter ſtatute was afterwards repealed by an act of 1 Eliz. there needed not any expreſs words of revival in queen Elizabeth's ſtatute, but theſe acts of king Henry were impliedly and virtually revived.

9. Acts of parliament derogatory from the power of ſubſequent parliaments bind not. So the ſtatute 11 Hen. VII. c. 1. which directs, that no perſon for aſſiſting a king *de facto* ſhall be attainted of treaſon by act of parliament or otherwiſe, is held to be good only as to common proſecutions for high treaſon; but will not reſtrain or clog any parliamentary attainder. Becauſe the legiſlature, being in truth the ſovereign power, is always of equal, always of abſolute authority: it acknowledges no ſuperior upon earth, which the prior legiſlature muſt have been if its ordinances could bind the preſent parliament. And upon the ſame principle, Cicero, in his letters to Atticus, treats with a proper contempt theſe reſtraining clauſes, which endeavour to tie up the hands of ſucceeding legiſlatures. "When you repeal the law itſelf (ſays he) you at the ſame time repeal the prohibitory clauſe which guards againſt ſuch repeal."

10. Laſtly, acts of parliament that are impoſſible to be performed are of no validity; and if there ariſe out of them collaterally any abſurd conſequences, manifeſtly contradictory to common reaſon, they are with regard to thoſe collateral conſequences void. We lay down the rule with theſe reſtrictions; though we know it is generally laid down more

largely, that acts of parliament contrary to reason are void. But if the parliament will positively enact a thing to be done which is unreasonable, we know of no power that can control it: and the examples usually alleged in support of this sense of the rule do none of them prove, that where the main object of a statute is unreasonable, the judges are at liberty to reject it; for that were to set the judicial power above that of the legislature, which would be subversive of all government. But where some collateral matter arises out of the general words, and happens to be unreasonable; there the judges are in decency to conclude that this consequence was not foreseen by the parliament, and therefore they are at liberty to expound the statute by equity, and only *quoad hoc* disregard it. Thus if an act of parliament gives a man power to try all causes that arise within his manor of Dale; yet, if a cause should arise in which he himself is party, the act is construed not to extend to that, because it is unreasonable that any man should determine his own quarrel. But, if we could conceive it possible for the parliament to enact, that he should try as well his own causes as those of other persons, there is no court that has power to defeat the intent of the legislature, when couched in such evident and express words as leave no doubt whether it was the intent of the legislature or not.

These are the several grounds of the laws of England: over and above which, equity is also frequently called in to assist, to moderate, and to explain them. What equity is, and how impossible in its very essence to be reduced to stated rules, hath been shewn above. It may be sufficient, therefore, to add in this place, that, besides the liberality of sentiment with which our common-law judges interpret acts of parliament, and such rules of the unwritten law as are not of a positive kind, there are also courts of equity established for the benefit of the subject, to detect latent frauds and concealments, which the process of the courts of law is not adapted to reach; to enforce the execution of such matters of trust and confidence, as are binding in conscience, though not cognizable in a court of law; to deliver from such dangers as are owing to misfortune or oversight; and to give a more specific relief, and more adapted to the circumstances of the case, than can always be obtained by the generality of the rules of the positive or common law. This is the business of the courts of equity, which however are only conversant in matters of property. For the freedom of our constitution will not permit, that in criminal cases a power should be lodged in any judge to construe the law otherwise than according to the letter. This caution, while it admirably protects the public liberty, can never bear hard upon individuals. A man cannot suffer *more* punishment than the law assigns, but he may suffer *less*. The laws cannot be strained by partiality to inflict a penalty beyond what the letter will warrant; but, in cases where the letter induces any apparent hardship, the crown has the power to pardon.

The objects of the laws of England are, 1. The rights of persons. 2. The rights of things. 3. Private wrongs. 4. Public wrongs.

CHAP. I.

Of the RIGHTS *of* PERSONS.

SECT. I. *Of the absolute rights of individuals.*

(1.) THE objects of the *Laws* of England are, 1. *Rights*. 2. *Wrongs*.

(2.) *Rights* are the rights of *persons*, or the rights of *things*.

(3.) The rights of *persons* are such as concern, and are annexed to, the persons of men: and, when the person *to* whom they are due is regarded, they are called (simply) *rights*; but, when we consider the person *from* whom they are due, they are then denominated *duties*.

(4.) *Persons* are either *natural*, that is, such as they are formed by nature; or *artificial*, that is, created by human policy, as bodies politic or *corporations*.

(5.) The rights of *natural* persons are, 1. *Absolute*, or such as belong to individuals. 2. *Relative*, or such as regard members of society.

(6.) The *absolute rights of individuals*, regarded by the municipal laws (which pay no attention to duties, of the absolute kind), compose what is called political or civil *liberty*.

(7.) Political or civil *liberty* is the natural liberty of mankind, so far restrained by human laws as is necessary for the good of society.

(8.) The absolute rights or civil liberties of Englishmen, as frequently declared in parliament, are principally three; the right of *personal security*, of *personal liberty*, and of *private property*.

(9.) The right of *personal security* consists in the legal enjoyment of life, limb, body, health, and reputation.

(10.) The right of *personal liberty* consists in the free power of loco-motion, without illegal restraint or banishment.

(11.) The right of *private property* consists in every man's free use and disposal of his own lawful acquisitions, without injury or illegal diminution.

(12.) Besides these three *primary* rights, there are others which are *secondary* and subordinate; viz. (to preserve the former from unlawful attacks) 1. The constitution and power of parliaments; 2. The limitation of the king's prerogative;—and (to vindicate them when actually violated) 3. The regular administration of public justice; 4. The right of petitioning for redress of grievances; 5. The right of having and using arms for self-defence.

SECT. II. *Of the parliament.*

(1.) THE *relations* of persons are, 1. *Public*. 2. *Private*. The *public* relations are those of *magistrates* and *people*. *Magistrates* are *superior* or *subordinate*. And of *supreme* magistrates, in England, the *parliament* is the supreme *legislative*, the *king* the supreme *executive*.

(2.) *Parliaments*, in some shape, are of as high antiquity as the Saxon government in this island; and have subsisted, in their present form, at least five hundred years.

(3.) The parliament is assembled by the king's writs, and its sitting must not be intermitted above three years.

(4.) Its constituent parts are the king's majesty, the lords spiritual and temporal, and the commons represented by their members: each of which parts has a negative, or necessary, voice in making laws.

(5.) With regard to the *general* law of parliament; its power is absolute: each house is the judge of its own privileges; and all the members of either house are entitled to the privilege of speech, of person, of their domestics, and of their lands and goods.

(6.) The *peculiar* privileges of the lords (besides their judicial capacity) are, to hunt in the king's forests; to be attended by the sages of the law; to make proxies; to enter protests; and to regulate the election of the 16 peers of North Britain.

(7.) The *peculiar privileges* of the commons are, to frame taxes for the subject; and to determine the merits of their own elections, with regard to the qualifications of the electors and elected, and the proceedings at elections themselves.

(8.) Bills are usually twice read in each house, committed, engrossed, and then read a third time; and when they have obtained the concurrence of both houses, and received the royal assent, they become *acts* of parliament.

(9.) The houses may adjourn themselves; but the king only can prorogue the parliament.

(10.) Parliaments are diſſolved, 1. At the king's will. 2. By the demiſe of the crown, that is, within ſix months after. 3. By length of time, or having ſat for the ſpace of ſeven years.

Sect. III. *Of the king and his title.*

(1.) The ſupreme *executive* power of this kingdom is lodged in a ſingle perſon; the king or queen.

(2.) This royal perſon may be conſidered with regard to, 1. His title. 2. His royal family. 3. His councils. 4. His duties. 5. His prerogative. 6. His revenue.

(3.) With regard to his *title*; the crown of England, by the poſitive conſtitution of the kingdom, hath ever been deſcendible, and ſo continues.

(4.) The crown is deſcendible in a courſe peculiar to itſelf.

(5.) This courſe of deſcent is ſubject to limitation by parliament.

(6.) Notwithſtanding ſuch limitations, the crown retains its deſcendible quality, and becomes hereditary in the prince to whom it is limited.

(7.) King Egbert, king Canute, and king William I. have been ſucceſſively conſtituted the common ſtocks, or anceſtors, of this deſcent.

(8.) At the revolution the convention of eſtates, or repreſentative body of the nation, declared, that the miſconduct of king James II. amounted to an abdication of the government, and that the throne was thereby *vacant*.

(9.) In conſequence of this vacancy, and from a regard to the ancient line, the convention appointed the next proteſtant heirs of the blood royal of king Charles I. to fill the vacant throne, in the old order of ſucceſſion; with a temporary exception, or preference, to the perſon of king William III.

(10.) On the impending failure of the proteſtant line of king Charles I. (whereby the throne might again have become vacant) the king and parliament extended the ſettlement of the crown to the proteſtant line of king James I. viz. to the princeſs Sophia of Hanover, and the heirs of her body, being proteſtants: And ſhe is now the common ſtock, from whom the heirs of the crown muſt deſcend.

Sect. IV. *Of the king's royal family.*

(1.) The king's royal *family* conſiſts, firſt, of the *queen*: who is regnant, conſort, or dowager.

(2.) The queen *conſort* is a public perſon, and hath many perſonal prerogatives and diſtinct revenues.

(3.) The prince and princeſs of Wales, and the princeſs-royal, are peculiarly regarded by the law.

(4.) The other princes of the blood-royal are only entitled to precedence.

Sect. V. *Of the councils belonging to the king.*

(1.) The *king's councils* are, 1. The *parliament*. 2. The great council of *peers*. 3. The *judges*, for matters of law. 4. The *privy* council.

(2.) In *privy-counſellors* may be conſidered, 1. Their creation. 2. Their qualifications. 3. Their duties. 4. Their powers. 5. Their privileges. 6. Their diſſolution.

Sect. VI. *Of the king's duties.*

(1.) The *king's duties* are, to govern his people according to law, to execute judgment in mercy, and to maintain the eſtabliſhed religion. Theſe are his part of the original contract between himſelf and the people; founded in the nature of ſociety, and expreſſed in his oath at the coronation.

Sect. VII. *Of the king's prerogative.*

(1.) Prerogative is that ſpecial power and pre-eminence which the king hath above other perſons, and out of the ordinary courſe of law, in right of his regal dignity.

(2.) Such *prerogatives* are either *direct*, or *incidental*. The *incidental*, ariſing out of other matters, are conſidered as they ariſe: We now treat only of the *direct*.

(3.) The *direct* prerogatives regard, 1. The *king's dignity*, or royal character; 2. His *authority*, or regal power; 3. His *revenue*, or royal income.

(4.) The *king's dignity* conſiſts in the legal attributes of, 1. Perſonal ſovereignty. 2. Abſolute perfection. 3. Political perpetuity.

(5.) In the *king's authority*, or regal power, conſiſts the executive part of government.

(6.) In *foreign* concerns; the *king*, as the repreſentative of the nation, has the right or *prerogative*, 1. Of ſending and receiving ambaſſadors. 2. Of making treaties. 3. Of proclaiming war or peace. 4. Of iſſuing repriſals. 5. Of granting ſafe conducts.

(7.) In *domeſtic* affairs; the *king* is, firſt, a conſtituent part of the ſupreme legiſlative power; hath a negative upon all new laws; and is bound by no ſtatute, unleſs ſpecially named therein.

(8.) He is alſo conſidered as the general of the kingdom, and may raiſe fleets and armies, build forts, appoint havens, erect beacons, prohibit the exportation of arms and ammunition, and confine his ſubjects within the realm, or recall them from foreign parts.

(9.) The *king* is alſo the fountain of juſtice, and general conſervator of the peace; and therefore may erect courts (wherein he hath a legal ubiquity), proſecute offenders, pardon crimes, and iſſue proclamations.

(10.) He is likewiſe the fountain of honour, of office, and of privilege.

(11.) He is alſo the arbiter of *domeſtic* commerce (not of *foreign*, which is regulated by the law of merchants); and is therefore entitled to the erection of public marts, the regulation of weights and meaſures, and the coinage or legitimation of money.

(12.) The *king* is, laſtly, the ſupreme head of the church; and, as ſuch, convenes, regulates, and diſſolves ſynods, nominates biſhops, and receives appeals in all eccleſiaſtical cauſes.

Sect. VIII. *Of the king's revenue.*

(1.) The *king's revenue* is either *ordinary* or *extraordinary*. And the *ordinary* is, 1. *Eccleſiaſtical* 2. *Temporal*.

(2.) The *king's eccleſiaſtical* revenue conſiſts in, 1. The cuſtody of the temporalties of vacant biſhopricks. 2. Corodies and penſions. 3. Extra-parochial tithes. 4. The firſt fruits and tenths of benefices.

(3.) The *king's* ordinary *temporal* revenue conſiſts in, 1. The demeſne lands of the crown. 2. The hereditary exciſe; being part of the conſideration for the purchaſe of his feodal profits, and the prerogatives of purveyance and pre-emption. 3. An annual ſum iſſuing from the duty on wine-licences; being the reſidue of the ſame conſideration. 4. His foreſts. 5. His courts of juſtice. 6. Royal fiſh. 7. Wrecks, and things jetſam, flotſam, and ligan. 8. Royal mines. 9. Treaſure trove. 10. Waifs. 11. Eſtrays. 12. Forfeitures for offences, and deodands. 13. Eſcheats of lands. 14. Cuſtody of idiots and lunatics.

(4.) The *king's extraordinary revenue*, conſiſts in aids, ſubſidies, and ſupplies, granted him by the commons in parliament.

(5.) Heretofore theſe were uſually raiſed by grants of the (nominal) *tenth* or *fifteenth* part of the moveables in every townſhip; or by ſcutages, hydages, and talliages; which were

ſucceeded by *ſubſidies* aſſeſſed upon individuals, with reſpect to their lands and goods.

(6.) A new ſyſtem of taxation took place about the time of the revolution: our modern taxes are therefore, 1. *Annual.* 2. *Perpetual.*

(7.) The *annual taxes* are, 1. The land-tax, or the ancient ſubſidy raiſed upon a new aſſeſſment. 2. The malt-tax, being an annual exciſe on malt, mum, cyder, and perry.

(8.) The *perpetual* taxes are, 1. The cuſtoms, or tonnage and poundage of all merchandiſe exported or imported. 2. The exciſe-duty, or inland impoſition on a great variety of commodities. 3. The ſalt-duty, or exciſe on ſalt. 4. The poſt-office, or duty for the carriage of letters. 5. The ſtamp-duty on paper, parchment, &c. 6. The duty on houſes and windows. 7. The duty on licences for hackney-coaches and chairs. 8. The duty on offices and penſions.

(9.) Part of this revenue is applied to pay the intereſt of the national debt, till the principal is diſcharged by parliament.

(10.) The produce of theſe ſeveral taxes were originally ſeparate and *ſpecific funds*, to anſwer *ſpecific loans* upon their reſpective credits; but are now conſolidated by parliament into three principal funds, the *aggregate*, *general*, and *South ſea* funds, to anſwer *all* the debts of the nation: the public faith being alſo ſuperadded, to ſupply deficiencies, and ſtrengthen the ſecurity of the whole.

(11.) The ſurpluſſes of theſe funds, after paying the intereſt of the national debt, are carried together, and denominated the *ſinking* fund; which, unleſs otherwiſe appropriated by parliament, is annually to be applied towards paying off ſome part of the principal.

(12.) But, previous to this, the *aggregate* fund is now charged with an annual ſum for the *civil liſt*; which is the immediate proper revenue of the crown, ſettled by parliament on the king at his acceſſion, for defraying the charges of civil government.

Sect. IX. *Of ſubordinate magiſtrates.*

(1.) Subordinate magiſtrates, of the moſt general uſe and authority, are, 1. *Sheriffs.* 2. *Coroners.* 3. *Juſtices* of the *Peace.* 4. *Conſtables.* 5. *Surveyors* of the *highways.* 6. *Overſeers* of the *poor.*

(2.) The *ſheriff* is the keeper of each county, annually nominated in due form by the king; and is (within his county) a judge, a conſervator of the peace, a miniſterial officer, and the king's bailiff.

(3.) *Coroners* are permanent officers of the crown in each county, elected by the freeholders; whoſe office it is to make inquiry concerning the death of the king's ſubjects, and certain revenues of the crown; and alſo, in particular caſes, to ſupply the office of ſheriff.

(4.) *Juſtices* of the *peace* are magiſtrates in each county, ſtatutably qualified, and commiſſioned by the king's majeſty: with authority to conſerve the peace: to hear and determine felonies and other miſdemeanors: and to do many other acts committed to their charge by particular ſtatutes.

(5.) *Conſtables* are officers of hundreds and townſhips, appointed at the leet, and empowered to preſerve the peace, to keep watch and ward, and to apprehend offenders.

(6.) *Surveyors* of the *highways* are officers appointed annually in every pariſh; to remove annoyances in, and to direct the reparation of, the public roads.

(7.) *Overſeers* of the *poor* are officers appointed annually in every pariſh; to relieve ſuch impotent, and employ ſuch ſturdy poor, as are *ſettled* in each pariſh—by birth,—by parentage,—by marriage,—or by 40 days reſidence; accompanied with, 1. Notice. 2. Renting a tenement of ten pounds annual value. 3. Paying their aſſeſſed taxations. 4. Serving an annual office. 5. Hiring and ſervice for a year. 6. Apprenticeſhip for ſeven years. 7. Having a ſufficient eſtate in the pariſh.

Sect. X. *Of the people, whether aliens, denizens, or natives.*

(1.) The *people* are either *aliens*, that is, born out of the dominions, or allegiance, of the crown of Great Britain: or *natives*, that is, born within it.

(2.) Allegiance is the duty of all ſubjects; being the reciprocal tie of the people to the prince, in return for the protection he affords them; and, in *natives*, this duty of allegiance is natural and perpetual; in *aliens*, is local and temporary only.

(3.) The rights of *natives* are alſo natural and perpetual: thoſe of *aliens*, local and temporary only; unleſs they be made denizens by the king, or naturaliſed by parliament.

Sect. XI. *Of the clergy.*

(1.) The people, whether aliens, denizens, or natives, are alſo either *clergy*, that is, all perſons in holy orders, or in eccleſiaſtical offices; or *laity*, which comprehends the reſt of the nation.

(2.) The *clerical* part of the nation, thus defined, are, 1. Archbiſhops and biſhops; who are elected by their ſeveral chapters, at the nomination of the crown, and afterwards confirmed and conſecrated by each other. 2. Deans and chapters. 3. Archdeacons. 4. Rural deans. 5. Parſons (under which are included appropriators) and vicars; to whom there are generally requiſite, holy orders, preſentation, inſtitution, and induction. 6. Curates. To which may be added, 7. Church-wardens. 8. Pariſh-clerks and ſextons.

Sect. XII. *Of the civil ſtate.*

(1.) The *laity* are diviſible into three ſtates; *civil*, *military*, and *maritime.*

(2.) The *civil* ſtate (which includes all the nation, except the clergy, the army, and the navy, and many individuals among them alſo) may be divided into the *nobility* and the *commonalty.*

(3.) The *nobility* are dukes, marquiſes, earls, viſcounts, and barons. Theſe had anciently duties annexed to their reſpective honours: they are created either by writ, that is, by ſummons to parliament; or by the king's letters patent, that is, by royal grant: and they enjoy many privileges excluſive of their ſenatorial capacity.

(4.) The *commonalty* conſiſt of knights of the garter, knights bannerets, baronets, knights of the bath, knights bachelors, eſquires, gentlemen, yeomen, tradeſmen, artificers, and labourers.

Sect. XIII. *Of the military and maritime ſtates.*

(1.) The *military* ſtate, by the ſtanding conſtitutional law, conſiſts of the militia of each county, raiſed from among the people by lot, officered by the principal land-holders, and commanded by the lord lieutenant.

(2.) The more diſciplined occaſional troops of the kingdom are kept on foot only from year to year by parliament; and during that period are governed by martial law, or arbitrary articles of war, formed at the pleaſure of the crown.

(3.) The *maritime* ſtate conſiſts of the officers and mariners of the Britiſh navy; who are governed by expreſs and permanent laws, or the articles of the navy, eſtabliſhed by act of parliament.

Sect. XIV. *Of maſter and ſervant.*

(1.) The *private*, economical, *relations* of perſons are thoſe of, 1. *Maſter* and *ſervant* 2. *Huſband* and *wife.* 3. *Parent* and *child.* 4. *Guardian* and *ward.*

(2.) The firſt relation may ſubſiſt between a *maſter* and four ſpecies of *ſervants* (for ſlavery is unknown to our laws): *viz.* 1. Menial ſervants; who are *hired*. 2. Apprentices; who are *bound* by indentures. 3. Labourers; who are caſually *employed*. 4. Stewards, bailiffs, and factors; who are rather in a *miniſterial* ſtate.

(3.) From this relation reſult divers powers to the maſter, and emoluments to the ſervant.

(4.) The maſter hath a property in the ſervice of his ſervant; and muſt be anſwerable for ſuch acts as the ſervant does by his expreſs, or implied, command.

Sect. XV. *Of huſband and wife.*

(1.) The ſecond private relation is that of *marriage*; which includes the reciprocal rights and duties of *huſband* and *wife*.

(2.) *Marriage* is duly contracted between perſons, 1. Conſenting: 2. Free from canonical impediments, which make it *voidable*: 3. Free alſo from the civil impediments,—of prior marriage,—of want of age,—of non-conſent of parents or guardians, where requiſite,—and of want of reaſon; either of which make it totally *void*. And it muſt be celebrated by a clergyman in due form and place.

(3.) Marriage is diſſolved, 1. By death. 2. By divorce in the ſpiritual court; not *a menſa et thoro* only, but *a vinculo matrimonii*, for canonical cauſe exiſting previous to the contract. 3. By act of parliament, as for adultery.

(4.) By marriage the huſband and wife become one perſon in law; which unity is the principal foundation of their reſpective rights, duties and diſabilities.

Sect. XVI. *Of parent and child.*

(1.) The third, and moſt univerſal private relation, is that of *parent* and *child*.

(2.) *Children* are, 1. *Legitimate*; being thoſe who are born in lawful wedlock, or within a competent time after. 2. *Baſtards*, being thoſe who are not ſo.

(3.) The duties of parents to *legitimate* children are, 1. Maintenance. 2. Protection. 3. Education.

(4.) The power of parents conſiſts principally in correction, and conſent to marriage. Both may after death be delegated by will to a guardian; and the former alſo, living the parent, to a tutor or maſter.

(5.) The duties of *legitimate* children to parents are, obedience, protection, and maintenance.

(6.) The duty of parents to *baſtards* is only that of maintenance.

(7.) The rights of a *baſtard* are ſuch only as he can acquire; for he is incapable of inheriting any thing.

Sect. XVII. *Of guardian and ward.*

(1.) The fourth private relation is that of *guardian* and *ward*, which is plainly derived from the laſt; theſe being, during the continuance of their relation, reciprocally ſubject to the ſame rights and duties.

(2.) *Guardians* are of divers ſorts: 1. Guardians by nature, or the parents. 2. Guardians for nurture, aſſigned by the eccleſiaſtical courts. 3. Guardians in ſocage, aſſigned by the common law. 4. Guardians by ſtatute, aſſigned by the father's will. All ſubject to the ſuperintendance of the court of chancery.

(3.) *Full age* in male or female for all purpoſes is the age of 21 years (different ages being allowed for different purpoſes); till which age the perſon is an *infant*.

(4.) An *infant*, in reſpect of his tender years, hath various privileges, and various diſabilities, in law; chiefly with regard to ſuits, crimes, eſtates, and contracts.

Sect. XVIII. *Of corporations.*

(1.) Bodies politic, or *corporations*, which are *artificial* perſons, are eſtabliſhed for preſerving in perpetual ſucceſſion certain rights; which, being conferred on *natural* perſons only, would fail in proceſs of time.

(2.) Corporations are, 1. *Aggregate*, conſiſting of many members. 2. *Sole*, conſiſting of one perſon only.

(3.) Corporations are alſo either *ſpiritual*, erected to perpetuate the rights of the church; or *lay*. And the lay are, 1. *Civil*; erected for many temporal purpoſes. 2. *Eleemoſynary*; erected to perpetuate the charity of the founder.

(4.) Corporations are uſually erected and named, by virtue of the king's royal charter; but may be created by act of parliament.

(5.) The powers incident to all corporations are, 1. To maintain perpetual ſucceſſion. 2. To act in their corporate capacity like an individual. 3. To hold lands ſubject to the ſtatutes of mortmain. 4. To have a common ſeal. 5. To make by-laws. Which laſt power, in ſpiritual or eleemoſynary corporations, may be executed by the king or the founder.

(6.) The duty of corporations is to anſwer the ends of their inſtitution.

(7.) To enforce this duty, all corporations may be *viſited*: ſpiritual corporations by the ordinary; lay corporations by the founder, or his repreſentatives; *viz.* the civil by the king (who is the *fundator incipiens* of all) repreſented in his court of king's bench; the eleemoſynary by the endower (who is the *fundator perficiens* of ſuch), or by his heirs or aſſigns.

(8.) Corporations may be diſſolved, 1. By act of parliament. 2. By the natural death of all their members. 3. By ſurrender of their franchiſes. 4. By forfeiture of their charter.

CHAP. II.

Of the Rights *of* Things.

Sect. I. *Of property in general.*

(1.) ALL *dominion* over external objects has its original from the gift of the Creator to man in general.

(2.) The *ſubſtance* of things was, at firſt, common to all mankind; yet a temporary property, in the *uſe* of them, might even then be acquired, and continued, by *occupancy*.

(3.) In proceſs of time a permanent property was eſtabliſhed in the *ſubſtance*, as well as the *uſe*, of things; which was alſo originally acquired by *occupancy* only.

(4.) Leſt this property ſhould determine by the owner's dereliction or death, whereby the thing would again become common, ſocieties have eſtabliſhed *conveyances*, *wills*, and *heirſhips*, in order to continue the property of the firſt occupant: and where by accident ſuch property becomes diſcontinued or unknown, the thing uſually reſults to the *ſovereign* of the ſtate, by virtue of the municipal law.

(5.) But of ſome things, which are incapable of permanent ſubſtantial dominion, there ſtill ſubſiſts only the ſame tranſient uſufructuary property, which originally ſubſiſted in all things.

Sect. II. *Of real property; and, firſt, of corporeal hereditaments.*

(1.) In this *property*, or excluſive dominion, conſiſt the *rights* of *things*; which are, 1. Things *real*. 2. Things *perſonal*.

(2.) In things *real* may be conſidered, 1. Their ſeveral *kinds*. 2. The *tenures* by which they may be holden. 3. The *eſtates* which may be acquired therein. 4. Their *title*, or the means of acquiring and loſing them.

(3.) All the ſeveral *kinds* of things real are reducible to one of theſe three, viz. *lands*, *tenements*, or *hereditaments*; whereof the ſecond includes the firſt, and the third includes the firſt and ſecond.

(4.) *Hereditaments*, therefore, or whatever may come to be inherited (being the moſt comprehenſive denomination of things real), are either *corporeal* or *incorporeal*.

(5.) *Corporeal* hereditaments conſiſt wholly of *lands*, in their largeſt legal ſenſe; wherein they include not only the face of the earth, but every other object of ſenſe adjoining thereto, and ſubſiſting either above or beneath it.

Sect. III. *Of incorporeal hereditaments.*

(1.) Incorporeal hereditaments are rights iſſuing out of things corporeal, or concerning, or annexed to, or exerciſable within the ſame.

(2.) Incorporeal hereditaments are, 1. *Advowſons*. 2. *Tithes*. 3. *Commons*. 4. *Ways*. 5. *Offices*. 6. *Dignities*. 7. *Franchiſes*. 8. *Corodies* or *penſions*. 9. *Annuities*. 10. *Rents*.

(3.) An *advowſon* is a right of preſentation to an eccleſiaſtical benefice; either appendant, or in groſs. This may be, 1. Preſentative. 2. Collative. 3. Donative.

(4.) *Tithes* are the tenth part of the increaſe yearly ariſing from the profits and ſtock of lands, and the perſonal induſtry of mankind. Theſe, by the ancient and poſitive law of the land, are due of common right to the parſon, or (by endowment) to the vicar; unleſs eſpecially diſcharged, 1. By real compoſition. 2. By preſcription, either *de modo decimandi*, or *de non decimando*.

(5.) *Common* is a profit which a man hath in the lands of another; being, 1. Common of paſture; which is either appendant, appurtenant, becauſe of vicinage, or in groſs. 2. Common of piſcary 3. Common of turbary. 4. Common of eſtovers, or botes.

(6.) *Ways* are a right of paſſing over another man's ground.

(7.) *Offices* are the right to exerciſe a public or private employment.

(8.) For *dignities*, which are titles of honour, ſee Chap. I. Sect. 12.

(9.) *Franchiſes* are a royal privilege, or branch of the king's prerogative, ſubſiſting in the hands of a ſubject.

(10.) *Corodies* are allotments for one's ſuſtenance; which may be converted into *penſions*, ſee Chap. I. Sect. 8.

(11.) An *annuity* is a yearly ſum of money, charged upon the perſon, and not upon the lands of the granter.

(12.) *Rents* are a certain profit iſſuing yearly out of lands and tenements; and are reducible to, 1. Rent-ſervice. 2. Rent-charge. 3. Rent-ſeck.

Sect. IV. *Of the feodal ſyſtem.*

(1.) The doctrine of *tenures* is derived from the *feodal* law; which was planted in Europe by its northern conquerors at the diſſolution of the Roman empire.

(2.) Pure and *proper feuds* were parcels of land allotted by a chief to his followers, to be held on the condition of perſonally rendering due military ſervice to their lord.

(3.) Theſe were granted by inveſtiture; were held under the bond of fealty; were inheritable only by deſcendants; and could not be transferred without the mutual conſent of the lord and vaſſal.

(4.) *Improper feuds* were derived from the other; but differed from them in their original, their ſervices and renders, their deſcent, and other circumſtances.

(5.) The lands of England were converted into *feuds*, of the improper kind, ſoon after the Norman conqueſt; which gave riſe to the grand maxim of tenure, viz. That all lands in the kingdom are *holden*, mediately or immediately, of the king.

Sect. V. *Of the ancient Engliſh tenures.*

(1.) The diſtinction of tenures conſiſted in the nature of their ſervices: as, 1. *Chivalry*, or *knight-ſervice*; where the ſervice was free, but uncertain. 2. *Free ſocage*; where the ſervice was free, and certain. 3. Pure *villenage*; where the ſervice was baſe, and uncertain. 4. *Privileged villenage*, or *villein ſocage*; where the ſervice was baſe, but certain.

(2.) The moſt univerſal ancient tenure was that in *chivalry*, or by *knight ſervice*; in which the tenant of every knight's fee was bound, if called upon, to attend his lord to the wars. This was granted by livery, and perfected by homage and fealty; which uſually drew after them ſuit of court.

(3.) The other fruits and conſequences of the tenure by knight-ſervice were, 1. Aid. 2. Relief. 3. Primer ſeiſin. 4. Wardſhip. 5. Marriage. 6. Fines upon alienation. 7. Eſcheat.

(4.) *Grand ſerjeanty* differed from chivalry principally in its render, or ſervice; and not in its fruits and conſequences.

(5.) The perſonal ſervice in chivalry was at length gradually changed into pecuniary aſſeſſments, which were called *ſcutage* or *eſcuage*.

(6.) Theſe military tenures (except the ſervices of grand ſerjeanty) were, at the reſtoration of king Charles, totally aboliſhed, and reduced to free ſocage by act of parliament.

Sect. VI. *Of the modern Engliſh tenures.*

(1.) Free *ſocage* is a tenure by any free, certain and determinate ſervice.

(2.) This tenure, the relic of Saxon liberty, includes *petit ſerjeanty*, tenure in *burgage*, and *gavelkind*.

(3.) Free ſocage lands partake ſtrongly of the feodal nature, as well as thoſe in chivalry: being holden, ſubject to ſome ſervice, at the leaſt to fealty and ſuit of court; ſubject to relief, to wardſhip, and to eſcheat, but not to marriage; ſubject alſo formerly to aids, primer ſeiſin, and fines for alienation.

(4.) *Pure villenage* was a precarious and ſlaviſh tenure, at the abſolute will of the lord, upon uncertain ſervices of the baſeſt nature.

(5.) From hence, by tacit conſent or encroachment, have ariſen the modern *copyholds*, or tenure by copy of court-roll; in which lands may be ſtill held at the (nominal) will of the lord, (but regulated) according to the cuſtom of the manor.

(6.) Theſe are ſubject, like ſocage lands, to ſervices, relief, and eſcheat; and alſo to heriots, wardſhip, and fines upon deſcent and alienation.

(7.) *Privileged villenage*, or *villein ſocage*, is an exalted ſpecies of copyhold tenure, upon baſe, but certain, ſervices, ſubſiſting only in the ancient demeſnes of the crown; whence the tenure is denominated the tenure in *ancient demeſne*.

(8.) Theſe copyholds of ancient demeſne have divers immunities annexed to their tenure; but are ſtill held by copy of court-roll, according to the cuſtom of the manor, though not at the will of the lord.

(9.) *Frankalmoign* is a tenure by ſpiritual ſervices at large, whereby many eccleſiaſtical and eleemoſynary corporations now hold their lands and tenements; being of a nature diſtinct from tenure by divine ſervice in certain.

Sect. VII. *Of freehold eſtates of inheritance.*

(1.) Eſtates in lands, tenements, and hereditaments, are ſuch intereſt as the tenant hath therein; to aſcertain which, may be conſidered, 1. The *quantity* of *intereſt*. 2. The *time* of *enjoyment*. 3. The *number* and *connections* of the *tenants*.

(2.) Eſtates, with reſpect to their *quantity* of *intereſt*, or duration, are either *freehold*, or *leſs* than *freehold*.

(3.) A *freehold* eſtate, in lands, is ſuch as is created by livery of ſeiſin at common law; or, in tenements of an incorporeal nature, by what is equivalent thereto.

(4.) Freehold eſtates are either eſtates of *inheritance*, or *not*

of *inheritance*, viz. for *life* only: and *inheritances* are, 1. *Abſolute*, or *fee ſimple*. 2. *Limited fees*.

(5.) Tenant in *fee ſimple* is he that hath lands, tenements, or hereditaments, to hold to him and his heirs for ever.

(6.) *Limited fees* are, 1. *Qualified*, or *baſe*, fees. 2. Fees *conditional* at the common law.

(7.) *Qualified* or *baſe* fees are thoſe which, having a qualification ſubjoined thereto, are liable to be defeated when that qualification is at an end.

(8.) *Conditional* fees, at the common law, were ſuch as were granted to the donee, and the heirs of his body, in excluſion of collateral heirs.

(9.) Theſe were held to be fees, granted on condition that the donee had iſſue of his body; which condition being once performed by the birth of iſſue, the donee might immediately aliene the land: but the ſtatute *de donis* being made to prevent ſuch alteration, thereupon from the diviſion of the fee (by conſtruction of this ſtatute) into a particular eſtate and a reverſion, the conditional fees began to be called *fees-tail*.

(10.) All tenements real, or ſavouring of the realty, are ſubject to entails.

(11.) Eſtates tail may be, 1. general, or ſpecial; 2. male, or female; 3. given in frank marriage.

(12.) Incident to eſtates tail are, 1. Waſte. 2. Dower. 3. Courteſy. 4. Bar;—by fine, recovery, or lineal warranty with aſſets.

(13.) Eſtates tail are now, by many ſtatutes and reſolutions of the courts, almoſt brought back to the ſtate of conditional fees at the common law.

Sect. VIII. *Of freeholds not of inheritance.*

(1.) Freeholds *not* of *inheritance*, or for *life* only, are, 1. *Conventional*, or created by the act of the parties. 2. *Legal*, or created by operation of law.

(2.) *Conventional* eſtates for *life* are created by an expreſs grant for term of one's own life, or *per auter vie*; or by a general grant, without expreſſing any term at all.

(3.) Incident to this, and all other eſtates for life, are eſtovers, and emblements: and to eſtates *per auter vie* general occupancy was alſo incident; as ſpecial occupancy ſtill is, if *ceſtuy que vie* ſurvives the tenant.

(4.) *Legal* eſtates for *life* are, 1. Tenancy in *tail*, after *poſſibility* of iſſue *extinct*. 2. Tenancy by the *courteſy* of England. 3. Tenancy in *dower*.

(5.) Tenancy in *tail*, after *poſſibility* of iſſue *extinct*, is where an eſtate is given in ſpecial tail; and, before iſſue had, a perſon dies from whoſe body the iſſue was to ſpring; whereupon the tenant (if ſurviving) becomes tenant in *tail*, after *poſſibility* of iſſue *extinct*.

(6.) This eſtate partakes both of the incidents to an eſtate tail, and thoſe of an eſtate for life.

(7.) Tenancy by the *courteſy* of England is where a man's wife is ſeiſed of an eſtate of inheritance; and he by her has iſſue, born alive, which was capable of inheriting her eſtate; in which caſe he ſhall, upon her death, hold the tenements for his own life, as tenant by the *courteſy*.

(8.) Tenancy in *dower* is where a woman's huſband is ſeiſed of an eſtate of inheritance, of which her iſſue might by any poſſibility have been heir; and the huſband dies: the woman is thereupon entitled to *dower*, or one third part of the lands and tenements, to hold for her natural life.

(9.) Dower is either by the common law; by ſpecial cuſtom *ad oſtium eccleſiæ*; or, *ex aſſenſu patris*.

(10.) Dower may be forfeited or barred, particularly by an eſtate in *jointure*.

Sect. IX. *Of eſtates leſs than freehold.*

(1.) Estates *leſs* than *freehold* are, 1. Eſtates for *years*. 2. Eſtates at *will*. 3. Eſtates at *ſufferance*.

(2.) An eſtate for *years* is where a man, ſeiſed of lands and tenements, letteth them to another for a certain period of time, which transfers the intereſt of the term; and the leſſee enters thereon, which gives him poſſeſſion of the term, but not legal ſeiſin of the land.

(3.) Incident to this eſtate are eſtovers; and alſo emblements, if it determines before the full end of the term.

(4.) An eſtate at *will* is where lands are let by one man to another, to hold at the will of both parties; and the leſſee enters thereon.

(5.) *Copyholds* are eſtates held at the will of the lord, (regulated) according to the cuſtom of the manor.

(6.) An eſtate at *ſufferance* is where one comes into poſſeſſion of land by lawful title, but keeps it afterwards without any title at all.

Sect. X. *Of eſtates upon condition.*

(1.) Estates (whether freehold or otherwiſe) may alſo be held upon *condition*; in which caſe their exiſtence depends on the happening, or not happening, of ſome uncertain event.

(2.) Theſe eſtates are, 1. On condition *implied*. 2. On condition *expreſſed*. 3. Eſtates in *gage*. 4. Eſtates by *ſtatute*, merchant or ſtaple. 5. Eſtates by *elegit*.

(3.) Eſtates on condition *implied* are where a grant of an eſtate has, from its eſſence and conſtitution, a condition inſeparably annexed to it; though none be expreſſed in words.

(4.) Eſtates on condition *expreſſed* are where an expreſs qualification or proviſion is annexed to the grant of an eſtate.

(5.) On the performance of theſe conditions either expreſſed or implied (if *precedent*) the eſtate may be veſted or enlarged; or, on the breach of them (if *ſubſequent*) an eſtate already veſted may be defeated.

(6.) Eſtates in *gage*, *in vadio*, or in pledge, are eſtates granted as a ſecurity for money lent; being, 1. *In vivo vadio*, or *living gage*; where the profits of land are granted till a debt be paid, upon which payment the granter's eſtate will revive. 2. *In mortuo vadio*, in *dead*, or *mort gage*; where an eſtate is granted, on condition to be void at a day certain, if the granter then repays the money borrowed; on failure of which, the eſtate becomes abſolutely dead to the granter.

(7.) Eſtates by *ſtatute*-merchant, or *ſtatute*-ſtaple, are alſo eſtates conveyed to creditors, in purſuance of certain ſtatutes, till their profits ſhall diſcharge the debt.

(8.) Eſtates by *elegit* are where, in conſequence of a judicial writ ſo called, lands are delivered by the ſheriff to a plaintiff, till their profits ſhall ſatisfy a debt adjudged to be due by law.

Sect. XI. *Of eſtates in poſſeſſion, remainder, and reverſion.*

(1.) Estates, with reſpect to their *time* of *enjoyment*, are either in immediate *poſſeſſion*, or in *expectancy*; which eſtates in *expectancy* are created at the ſame time, and are parcel of the ſame eſtates, as thoſe upon which they are expectant. Theſe are, 1. *Remainders*. 2. *Reverſions*.

(2.) A *remainder* is an eſtate limited to take effect, and be enjoyed, after another *particular* eſtate is determined.

(3.) Therefore, 1. There muſt be a precedent particular eſtate, in order to ſupport a remainder. 2. The remainder muſt paſs out of the granter, at the creation of the particular eſtate. 3. The remainder muſt veſt in the grantee, during the continuance, or at the determination, of the particular eſtate.

(4.) Remainders are, 1. Veſted; where the eſtate is fixed to remain to a *certain* perſon, after the particular eſtate is ſpent. 2. Contingent; where the eſtate is limited to take effect, either to an *uncertain* perſon, or upon an *uncertain* event.

(5.) An *executory deviſe* is ſuch a diſpoſition of lands, by will, that an eſtate ſhall not veſt thereby at the death of the deviſor, but only upon ſome future contingency, and without any precedent particular eſtate to ſupport it.

(6.) A *reverſion* is the reſidue of an eſtate left in the granter, to commence in poſſeſſion after the determination of ſome *particular* eſtate granted: to which are incident fealty, and rent.

(7.) Where two eſtates, the one leſs, the other greater, the one in poſſeſſion, the other in expectancy, meet together in one and the ſame perſon, and in one and the ſame right, the leſs is *merged* in the greater.

Sect. XII. *Of eſtates, in ſeveralty, joint-tenancy, coparcenary, and common.*

(1.) Estates, with reſpect to the *number* and *connections* of their *tenants*, may be held, 1. *In ſeveralty*. 2. In *joint-tenancy*. 3. In *coparcenary*. 4. In *common*.

(2.) An eſtate in *ſeveralty* is where one tenant holds it in his own ſole right, without any other perſon being joined with him.

(3.) An eſtate in *joint-tenancy* is where an eſtate is granted to two or more perſons; in which caſe the law conſtrues them to be *joint-tenants*, unleſs the words of the grant expreſsly exclude ſuch conſtruction.

(4.) Joint-tenants have an unity of intereſt, of title, of time, and of poſſeſſion: they are ſeiſed *per my & per tout*: and therefore upon the deceaſe of one joint-tenant, the whole intereſt remains to the ſurvivor.

(5.) Joint-tenancy may be diſſolved by deſtroying one of its four conſtituent unities.

(6.) An eſtate in *coparcenary* is where an eſtate of inheritance deſcends from the anceſtor to two or more perſons; who are called *parceners*, and altogether make but one heir.

(7.) Parceners have an unity of intereſt, title, and poſſeſſion; but are only ſeiſed *per my*, and not *per tout*: wherefore there is no ſurvivorſhip among parceners.

(8.) Incident to this eſtate is the law of *hotchpot*.

(9.) Coparcenary may alſo be diſſolved, by deſtroying any of its three conſtituent unities.

(10.) An eſtate in *common* is where two or more perſons hold lands, poſſibly by diſtinct titles, and for diſtinct intereſts; but by unity of poſſeſſion, becauſe none knoweth his own ſeveralty.

(11.) Tenants in common have therefore an unity of poſſeſſion (without ſurvivorſhip; being ſeiſed *per my*, and not *per tout*); but no neceſſary unity of title, time, or intereſt.

(12.) This eſtate may be created, 1. By diſſolving the conſtituent unities of the two former; 2. By expreſs limitation in a grant: and may be deſtroyed, 1. By uniting the ſeveral titles in one tenant; 2. By partition of the land.

Sect. XIII. *Of the title to things real, in general.*

(1.) A *title* to things real is the means whereby a man cometh to the juſt poſſeſſion of his property.

(2.) Herein may be conſidered, 1. A mere or naked poſſeſſion. 2. The right of poſſeſſion; which is, 1*ſt*, an apparent, 2*dly*, an actual right. 3. The mere right of property. 4. The conjunction of actual poſſeſſion with both theſe rights; which conſtitutes a perfect *title*.

Sect. XIV. *Of title by deſcent.*

(1.) The *title* to things real may be reciprocally acquired or loſt, 1. By *deſcent*. 2. By *purchaſe*.

(2.) *Deſcent* is the means whereby a man, on the death of his anceſtor, acquires a title to his eſtate, in right of repreſentation, as his *heir* at law.

(3.) To underſtand the doctrine of deſcents, we muſt form a clear notion of *conſanguinity*; which is the connection, or relation, of perſons deſcended from the ſame ſtock or common anceſtor; and it is, 1. *Lineal*, where one of the kinſmen is lineally deſcended from the other. 2. *Collateral*, where they are lineally deſcended, not one from the other, but both from the ſame common anceſtor.

(4.) The rules of deſcent, or *canons*, of *inheritance*, obſerved by the laws of England, are theſe:

1*ſt*, Inheritances ſhall lineally *deſcend* to the *iſſue* of the perſon laſt actually ſeiſed, *in infinitum*; but ſhall never lineally *aſcend*.

2*d*, The *male* iſſue ſhall be admitted before the *female*.

3*d*, Where there are two or more males in equal degree, the *eldeſt* only ſhall inherit; but the females *all* together.

4*th*, The lineal deſcendants, *in infinitum*, of any perſon deceaſed ſhall *repreſent* their anceſtor; that is, ſhall ſtand in the ſame place as the perſon himſelf would have done, had he been living.

5*th*, On failure of *lineal* deſcendants, or iſſue, of the perſon laſt ſeiſed, the inheritance ſhall deſcend to the blood of the *firſt purchaſer*; ſubject to the three preceding rules. To evidence which blood, the two following rules are eſtabliſhed:

6*th*, The collateral heir of the perſon laſt ſeiſed muſt be his next collateral kinſman of the *whole* blood.

7*th*, In collateral inheritances, the *male ſtocks* ſhall be preferred to the *female*; that is, kindred derived from the blood of the male anceſtors ſhall be admitted before thoſe from the blood of the female; unleſs where the lands have, in fact, deſcended from a female.

Sect. XV. *Of title by purchaſe, and firſt by eſcheat.*

(1.) Purchase, or perquiſition, is the poſſeſſion of an eſtate which a man hath by his own act or agreement; and not by the mere act of law, or deſcent from any of his anceſtors. This includes, 1. *Eſcheat*. 2. *Occupancy*. 3. *Preſcription*. 4. *Forfeiture*. 5. *Alienation*.

(2.) *Eſcheat* is where, upon deficiency of the tenant's *inheritable blood*, the eſtate falls to the lord of the fee.

(3.) *Inheritable blood* is wanting to, 1. Such as are not related to the perſon laſt ſeiſed. 2. His maternal relations in paternal inheritances, and *vice verſa*. 3. His kindred of the half blood. 4. Monſters. 5. Baſtards. 6. Aliens, and their iſſue. 7. Perſons attainted of treaſon or felony. 8. Papiſts, in reſpect of themſelves only, by the ſtatute law.

Sect. XVI. *Of title by occupancy.*

(1.) Occupancy is the taking poſſeſſion of thoſe things which before had no owner.

(2.) Thus, at the common law, where tenant *per autre vie* died during the life of *ceſtuy que vie*, he, who could firſt enter, might lawfully retain the poſſeſſion; unleſs by the original grant the heir was made a *ſpecial* occupant.

(3.) The law of *derelictions* and *alluvions* has narrowed the title by occupancy.

Sect. XVII. *Of title by preſcription.*

(1.) Prescription (as diſtinguiſhed from *cuſtom*) is a *perſonal* immemorial uſage of enjoying a right in ſome incorporeal hereditament, by a man, and either his anceſtors or thoſe whoſe eſtate of inheritance he hath: of which the firſt is called *preſcribing in his anceſtors*, the latter in a *que eſtate*.

Sect. XVIII. *Of title by forfeiture.*

(1.) Forfeiture is a puniſhment annexed by law to ſome illegal act, or negligence, in the owner of things real; whereby the eſtate is transferred to another, who is uſually the party injured.

(2.) Forfeitures are occaſioned, 1. By *crimes*. 2. By *alienation*, contrary to law. 3. By *life*. 4. By *ſimony*. 5. By *non-performance* of *conditions*. 6. By *waſte*. 7. By *breach* of *copyhold cuſtoms*. 8. By *bankruptcy*.

3. Forfeitures for *crimes*, or misdemeanors, are for, 1. Treason. 2. Felony. 3. Misprision of treason. 4. *Præmunire*. 5. Assaults on a judge, and batteries, sitting the courts. 6. Popish recusancy, &c.

(4.) *Alienations*, or conveyances, which induce a forfeiture, are, 1. Those in mortmain, made to corporations contrary to the statute law. 2. Those made to aliens. 3. Those made by particular tenants, when larger than their estates will warrant.

(5.) *Lapse* is a forfeiture of the right of presentation to a vacant church, by neglect of the patron to present within six kalendar months.

(6.) *Simony* is the corrupt presentation of any one to an ecclesiastical benefice, whereby that turn becomes forfeited to the crown.

(7.) For forfeiture by *nonperformance* of *conditions*, see Sect. 10.

(8.) *Waste* is a spoil, or destruction, in any corporeal hereditaments, to the prejudice of him that hath the inheritance.

(9.) *Copyhold* estates may have also other peculiar causes of forfeiture, according to the custom of the manor.

(10.) *Bankruptcy* is the act of becoming a *bankrupt*; that is, a trader who secretes himself, or does certain other acts tending to defraud his creditors. (See Sect. 22.)

(11.) By bankruptcy all the estates of the bankrupt are transferred to the assignees of his commissioners, to be sold for the benefit of his creditors.

Sect. XIX. *Of title by alienation.*

(1.) Alienation, conveyance, or purchase in its more limited sense, is a means of transferring real estates, wherein they are voluntarily resigned by one man, and accepted by another.

(2.) This formerly could not be done by a tenant, without *licence* from his lord; nor by a lord without *attornment* of his tenant.

(3.) All persons are *capable* of purchasing; and all that are in possession of any estates are *capable* of conveying them: unless under peculiar disabilities by law; as being attainted, *non compotes*, infants, under duress, feme-coverts, aliens, or papists.

(4.) Alienations are made by *common assurances*; which are, 1. By *deed*, or matter in *pais*. 2. By matter of *record*. 3. By special *custom*. 4. By *devise*.

Sect. XX. *Of alienation by deed.*

(1.) In assurances by *deed* may be considered, 1. Its *general nature*. 2. Its *several species*.

(2.) A deed, *in general*, is the solemn act of the parties; being usually a writing sealed and delivered; and it may be, 1. A deed indented, or indenture. 2. A deed-poll.

(3.) The *requisites* of a deed are, 1. Sufficient *parties*, and proper *subject-matter*. 2. A good and sufficient *consideration*. 3. *Writing* on paper, or parchment, duly stamped. 4. Legal and orderly *parts* (which are usually, 1st, the premises; 2dly, the *habendum*; 3dly, the *tenendum*; 4thly, the *reddendum*; 5thly, the conditions; 6thly, the warranty, which is either lineal or collateral; 7thly, the covenants; 8thly, the conclusion, which includes the date). 5. *Reading* it, if desired. 6. *Sealing*, and, in many cases, *signing* it also. 7. *Delivery*. 8. *Attestation*.

(4.) A deed may be *avoided*, 1. By the want of any of the requisites before-mentioned. 2. By subsequent matter; as 1st, Rasure, or alteration. 2dly, Defacing its seal. 3dly, Cancelling it. 4thly, Disagreement of those whose consent is necessary. 5thly, Judgment of a court of justice.

(5.) Of the several *species* of deeds, some serve to *convey* real property, some only to *charge* and *discharge* it.

(6.) Deeds which serve to *convey* real property, or *conveyances*, are either by *common law*, or by *statute*. And, of conveyances by *common law*, some are *original* or primary, others *derivative* or secondary.

(7.) *Original* conveyances are, 1. *Feoffments*. 2. *Gifts*. 3. *Grants*. 4. *Leases*. 5. *Exchanges*. 6. *Partitions*.—*Derivative* are, 7. *Releases*. 8. *Confirmations*. 9. *Surrenders*. 10. *Assignments*. 11. *Defeazances*.

(8.) A *feoffment* is the transfer of any *corporeal* hereditament to another, perfected by *livery* of *seisin*, or delivery of bodily possession from the feoffer to the feoffee: without which no freehold estate therein can be created at common law.

(9.) A *gift* is properly the conveyance of lands in tail.

(10.) A *grant* is the regular method, by common law, of conveying *incorporeal* hereditaments.

(11.) A *lease* is the demise, granting, or letting to farm of any tenement, usually for a less term than the lessor hath therein; yet sometimes possibly for a greater; according to the regulations of the restraining and enabling statutes.

(12.) An *exchange* is the mutual conveyance of equal interests, the one in consideration of the other.

(13.) A *partition* is the division of an estate held in joint-tenancy, in coparcenary, or in common, between the respective tenants; so that each may hold his distinct part in severalty.

(14.) A *release* is the discharge or conveyance of a man's right, in lands and tenements, to another that hath some former estate in possession therein.

(15.) A *confirmation* is the conveyance of an estate or right *in esse*, whereby a voidable estate is made sure, or a particular estate is increased.

(16.) A *surrender* is the yielding up of an estate for life, or years, to him that hath the immediate remainder or reversion; wherein the particular estate may merge.

(17.) An *assignment* is the transfer, or making over to another, of the whole right one has in any estate; but usually in a lease, for life or years.

(18.) A *defeazance* is a collateral deed, made at the same time with the original conveyance; containing some condition, upon which the estate may be defeated.

(19.) Conveyances by *statute* depend much on the doctrine of *uses* and *trusts*: which are a confidence reposed in the *terre tenant*, or tenant of the land, that he shall permit the profits to be enjoyed, according to the directions of *cestuy que use*, or *cestuy que trust*.

(20.) The statute of uses, having transferred all uses into actual possession (or, rather, having drawn the possession to the use), has given birth to divers other species of conveyance: 1. A *covenant* to stand seised to *use*. 2. A *bargain* and *sale*, enrolled. 3. A *lease* and *release*. 4. A deed to *lead* or *declare* the use of other more direct conveyances. 5. A *revocation* of *uses*; being the execution of a power, reserved at the creation of the use, of recalling at a future time the use or estate so creating. All which owe their present operation principally to the statute of uses.

(21.) Deeds which do not *convey*, but only *charge* real property, and *discharge* it, are, 1. *Obligations*. 2. *Recognizances*. 3. *Defeazances* upon both.

Sect. XXI. *Of alienation by matter of record.*

(1.) Assurances by matter of *record* are where the sanction of some court of record is called in, to substantiate and witness the transfer of real property. These are, 1. *Private acts of parliament*. 2. The *king's grants*. 3. *Fines*. 4. Common *recoveries*.

(2.) *Private acts* of *parliament* are a species of assurances, calculated to give (by the transcendent authority of parliament) such reasonable powers or relief as are beyond the reach of the ordinary course of law.

(3.) The *king's grants*, contained in charters or letters patent, are all entered on record, for the dignity of the royal perſon, and ſecurity of the royal revenue.

(4.) A *fine* (ſometimes ſaid to be a feoffment of record) is an amicable compoſition and agreement of an actual, or fictitious, ſuit; whereby the eſtate in queſtion is acknowledged to be the right of one of the parties.

(5.) The *parts* of a fine are, 1. The writ of covenant. 2. The licence to agree. 3. The concord. 4. The note. 5. The foot. To which the ſtatute hath added, 6. Proclamations.

(6.) Fines are of four *kinds*: 1. *Sur cognizance de droit, come ceo que il ad de ſon done.* 2. *Sur cognizance de droit tantum.* 3. *Sur conceſſit.* 4. *Sur done, grant, et render*; which is a double fine.

(7.) The *force* and *effect* of fines (when levied by ſuch as have themſelves any intereſt in the eſtate) are to aſſure the lands in queſtion to the cognizee, by barring the reſpective rights of parties, privies, and ſtrangers.

(8.) A common *recovery* is by an actual, or fictitious, ſuit or action for land, brought againſt the tenant of the freehold; who thereupon vouches another, who undertakes to warrant the tenant's title: but, upon ſuch vouchee's making default, the land is *recovered* by judgment at law againſt the tenant; who, in return, obtains judgment againſt the vouchee to recover lands of equal value in recompenſe.

(9.) The *force* and *effect* of a recovery are to aſſure lands to the recoverer, by barring eſtates tail, and all remainders and reverſions expectant thereon; provided the tenant in tail either ſuffers, or is vouched in, ſuch recovery.

(10.) The *uſes* of a fine or recovery may be directed by, 1. Deeds to *lead* ſuch uſes; which are made previous to the levying or ſuffering them. 2. Deeds to *declare* the uſes; which are made ſubſequent.

Sect. XXII. *Of alienation by ſpecial cuſtom.*

(1.) Assurances by ſpecial *cuſtom* are confined to the transfer of *copyhold* eſtates.

(2.) This is effected by, 1. *Surrender* by the tenant into the hands of the lord to the uſe of another, according to the cuſtom of the manor. 2. *Preſentment*, by the tenants or homage, of ſuch ſurrender. 3. *Admittance* of the ſurrenderee by the lord, according to the uſes expreſſed in ſuch ſurrender.

(3.) *Admittance* may alſo be had upon original *grants* to the tenant from the lord, and upon *deſcents* to the heir from the anceſtor.

Sect. XXIII. *Of alienation by deviſe.*

(1.) Devise is a diſpoſition of lands and tenements, contained in the laſt will and teſtament of the owner.

(2.) This was not permitted by the common law, as it ſtood ſince the conqueſt; but was introduced by the ſtatute law, under Henry VIII. ſince made more univerſal by the ſtatute of tenures under Charles II. with the introduction of additional ſolemnities by the ſtatute of frauds and perjuries in the ſame reign.

(3.) The *conſtruction* of all *common aſſurances* ſhould be, 1. Agreeable to the intention. 2. To the words of the parties. 3. Made upon the entire deed. 4. Bearing ſtrongeſt againſt the contractor. 5. Conformable to law. 6. Rejecting the latter of two totally repugnant clauſes in a deed, and the former in a will. 7. Moſt favourable in caſe of a deviſe.

Sect. XXIV. *Of things perſonal.*

(1.) Things *perſonal* are comprehended under the general name of *chattels*; which includes whatever wants either the duration, or the immobility, attending things real.

(2.) In theſe are to be conſidered, 1. Their *diſtribution*. 2. The *property* of them. 3. The *title* to that property.

(3.) As to the *diſtribution* of chattels, they are, 1. Chattels *real*. 2. Chattels *perſonal*.

(4.) Chattels *real* are ſuch quantities of intereſt, in things *immoveable*, as are ſhort of the duration of freeholds; being limited to a time certain, beyond which they cannot ſubſiſt. (See Sect. 7.)

(5.) Chattels *perſonal* are things *moveable*; which may be transferred from place to place, together with the perſon of the owner.

Sect. XXV. *Of property in things perſonal.*

(1.) Property, in chattels perſonal, is either in *poſſeſſion* or in *action*.

(2.) Property in *poſſeſſion*, where a man has the actual enjoyment of the thing, is, 1. *Abſolute*. 2. *Qualified*.

(3.) *Abſolute* property is where a man has ſuch an excluſive right in the thing, that it cannot ceaſe to be his, without his own act or default.

(4.) *Qualified* property is ſuch as is not, in its nature, permanent; but may ſometimes ſubſiſt, and at other times not ſubſiſt.

(5.) This may ariſe, 1. Where the ſubject is incapable of abſolute ownerſhip. 2. From the peculiar circumſtances of the owners.

(6.) Property in *action*, is where a man hath not the actual *occupation* of the thing; but only a *right* to it, ariſing upon ſome contract, and recoverable by an action at law.

(7.) The property of chattels perſonal is liable to remainders, expectant on eſtates for life; to joint-tenancy; and to tenancy in common.

Sect. XXVI. *Of title to things perſonal by occupancy.*

(1.) The *title* to things perſonal may be acquired or loſt by, 1. *Occupancy*. 2. *Prerogative*. 3. *Forfeiture*. 4. *Cuſtom*. 5. *Succeſſion*. 6. *Marriage*. 7. *Judgement*. 8. *Gift*, or *Grant*. 9. *Contract*. 10. *Bankruptcy*. 11. *Teſtament*. 12. *Adminiſtration*.

(2.) Occupancy ſtill gives the firſt occupant a right to thoſe few things which have no legal owner, or which are incapable of permanent ownerſhip. Such as, 1. Goods of alien enemies. 2. Things found. 3. The benefit of the elements. 4. Animals *feræ naturæ*. 5. Emblements. 6. Things gained by acceſſion; or, 7. By confuſion. 8. Literary property.

Sect. XXVII. *Of title by prerogative, and forfeiture.*

(1.) By *prerogative* is veſted in the crown; or its grantees, the property of the royal revenue (ſee Chap. I. Sect. 8.); and alſo the property of all game in the kingdom, with the right of purſuing and taking it.

(2.) By *forfeiture*, for crimes and miſdemeanors, the right of goods and chattels may be transferred from one man to another; either in part or totally.

(3.) Total forfeitures of goods ariſe from conviction of, 1. Treaſon, and miſpriſion thereof. 2. Felony. 3. Excuſable homicide. 4. Outlawry for treaſon or felony. 5. Flight. 6. Standing mute. 7. Aſſaults on a judge; and batteries, ſitting the courts. 8. *Præmunire*. 9. Pretended prophecies. 10. Owling. 11. Reſiding abroad of artificers. 12. Challenges to fight, for debts at play.

Sect. XXVIII. *Of title by cuſtom.*

(1.) By *cuſtom*, obtaining in particular places, a right may be acquired in chattels: the moſt uſual of which cuſtoms are thoſe relating to, 1. *Heriots*. 2. *Mortuaries*. 3. *Heir-looms*.

(2.) *Heriots* are either heriot-*service*, which differs little from a rent; or heriot-cuſtom, which is a cuſtomary tribute, of goods and chattels, payable to the lord of the fee on the deceaſe of the owner of lands.

(3.) *Mortuaries* are a cuſtomary gift, due to the miniſter in many pariſhes, on the death of his pariſhioners.

(4.) *Heir-looms* are ſuch perſonal chattels, as deſcend by ſpecial cuſtom to the heir, along with the inheritance of his anceſtor.

SECT. XXIX. *Of title by ſucceſſion, marriage, and judgement.*

(1.) By *ſucceſſion* the right of chattels is veſted in corporations *aggregate*; and likewiſe in ſuch corporations *ſole* as are the heads and repreſentatives of bodies aggregate.

(2.) By *marriage* the chattels real and perſonal of the wife are veſted in the huſband, in the ſame degree of property, and with the ſame powers, as the wife when ſole had over them; provided he reduces them to poſſeſſion.

(3.) The wife alſo acquires, by *marriage*, a property in her own *paraphernalia*.

(4.) By *judgment*, conſequent on a ſuit at law, a man may, in ſome caſes, not only *recover*, but originally *acquire*, a right to perſonal property. As, 1. To penalties recoverable by action popular. 2. To damages. 3. To coſts of ſuit.

SECT. XXX. *Of title by gift, grant, and contract.*

(1.) A *gift*, or *grant*, is a voluntary conveyance of a chattel perſonal in poſſeſſion, without any conſideration or equivalent.

(2.) A *contract* is an agreement, upon ſufficient conſideration, to do or not to do a particular thing: and, by ſuch contract, any perſonal property (either in poſſeſſion or in action) may be transferred.

(3.) Contracts may either be expreſs or implied; either executed or executory.

(4.) The *conſideration* of contracts is, 1. A good conſideration. 2. A valuable conſideration; which is, 1. *Do, ut des.* 2. *Facio, ut facias.* 3. *Facio, ut des.* 4. *Do, ut facias.*

(5.) The moſt uſual *ſpecies* of perſonal contracts are, 1. *Sale* or *exchange.* 2. *Bailment.* 3. *Hiring* or *borrowing.* 4. *Debt.*

(6.) *Sale* or *exchange* is a tranſmutation of property from one man to another, in conſideration of ſome recompenſe in value.

(7.) *Bailment* is the delivery of goods in truſt; upon a contract, expreſs or implied, that the truſt ſhall be faithfully performed by the bailee.

(8.) *Hiring* or *borrowing* is a contract, whereby the poſſeſſion of chattels is transferred for a particular time, on condition that the identical goods (or ſometimes their value) be reſtored at the time appointed: together with (in caſe of *hiring*) a ſtipend or price for the uſe.

(9.) This price, being calculated to anſwer the hazard as well as inconvenience of lending, gives birth to the doctrine of *intereſt*, or *uſury*, upon loans; and, conſequently, to the doctrine of *bottomry* or *reſpondentia*, and *inſurance*.

(10.) *Debt* is any contract, whereby a certain ſum of *money* becomes due to the creditor. This is, 1. A debt of *record.* 2. A debt upon *ſpecial* contract. 3. A debt upon *ſimple* contract; which laſt includes paper credit, or bills of exchange, and promiſſory notes.

SECT. XXXI. *Of title by bankruptcy.*

(1.) BANKRUPTCY (as defined in Sect. 18.) is the act of becoming a bankrupt.

(2.) Herein may be conſidered, 1. Who may become a bankrupt. 2. The *acts* whereby he may become a bankrupt. 3. The *proceedings* on a commiſſion of bankrupt. 4. How his *property* is transferred thereby.

(3.) Perſons of full age, *uſing* the *trade* of merchandize, by buying, and ſelling, and ſeeking their livelihood thereby, are liable to become bankrupts; for debts of a ſufficient amount.

(4.) A trader, who endeavours to avoid his creditors, or evade their juſt demands, by any of the ways ſpecified in the ſeveral ſtatutes of bankruptcy, doth thereby commit an *act* of bankruptcy.

(5.) The *proceedings* on a commiſſion of bankrupt, ſo far as they affect the bankrupt himſelf, are principally by, 1. Petition. 2. Commiſſion. 3. Declaration of bankruptcy. 4. Choice of aſſignees. 5. The bankrupt's ſurrender. 6. His examination. 7. His diſcovery. 8. His certificate. 9. His allowance. 10. His indemnity.

(6.) The *property* of a bankrupt's perſonal eſtate is, immediately upon the act of bankruptcy, veſted by conſtruction of law in the aſſignees: and they, when they have collected, diſtribute the whole by equal dividends among all the creditors.

SECT. XXXII. *Of title by teſtament, and adminiſtration.*

(1.) CONCERNING *teſtaments* and *adminiſtrations*, conſidered jointly, are to be obſerved, 1. Their *original* and *antiquity.* 2. *Who* may make a teſtament. 3. Its *nature* and *incidents.* 4. What are *executors* and *adminiſtrators.* 5. Their *office* and *duty.*

(2.) *Teſtaments* have ſubſiſted in England immemorially; whereby the deceaſed was at liberty to diſpoſe of his perſonal eſtate, reſerving anciently to his wife and children their *reaſonable part of his effects.*

(3.) The goods of *inteſtates* belonged anciently to the king; who granted them to the prelates to be diſpoſed in pious uſes: but, on their abuſe of this truſt in the times of popery, the legiſlature compelled them to delegate their power to *adminiſtrators* expreſsly provided by law.

(4.) *All* perſons may make a teſtament unleſs diſabled by, 1. Want of diſcretion. 2. Want of free-will. 3. Criminal conduct.

(5.) *Teſtaments* are the legal declaration of a man's intentions, which he wills to be performed after his death. Theſe are, 1. Written. 2. Nuncupative.

(6.) An *executor* is he, to whom a man by his will commits the execution thereof.

(7.) *Adminiſtrators* are, 1. *Durante minore ætate* of an infant executor or adminiſtrator: or *durante abſentia*; or *pendente lite.* 2. *Cum teſtamento annexo*; when no executor is named, or the executor refuſes to act. 3. General adminiſtrators; in purſuance of the ſtatutes of Edward III. and Henry VIII. 4. Adminiſtrators *de bonis non*; when a former executor or adminiſtrator dies without completing his truſt.

(8.) The *office* and *duty* of executors (and, in many points, of adminiſtrators alſo) are, 1. To bury the deceaſed. 2. To prove the will, or take out adminiſtration. 3. To make an inventory. 4. To collect the goods and chattels. 5. To pay debts; obſerving the rules of priority. 6. To pay legacies, either general or ſpecific; if they be veſted, and not lapſed. 7. To diſtribute the undeviſed ſurplus, according to the ſtatute of diſtributions.

CHAP. III.

Of PRIVATE WRONGS.

SECT. I. *Of the redreſs of private wrongs, by the mere act of the parties.*

(1.) WRONGS are the privation of *right*; and are, 1. *Private.* 2. *Public.*

(2.) *Private wrongs*, or *civil injuries*, are an infringement,

or privation, of the civil rights of individuals, conſidered as individuals.

(3.) The *redreſs* of civil injuries is one principal object of the laws of England.

(4.) This *redreſs* is effected, 1. By the mere *act* of the parties. 2. By the mere *operation* of *law*. 3. By *both* together, or *ſuit* in *courts*.

(5.) *Redreſs*, by the mere *act* of the parties, is that which ariſes, 1. From the *ſole* act of the party injured. 2. From the *joint* act of all the parties.

(6.) Of the firſt ſort are, 1. Defence of one's ſelf, or relations. 2. Recaption of goods. 3. Entry on lands and tenements. 4. Abatement of nuſances. 5. Diſtreſs; for rent, for ſuit or ſervice, for amercements, for damage, or for divers ſtatutable penalties; made of ſuch things only as are legally diſtrainable;—and taken and diſpoſed of according to the due courſe of law. 6. Seiſing of heriots, &c.

(7.) Of the ſecond ſort are, 1. Accord. 2. Arbitration.

Sect. II. *Of redreſs by the mere operation of law.*

Redress, effected by the mere *operation* of *law*, is, 1. In the caſe of *retainer*; where a creditor is executor or adminiſtrator, and is thereupon allowed to retain his own debt. 2. In the caſe of *remitter*; where one, who has a *good* title to lands, &c. comes into poſſeſſion by a *bad* one, and is thereupon remitted to his ancient good title, which protects his ill-acquired poſſeſſion.

Sect. III. *Of courts in general.*

(1.) Redress, that is effected by the *act* both of law and of the *parties*, is by *ſuit* or *action* in the *courts* of juſtice.

(2.) Herein may be conſidered, 1. The *courts* themſelves. 2. The *cogniſance* of wrongs or injuries therein. And, of *courts*, 1. Their *nature* and *incidents*. 2. Their ſeveral *ſpecies*.

(3.) A *court* is a place wherein juſtice is judicially adminiſtered, by officers delegated by the crown; being a court either of record, or not of record.

(4.) *Incident* to all courts are a plaintiff, defendant, and judge: and, with us, there are alſo uſually attorneys; and advocates or counſel, *viz.* either barriſters or ſerjeants at law.

Sect. IV. *Of the public courts of common law and equity.*

(1.) Courts of juſtice, with regard to their ſeveral *ſpecies*, are, 1. Of a *public*, or general, juriſdiction throughout the realm. 2. Of a *private*, or ſpecial, juriſdiction.

(2.) *Public* courts of juſtice are, 1. The courts of *common law* and *equity*. 2. The *eccleſiaſtical* courts. 3. The *military* courts. 4. The *maritime* courts.

(3.) The general and public courts of *common law* and *equity* are, 1. The court of piepoudre. 2. The court-baron. 3. The hundred court. 4. The county court. 5. The court of common pleas. 6. The court of king's bench. 7. The court of exchequer. 8. The court of chancery. (Which two laſt are courts of *equity* as well as *law*.) 9. The courts of exchequer-chamber. 10. The houſe of peers. To which may be added, as auxiliaries, 11. The courts of aſſize and *niſi prius*.

Sect. V. *Of courts eccleſiaſtical, military, and maritime.*

(1.) Ecclesiastical courts (which were ſeparated from the *temporal* by William the conqueror), or courts *Chriſtian*, are, 1. The court of the archdeacon. 2. The court of the biſhop's conſiſtory. 3. The court of arches. 4. The court of peculiars. 5. The prerogative court. 6. The court of delegates. 7. The court of review.

(2.) The only permanent *military* court is that of chivalry; the courts martial, annually eſtabliſhed by act of parliament, being only temporary.

(3.) *Maritime* courts are, 1. The court of admiralty and vice-admiralty. 2. The court of delegates. 3. The lords of the privy-council, and others, authoriſed by the king's commiſſion, for appeals in prize-cauſes.

Sect. VI. *Of courts of a ſpecial juriſdiction.*

Courts of a ſpecial or private juriſdiction are, 1. The foreſt courts; including the courts of attachments, regard, ſwein-mote, and juſtice ſeat. 2. The court of commiſſioners of ſewers. 3. The court of policies of aſſurance. 4. The court of the marſhalſea and the palace court. 5. The courts of the principality of Wales. 6. The court of the duchy chamber of Lancaſter. 7. The courts of the counties palatine, and other royal franchiſes. 8. The ſtannery courts. 9. The courts of London, and other corporations:—To which may be referred the courts of requeſts or courts of conſcience; and the modern regulations of certain courts baron and county courts. 10. The courts of the two univerſities.

Sect. VII. *Of the cogniſance of private wrongs.*

(1.) All private wrongs or civil injuries are *cogniſable* either in the courts *eccleſiaſtical*, *military*, *maritime*, or thoſe of *common law*.

(2.) Injuries cogniſable in the *eccleſiaſtical* courts are, 1. *Pecuniary*. 2. *Matrimonial*. 3. *Teſtamentary*.

(3.) *Pecuniary* injuries, here cogniſable, are, 1. *Subtraction* of *tithes*. For which the remedy is by ſuit to compel their payment, or an equivalent; and alſo their double value. 2. *Nonpayment* of eccleſiaſtical *dues*. Remedy: by ſuit for payment. 3. *Spoliation*. Remedy: by ſuit for reſtitution. 4. *Dilapidations*. Remedy: by ſuit for damages. 5. *Non-repair* of the church, &c.; and *non-payment* of church-rates. Remedy: by ſuit to compel them.

(4.) *Matrimonial* injuries are, 1. *Jactitation* of *marriage*. Remedy: by ſuit for perpetual ſilence. 2. *Subtraction* of *conjugal* rights. Remedy: by ſuit for reſtitution. 3. *Inability* for the marriage ſtate. Remedy: by ſuit for divorce. 4. *Refuſal* of decent *maintenance* to the wife. Remedy: by ſuit for alimony.

(5.) *Teſtamentary* injuries are, 1. *Diſputing* the validity of *wills*. Remedy: by ſuit to eſtabliſh them. 2. *Obſtructing* of *adminiſtrations*. Remedy: by ſuit for the granting them. 3. *Subtraction* of *legacies*. Remedy: by ſuit for the payment.

(6.) The courſe of proceedings herein is much conformed to the civil and canon law: but their only compulſive proceſs is that of excommunication; which is enforced by the temporal writ of *ſignificavit*, or *de excommunicato capiendo*.

(7.) Civil injuries, cogniſable in the court *military*, or court of chivalry, are, 1. Injuries in point of *honour*. Remedy: by ſuit for honourable amends. 2. *Encroachments* in *coat-armour*, &c. Remedy: by ſuit to remove them. The proceedings are in a ſummary method.

(8.) Civil injuries, cogniſable in the courts *maritime*, are injuries, in their nature of common law cogniſance, but ariſing wholly upon the ſea, and not within the precincts of any county. The proceedings are herein alſo much conformed to the civil law.

(9.) All other injuries are cogniſable only in the courts of *common law*: of which in the remainder of this chapter.

(10.) Two of them are, however, commiſſible by theſe and other inferior courts; *viz.* 1. *Refuſal*, or *neglect*, of *juſtice*. Remedies: by writ of *procedendo*, or *mandamus*. 2. *Encroachment* of *juriſdiction*. Remedy: by writ of prohibition.

Sect. VIII. *Of wrongs, and their remedies, reſpecting the rights of perſons.*

(1.) In treating of the cogniſance of injuries by the courts

of *common* law, may be conſidered, 1. The *injuries* themſelves, and their reſpective *remedies*. 2. The *purſuit* of thoſe remedies in the ſeveral courts.

(2.) *Injuries* between ſubject and ſubject, cogniſable by the courts of *common* law, are in general *remedied* by putting the party injured into poſſeſſion of that right whereof he is unjuſtly deprived.

(3.) This is effected, 1. By *delivery* of the *thing* detained to the rightful owner. 2. Where that remedy is either impoſſible or inadequate, by giving the party injured a *ſatisfaction* in *damages*.

(4.) The inſtruments, by which theſe remedies may be obtained, are *ſuits* or *actions*; which are defined to be the legal demand of one's right: and theſe are, 1. Perſonal. 2. Real. 3. Mixed.

(5.) Injuries (whereof ſome are with, others without, *force*) are, 1. Injuries to the rights of *perſons*. 2. Injuries to the rights of *property*. And the former are, 1. Injuries to the *abſolute*, 2. Injuries to the *relative*, rights of perſons.

(6.) The *abſolute* rights of individuals are, 1. *Perſonal ſecurity*. 2. *Perſonal liberty*. 3. *Private property*: (See Chap. I. Sect. 1.) To which the injuries muſt be correſpondent.

(7.) Injuries to *perſonal ſecurity* are, 1. Againſt a man's *life*. 2. Againſt his *limbs*. 3. Againſt his *body*. 4. Againſt his *health*. 5. Againſt his *reputation*.—The firſt muſt be referred to the next chapter.

(8.) Injuries to the *limbs* and *body* are, 1. *Threats*. 2. *Aſſault*. 3. *Battery*. 4. *Wounding*. 5. *Mayhem*. Remedy: by action of treſpaſs *vi et armis*; for damages.

(9.) Injuries to *health*, by any unwholeſome practices, are remedied by a ſpecial action of treſpaſs on the caſe; for damages.

(10.) Injuries to *reputation* are, 1. Slanderous and malicious *words*. Remedy: by action on the caſe; for damages. 2. *Libels*. Remedy: the ſame. 3. Malicious *proſecutions*. Remedy: by action of conſpiracy, or on the caſe; for damages.

(11.) The ſole injury to *perſonal liberty* is *falſe impriſonment*. Remedies: 1. By writ of, 1ſt, Mainprize; 2dly, *Odio et atia*; 3dly, *Homine replegiando*; 4thly, *Habeas corpus*; to remove the wrong. 2. By action of treſpaſs; to recover damages.

(12.) For injuries to *private property*, ſee the next ſection.

(13. Injuries to *relative* rights affect, 1. *Huſbands*. 2. *Parents*. 3. *Guardians*. 4. *Maſters*.

(14.) Injuries to an *huſband* are, 1. *Abduction*, or taking away his wife. Remedy: by action of treſpaſs, *de uxore rapta et abducta*; to recover poſſeſſion of his wife, and damages. 2. *Criminal converſation* with her. Remedy: by action on the caſe; for damages. 3. *Beating* her. Remedy; by action on the caſe, *per quod conſortium amiſit*; for damages.

(15.) The only injury to a *parent* or *guardian* is the *abduction* of their children or wards. Remedy: by action of treſpaſs, *de filiis vel cuſtodiis, raptis vel abductis*; to recover poſſeſſion of them, and damages.

(16.) Injuries to a *maſter* are, 1. *Retaining* his ſervants. Remedy: by action on the caſe; for damages. 2. *Beating* them. Remedy: by action on the caſe, *per quod ſervitium amiſit*; for damages.

Sect. IX. *Of injuries to perſonal property.*

(1.) Injuries to the rights of *property* are either to thoſe of *perſonal* or *real* property.

(2.) *Perſonal* property is either in *poſſeſſion* or in *action*.

(3.) Injuries to perſonal property in poſſeſſion are, 1. By *diſpoſſeſſion*. 2. By *damage*, while the owner remains in poſſeſſion.

(4.) *Diſpoſſeſſion* may be effected, 1. By an unlawful *taking*. 2. By an unlawful *detaining*.

(5.) For the unlawful *taking* of goods and chattels perſonal, the remedy is, 1. Actual reſtitution, which (in caſe of a wrongful diſtreſs) is obtained by action of replevin. 2. Satisfaction in damages: 1*ſt*, in caſe of *reſeous*, by action of *reſeous*, pound-breach, or on the caſe; 2*dly*, in caſe of other unlawful takings, by action of treſpaſs or trover.

(6.) For the unlawful *detaining* of goods lawfully taken, the remedy is alſo, 1. Actual reſtitution; by action of replevin or detinue. 2. Satisfaction in damages: by action on the caſe, for trover and converſion.

(7.) For *damage* to perſonal property, while in the owner's poſſeſſion, the remedy is in damages; by action of treſpaſs *vi et armis*, in caſe the act be immediately injurious; or by action of treſpaſs on the caſe, to redreſs conſequential damage.

(8.) Injuries to perſonal property, in *action*, ariſe by breach of *contracts*, 1. *Expreſs*. 2. *Implied*.

(9.) Breaches of *expreſs* contracts are, 1. By *nonpayment* of *debts*. Remedy: 1*ſt*, Specific payment; recoverable by action of debt. 2*dly*, Damages for nonpayment; recoverable by action on the caſe. 2. By *nonperformance* of *covenants*. Remedy: by action of covenant, 1*ſt*, to recover damages, in covenants perſonal; 2*dly*, to compel performance, in covenants real. 3. By *nonperformance* of *promiſes*, or *aſſumpſits*. Remedy: by action on the caſe; for damages.

(10.) *Implied* contracts are ſuch as ariſe, 1. From the nature and conſtitution of *government*. 2. From *reaſon* and the conſtruction of law.

(11.) Breaches of contracts, implied in the nature of *government*, are by the *nonpayment* of money which the laws have directed to be paid. Remedy: by action of debt (which, in ſuch caſes, is frequently a *popular*, frequently a *qui tam*, action); to compel the ſpecific payment;—or, ſometimes, by action on the caſe; for damages.

(12.) Breaches of contracts, implied in *reaſon* and conſtruction of law, are by the *nonperformance* of legal preſumptive *aſſumpſits*: for which the remedy is in damages; by an action on the caſe on the implied *aſſumpſits*, 1. Of a *quantum meruit*. 2. Of a *quantum valebat*. 3. Of money expended for another. 4. Of receiving money to another's uſe. 5. Of an *inſimul computaſſent*, on an account ſtated (the remedy on an account unſtated being by action of account). 6. Of performing one's duty, in any employment, with integrity, diligence, and ſkill. In ſome of which caſes an action of deceit (or on the caſe, in nature of deceit) will lie.

Sect. X. *Of injuries to real property; and, firſt, of diſpoſſeſſion, or ouſter, of the freehold.*

(1.) Injuries affecting *real* property are, 1. *Ouſter*. 2. *Treſpaſs*. 3. *Nuſance*. 4. *Waſte*. 5. *Subtraction*. 6. *Diſturbance*.

(2.) *Ouſter* is the amotion of poſſeſſion; and is, 1. From *freeholds*. 2. From *chattels* real.

(3.) *Ouſter* from *freeholds* is effected by, 1. *Abatement*. 2. *Intruſion*. 3 *Diſſeiſin*. 4. *Diſcontinuance*. 5. *Deforcement*.

(4.) *Abatement* is the entry of a ſtranger, after the death of the anceſtor, before the heir.

(5.) *Intruſion* is the entry of a ſtranger, after a particular eſtate of freehold is determined, before him in remainder or reverſion.

(6.) *Diſſeiſin* is a wrongful putting out of him that is ſeiſed of the freehold.

(7.) *Diſcontinuance* is where tenant in tail, or the huſband of tenant in fee, makes a larger eſtate of the land than the law alloweth.

(8.) *Deforcement* is any other detainer of the freehold from him who hath the property, but who never had the poſſeſſion.

(9.) The univerſal remedy for all theſe is reſtitution or delivery of poſſeſſion; and, ſometimes, damages for the detention. This is effected, 1. By mere *entry*. 2. By action *poſſeſſory*. 3. By writ of *right*.

(10.) Mere *entry*, on lands, by him who hath the apparent right of poſſeſſion, will (if *peaceable*) diveſt the mere *poſſeſſion* of a wrongdoer. But *forcible* entries are remedied by immediate reſtitution, to be given by a juſtice of the peace.

(11.) Where the wrongdoer hath not only mere poſſeſſion, but alſo an *apparent* right of poſſeſſion, this may be diveſted by him who hath the *actual* right of poſſeſſion, by means of the *poſſeſſory* actions of *writ* of *entry* or *aſſiſe*.

(12.) A writ of *entry* is a real action, which diſproves the title of the tenant, by ſhowing the unlawful means under which he gained or continues poſſeſſion. And it may be brought either againſt the wrongdoer himſelf, or in the degrees called the *per*, the *per* and *cui*, and the *poſt*.

(13.) An *aſſiſe* is a real action, which proves the title of the demandant, by ſhowing his own or his anceſtor's poſſeſſion. And it may be brought either to remedy abatements; *viz.* the aſſiſe of *mort d'anceſtor*, &c.: Or to remedy recent diſſeiſins; *viz.* the aſſiſe of *novel diſſeiſin*.

(14.) Where the wrongdoer hath gained the actual right of *poſſeſſion*, he who hath the right of *property* can only be remedied by a writ of *right*, or ſome writ of a ſimilar nature. As, 1. Where ſuch right of poſſeſſion is gained by the *diſcontinuance* of tenant in tail. Remedy, for the right of property: by writ of *formedon*. 2. Where gained by *recovery* in a poſſeſſory action, had againſt tenants of particular eſtates by their own default. Remedy: by writ of *quod ei deforceat*. 3. Where gained by *recovery* in a poſſeſſory action, had upon the merits. 4. Where gained by the *ſtatute* of *limitations*. Remedy, in both caſes: by a mere writ of *right*, the higheſt writ in the law.

Sect. XI. *Of diſpoſſeſſion, or ouſter, of chattels real.*

(1.) Ouster from *chattels* real is, 1. From eſtates by *ſtatute* and *elegit*. 2. From an eſtate for *years*.

(2.) Ouſter from eſtates by *ſtatute* or *elegit*, is effected by a kind of *diſſeiſin*. Remedy: reſtitution and damages; by aſſiſe of *novel diſſeiſin*.

(3.) Ouſter from an eſtate for years, is effected by a like diſſeiſin, or *ejectment*. Remedy: reſtitution, and damages; 1. By writ of *ejectione firmæ*. 2. By writ of *quare ejecit infra terminum*.

(4.) A writ of *ejectione firmæ*, or action of treſpaſs in ejectment, lieth where lands, &c. are let for a term of years, and the leſſee is ouſted or ejected from his term; in which caſe he ſhall recover poſſeſſion of his term, and damages.

(5.) This is now the uſual method of trying titles to land, inſtead of an action real: *viz.* By, 1. The claimant's making an actual (or ſuppoſed) leaſe upon the land to the plaintiff. 2. The plaintiff's actual (or ſuppoſed) entry thereupon. 3. His actual (or ſuppoſed) ouſter and ejectment by the defendant. For which injury this action is brought either againſt the tenant, or (more uſually) againſt ſome caſual or fictitious ejector; in whoſe ſtead the tenant may be admitted defendant, on condition that the leaſe, entry, and ouſter, be confeſſed, and that nothing elſe be diſputed but the merits of the title claimed by the leſſor of the plaintiff.

(6.) A writ of *quare ejecit infra terminum* is an action of a ſimilar nature; only not brought againſt the wrongdoer or ejector himſelf, but ſuch as are in poſſeſſion under his title.

Sect. XII. *Of treſpaſs.*

Trespass is an entry upon, and damage done to, another's lands, by one's ſelf, or one's cattle; without any lawful authority, or cauſe of juſtification: which is called a *breach of his cloſs*. Remedy: damages; by action of treſpaſs, *quare clauſum fregit*: beſides that of diſtreſs, damage feaſant. But, unleſs the title to the land came chiefly in queſtion, or the treſpaſs was wilful or malicious, the plaintiff (if the damages be under forty ſhillings) ſhall recover no more coſts than damages.

Sect. XIII. *Of nuſance.*

(1.) Nusance, or annoyance, is any thing that worketh damage or inconvenience: and it is either a *public* and *common* nuſance, of which in the next chapter; or, a *private* nuſance, which is any thing done to the hurt or annoyance of, 1. The corporeal; 2. The incorporeal, hereditaments of another.

(2.) The remedies for a private nuſance (beſides that of abatement) are, 1. Damages; by action on the caſe (which alſo lies for ſpecial prejudice by a public nuſance). 2. Removal thereof, and damages; by aſſiſe of nuſance. 3. Like removal, and damages; by writ of *Quod permittat proſternere*.

Sect. XIV. *Of waſte.*

(1.) Waste is a ſpoil and deſtruction in lands and tenements, to the injury of him who hath, 1. An immediate intereſt (as, by right of common) in the lands. 2. The remainder or reverſion of the inheritance.

(2.) The remedies, for a commoner, are reſtitution, and damages; by aſſiſe of common: Or, damages only; by action on the caſe.

(3.) The remedy, for him in remainder, or reverſion, is, 1. Preventive: by writ of *eſtrepement* at law, or injunction out of chancery; to ſtay waſte. 2. Corrective: by action of waſte; to recover the place waſted, and damages.

Sect. XV. *Of ſubtraction.*

(1.) Subtraction is when one, who owes ſervices to another, withdraws or neglects to perform them. This may be, 1. Of rents, and other ſervices, due by *tenure*. 2. Of thoſe due by *cuſtom*.

(2.) For ſubtraction of rents and ſervices, due by *tenure*, the remedy is, 1. By diſtreſs; to compel the payment or performance. 2. By action of debt. 3. By aſſiſe. 4. By writ *de conſuetudinibus et ſervitiis*;—to compel the payment. 5. By writ of *ceſſavit*;—and, 6. By writ of right *ſur diſclaimer*;—to recover the land itſelf.

(3.) To remedy the oppreſſion of the lord, the law has alſo given, 1. The writ of *Ne injuſte vexes*: 2. The writ of *meſne*.

(4.) For ſubtraction of ſervices, due by *cuſtom*, the remedy is, 1. By writ of *Secta ad molendinum, furnum, torrale*, &c. to compel the performance, and recover damages. 2. By action on the caſe; for damages only.

Sect. XVI. *Of diſturbance.*

(1.) Disturbance is the hindering, or diſquieting, the owners of an incorporeal hereditament, in their regular and lawful enjoyment of it.

(2.) Diſturbances are, 1. Of *franchiſes*. 2. Of *commons*. 3. Of *ways*. 4. Of *tenure*. 5. Of *patronage*.

(3.) Diſturbance of *franchiſes*, is remedied by a ſpecial action on the caſe; for damages.

(4.) Diſturbance of *common*, is, 1. *Intercommoning* without right. Remedy: Damages; by an action on the caſe, or of treſpaſs: beſides diſtreſs, damage feaſant; to compel ſatisfaction. 2. *Surcharging* the common. Remedies: diſtreſs, damage feaſant; to compel ſatisfaction: Action on the caſe; for damages: or, writ of admeaſurement of paſture; to apportion the common; and writ *de ſecunda ſuperoneratione*; for the ſupernumerary cattle, and damages. 3. *Incloſure*, or obſtruction. Remedies: reſtitution of the common, and damages; by aſſiſe of *novel diſſeiſin*, and by writ of *quod permittat*: or, Damages only; by action on the caſe.

(5.) Diſturbance of *ways*, is the obſtruction, 1. Of a way in groſs, by the owner of the land 2. Of a way appendant, by a ſtranger. Remedy, for both: damages; by action on the caſe.

(6.) Diſturbance of *tenure*, by driving away tenants, is remedied by a ſpecial action on the caſe; for damages.

(7.) Diſturbance of *patronage*, is the hindrance of a patron to preſent his clerk to a benefice; whereof *uſurpation*, within ſix months, is now become a ſpecies.

(8.) Diſturbers may be, 1. The pſeudo-patron, by his wrongful preſentation. 2. His clerk, by demanding inſtitution. 3. The ordinary, by refuſing the clerk of the true patron.

(9.) The remedies are, 1. By aſſiſe of *darrein preſentment*. 2. By writ of *quare impedit*;—to compel inſtitution and recover damages: Conſequent to which are the writs of *quare incumbravit*, and *quare non admiſit*; for ſubſequent damages. 3. By writ of right of advowſon; to compel inſtitution, or eſtabliſh the permanent right.

Sect. XVII. *Of injuries proceeding from, or affecting, the crown.*

(1.) Injuries to which the crown is a party are, 1. Where the crown is the aggreſſor. 2. Where the crown is the ſufferer.

(2.) The crown is the aggreſſor, whenever it is in poſſeſſion of any property to which the ſubject hath a right.

(3.) This is remedied, 1. By *petition* of *right*; where the right is grounded on facts diſcloſed in the petition itſelf. 2. By *monſtrans de droit*; where the claim is grounded on facts already appearing on record. The effect of both which is to remove the hands (or poſſeſſion) of the king.

(4.) Where the crown is the ſufferer, the king's remedies are, 1. By ſuch common-law actions as are conſiſtent with the royal dignity. 2. By *inquiſt* of *office*, to recover poſſeſſion: which, when found, gives the king his right by ſolemn matter of record; but may afterwards be *traverſed* by the ſubject. 3. By writ of *ſcire facias*, to repeal the king's patent or grant. 4. By *information* of *intruſion*, to give damages for any treſpaſs on the lands of the crown; or of *debt*, to recover moneys due upon contract, or forfeited by the breach of any penal ſtatute; or ſometimes (in the latter caſe) by information *in rem*: all filed in the exchequer *ex officio* by the king's attorney general. 5. By writ of *quo warranto*, or information in the nature of ſuch writ; to ſeize into the king's hands any franchiſe uſurped by the ſubject, or to ouſt an uſurper from any public office. 6. By writ of *mandamus*, unleſs cauſe; to admit or reſtore any perſon entitled to a franchiſe or office: to which if a falſe cauſe be returned, the remedy is by traverſe, or by action on the caſe for damages; and, in conſequence, a peremptory *mandamus*, or writ of reſtitution.

Sect. XVIII. *Of the purſuit of remedies by action: and, firſt, of the original writ.*

(1.) The *purſuit* of the ſeveral remedies furniſhed by the laws of England, is, 1. By *action* in the courts of *common law*. 2. By *proceedings* in the courts of *equity*.

(2.) Of an *action* in the court of *common pleas* (originally the proper court for proſecuting civil ſuits) the orderly parts are, 1. The *original* writ. 2. The *proceſs*. 3. The *pleadings*. 4. The *iſſue*, or *demurrer*. 5. The *trial*. 6. The *judgment*. 7. The proceedings in nature of *appeal*. 8. The *execution*.

(3.) The *original* writ is the beginning or foundation of a ſuit, and is either *optional* (called a *præcipe*), commanding the defendant to do ſomething in certain, or otherwiſe ſhow cauſe to the contrary; or *peremptory* (called a *ſi feccrit te ſecurum*), commanding, upon ſecurity given by the plaintiff, the defendant to appear in court, to ſhow wherefore he hath injured the plaintiff: both iſſuing out of chancery under the king's great ſeal, and returnable in bank during term-time.

Sect. XIX. *Of proceſs.*

(1.) Process is the means of compelling the defendant to appear in court.

(2.) This includes, 1. Summons 2. The writ of attachment, or *pone*; which is ſometimes the firſt or original proceſs. 3. The writ of *diſtringas*, or diſtreſs infinite. 4. The writs of *capias ad reſpondendum*, and *teſtatum capias*: or, inſtead of theſe, in the king's bench, the bill of Middleſex, and writ of *latitat*: and, in the exchequer, the writ of *quo minus*. 5. The *alias* and *pluries* writs. 6. The exigent, or writ of *exigi facias*, proclamations, and outlawry. 7. Appearance, and common bail. 8. The arreſt. 9. Special bail, firſt to the ſheriff, and then to the action.

Sect. XX. *Of pleadings.*

Pleadings are the mutual altercations of the plaintiff and defendant in writing; under which are compriſed, 1. The declaration or count (wherein, incidentally, of the viſne, nonſuit, *retraxit*, and diſcontinuance). 2. The defence, claim of cogniſance, imparlance, view, oyer, aid prayer, voucher, or age. 3. The plea; which is either a *dilatory* plea (*1ſt*, to the juriſdiction; *2dly*, in diſability of the plaintiff; *3dly*, in abatement), or it is a plea *to the action*; ſometimes confeſſing the action either in whole or in part (wherein of a tender, paying money into court, and ſet off): but uſually denying the complaint, by pleading either, *1ſt*, the general iſſue; or, 2dly, a ſpecial bar (wherein of juſtifications, the ſtatutes of limitation, &c.). 4. Replication, rejoinder, ſurrejoinder, rebutter, ſurrebutter, &c. Therein of eſtoppels, colour, duplicity, departure, new aſſignment, proteſtation, averment, and other incidents of pleading.

Sect. XXI. *Of iſſue and demurrer.*

(1.) Issue is where the parties, in a courſe of pleading, come to a point affirmed on one ſide and denied on the other; which, if it be a matter of law, is called a *demurrer*; if it be a matter of fact, ſtill retains the name of an iſſue of fact.

(2.) *Continuance* is the detaining of the parties in court from time to time, by giving them a day certain to appear upon. And, if any new matter ariſes ſince the laſt continuance or adjournment, the defendant may take advantage of it, even after demurrer or iſſue, by alleging it in a plea *puis darrein continuance*.

(3.) The determination of an iſſue in law, or demurrer, is by the opinion of the judges of the court; which is afterwards entered on *record*.

Sect. XXII. *Of the ſeveral ſpecies of trial.*

(1.) Trial is the examination of the matter of fact put in iſſue.

(2.) The ſpecies of trials are, 1. By the *record*. 2. By *inſpection*. 3. By *certificate*. 4. By *witneſſes*. 5. By *wager* of *battel*. 6. By *wager* of *law*. 7. By *jury*.

(3.) Trial by the *record* is had, when the exiſtence of ſuch record is the point in iſſue.

(4.) Trial by *inſpection* or *examination* is had by the court, principally when the matter in iſſue is the evident object of the ſenſes.

(5.) Trial by *certificate* is had in thoſe caſes, where ſuch certificate muſt have been concluſive to a jury.

(6.) Trial by *witneſſes* (the regular method in the civil law) is only uſed on a writ of dower, when the death of the huſband is in iſſue.

(7.) Trial by *wager* of *battel*, in civil caſes, is only had on a

writ of right; but, in lieu thereof, the tenant may have at his option the trial by the *grand aſſiſe*.

(8.) Trial by *wager* of *law* is only had, where the matter in iſſue may be ſuppoſed to have been privily tranſacted between the parties themſelves, without the intervention of other witneſſes.

Sect. XXIII. *Of the trial by jury.*

(1.) Trial by *jury* is, 1. *Extraordinary*; as, by the grand aſſiſe, in writs of right; and by the grand jury, in writs of attaint. 2. *Ordinary*.

(2.) The method and proceſs of the *ordinary* trial by jury is, 1. The writ of *venire facias* to the ſheriff, coroners, or eliſors; with the ſubſequent compulſive proceſs of *habeas corpora*, or *diſtringas*. 2. The carrying down of the record to the court of *niſi prius*. 3. The ſheriff's return; or panel of, 1ſt, ſpecial, 2dly, common jurors. 4. The challenges; 1ſt, to the array; 2dly, to the polls of the jurors; either, *propter honoris reſpectum*, *propter defectum*, *propter affectum* (which is ſometimes a principal challenge, ſometimes to the favour), or *propter delictum*. 5. The *tales de circumſtantibus*. 6. The oath of the jury. 7. The evidence; which is either by proofs, 1ſt, written; 2dly, parole:—or, by the private knowledge of the jurors. 6. The verdict; which may be, 1ſt, privy; 2dly, public; 3dly, ſpecial.

Sect. XXIV. *Of judgment, and its incidents.*

(1.) Whatever is tranſacted at the trial, in the court of *niſi prius*, is added to the record under the name of a *poſtea*: conſequent upon which is the *judgment*.

(2.) Judgment may be *arreſted* or ſtayed for cauſes, 1. Extrinſic, or *dehors* the record; as in the caſe of *new trials*. 2. Intrinſic, or within it; as where the declaration varies from the writ, or the verdict from the pleadings, and iſſue; or where the caſe, laid in the declaration, is not ſufficient to ſupport the action in point of law.

(3.) Where the iſſue is immaterial, or inſufficient, the court may award a *repleader*.

(4.) *Judgment* is the ſentence of the law, pronounced by the court, upon the matter contained in the record.

(5.) Judgments are, 1. Interlocutory; which are incomplete till perfected by a writ of inquiry. 2. Final.

(6.) *Coſts*, or expences of ſuit, are now the neceſſary conſequence of obtaining judgment.

Sect. XXV. *Of proceedings in the nature of appeals.*

(1.) Proceedings, in the nature of *appeals* from judgment, are, 1. A writ of *attaint*; to impeach the verdict of a jury; which of late has been ſuperſeded by new trials. 2. A writ of *audita querela*; to diſcharge a judgment by matter that has ſince happened. 3. A writ of *error*, from one court of record to another; to correct judgments, erroneous in point of law, and not helped by the ſtatutes of amendment and jeofails.

(2.) Writs of error lie, 1. To the court of *king's bench*, from all inferior courts of record; from the court of *common-pleas* at Weſtminſter; and from the court of *king's-bench* in Ireland. 2. To the courts of *exchequer-chamber*, from the law ſide of the court of *exchequer*; and from proceedings in the court of *king's-bench* by bill. 3. To the houſe of *peers*, from proceedings in the court of *king's-bench* by original, and on writs of error; and from the ſeveral courts of *exchequer-chamber*.

Sect. XXVI. *Of execution.*

Execution is the putting in force of the ſentence or judgment of the law. Which is effected, 1. Where poſſeſſion of any hereditament is recovered: by writ of *habere facias ſeiſinam*, *poſſeſſionem*, &c. 2. Where any thing is awarded to be done or rendered, by a ſpecial writ for that purpoſe: as, by writ of abatement, in caſe of nuſance; *retorna habendo*, and *capias in withernam*, in replevin; *diſtringas* and *ſcire facias*, in detinue. 3. Where money only is recovered; by writ of, 1ſt, *capias ad ſatisfaciendum*, againſt the *body* of the defendant; or, in default thereof, *ſcire facias* againſt his bail. 2dly, *Fieri facias*, againſt his *goods* and chattels. 3dly, *Levari facias*, againſt his *goods* and the *profits* of his lands. 4thly, *Elegit*, againſt his *goods*, and the *poſſeſſion* of his *lands*. 5thly, *Extendi facias*, and other proceſs, on ſtatutes, recognizances, &c. againſt his *body*, *lands*, and *goods*.

Sect. XXVII. *Of proceedings in the courts of equity.*

(1.) Matters of equity which belong to the peculiar juriſdiction of the court of *chancery*, are, 1. The guardianſhip of infants. 2. The cuſtody of idiots and lunatics. 3. The ſuperintendance of charities. 4. Commiſſions of bankrupt.

(2.) The court of *exchequer*, and the duchy-court of *Lancaſter*, have alſo ſome peculiar cauſes, in which the intereſt of the king is more immediately concerned.

(3.) *Equity* is the true ſenſe and ſound interpretation of the rules of law; and, as ſuch, is equally attended to by the judges of the courts both of common law and equity.

(4.) The eſſential differences, whereby the Engliſh courts of equity are diſtinguiſhed from the courts of law, are, 1. The mode of *proof*, by a diſcovery on the oath of the party; which gives a juriſdiction in matters of account, and fraud. 2. The mode of *trial*; by depoſitions taken in any part of the world. 3. The mode of *relief*; by giving a more ſpecific and extenſive remedy than can be had in the courts of law; as, by carrying agreements into execution, ſtaying waſte or other injuries by injunction, directing the ſale of incumbered lands, &c. 4. The true conſtruction of *ſecurities* for money, by conſidering them merely as a pledge. 5. The execution of *truſts*, or ſecond uſes, in a manner analogous to the law of legal eſtates.

(5.) The proceedings in the court of chancery (to which thoſe in the exchequer, &c. very nearly conform) are, 1. Bill. 2. Writ of *ſubpœna*; and, perhaps, injunction. 3. Proceſs of contempt; viz. (ordinarily) attachment, attachment with proclamations, commiſſion of rebellion, ſerjeant at arms, and ſequeſtrations. 4. Appearance. 5. Demurrer. 6. Plea. 7. Anſwer. 8. Exceptions; amendments; croſs, or ſupplemental, bills; bills of revivor, interpleader, &c. 9. Replication. 10. Iſſue. 11. Depoſitions, taken upon interrogatories; and ſubſequent publication thereof. 12. Hearing. 13. Interlocutory decree; feigned iſſue, and trial; reference to the maſter, and report; &c. 14. Final decree. 15. Rehearing, or bill of review. 16. Appeal to parliament.

CHAP. IV.

Of Public Wrongs.

Sect. I. *Of the nature of crimes, and their puniſhment.*

(1.) IN treating of *public wrongs* may be conſidered, 1. The general *nature* of crimes and puniſhments. 2. The perſons *capable* of committing crimes. 3. Their ſeveral *degrees* of guilt. 4. The ſeveral *ſpecies* of crimes, and their reſpective puniſhments. 5. The means of *prevention*. 6. The method of *puniſhment*.

(2.) A *crime*, or *miſdemeanor*, is an act committed, or omitted, in violation of a public law either forbidding or commanding it.

(3.) Crimes are diſtinguiſhed from civil injuries, in that they are a breach and violation of the *public* rights, due to the whole community, conſidered as a community.

(4.) *Puniſhments* may be conſidered with regard to, 1. The *power*; 2. The *end*; 3. The *meaſure*;—of their infliction.

(5.) The *power*, or right, of inflicting human punishments for *natural* crimes, or such as are *mala in se*, was by the law of nature vested in every individual: but, by the fundamental contract of society, is now transferred to the sovereign power; in which also is vested, by the same contract, the right of punishing *positive* offences, or such as are *mala prohibita*.

(6.) The *end* of human punishments is to prevent future offences; 1. By amending the offender himself. 2. By deterring others through his example. 3. By depriving him of the power to do future mischief.

(7.) The *measure* of human punishments must be determined by the wisdom of the sovereign power, and not by any uniform universal rule: though that wisdom may be regulated, and assisted, by certain general, equitable, principles.

Sect. II. *Of the persons capable of committing crimes.*

(1.) All persons are *capable* of committing crimes, unless there be in them a *defect* of *will*: for, to constitute a legal crime, there must be both a vitious will, and a vitious act.

(2.) The will does not concur with the act, 1. Where there is a defect of *understanding*. 2. Where no will is *exerted*. 3. Where the act is *constrained* by force and violence.

(3.) A vitious will may therefore be wanting, in the cases of, 1. Infancy. 2. Idiocy, or lunacy. 3. Drunkenness; which doth not, however, excuse. 4. Misfortune. 5. Ignorance, or mistake of fact. 6. Compulsion, or necessity; which is, 1st, that of civil subjection; 2dly, that of dures *per minas*; 3dly, that of chooſing the least pernicious of two evils, where one is unavoidable; 4thly, that of want, or hunger; which is no legitimate excuse.

(4.) The king, from his excellence and dignity, is also incapable of doing wrong.

Sect. III. *Of principals and accessories.*

(1.) The different *degrees* of guilt in criminals are, 1. As *principals*. 2. As *accessories*.

(2.) A *principal* in a crime is, 1. He who commits the fact. 2. He who is present at, aiding, and abetting the commission.

(3.) An *accessory* is he who doth not commit the fact, nor is present at the commission; but is in some sort concerned therein, either *before* or *after*.

(4.) Accessories can only be in petit treason, and felony: in high treason, and misdemeanors, all are principals.

(5.) An accessory, *before* the fact, is one who, being absent when the crime is committed, hath procured, counselled, or commanded, another to commit it.

(6.) An accessory *after* the fact, is where a person, knowing a felony to have been committed, receives, relieves, comforts, or assists, the felon. Such accessory is usually entitled to the benefit of clergy; where the principal, and accessory *before* the fact, are excluded from it.

Sect. IV. *Of offences against* God *and religion.*

(1.) Crimes and misdemeanors cognizable by the laws of England are such as more immediately offend, 1. God, and his holy *religion*. 2. The law of *nations*. 3. The *king*, and his *government*. 4. The *public*, or *commonwealth*. 5. *Individuals*.

(2.) Crimes more immediately offending God and *religion* are, 1. *Apostacy*. For which the penalty is incapacity, and imprisonment. 2. *Heresy*. Penalty, for one species thereof: the same. 3. Offences against the established *church*:—Either, by *reviling* its ordinances. Penalties: fine; deprivation; imprisonment; forfeiture.—Or, by *nonconformity* to its worship: 1st, Through total *irreligion*. Penalty: fine. 2dly, Through protestant *dissenting*. Penalty: suspended by the toleration act. 3dly, Through *popery*, either in professors of the popish religion, popish recusants convict, or popish priests. Penalties: incapacity; double taxes; imprisonment; fines, forfeitures; abjuration of the realm; judgment of felony, without clergy; and judgment of high treason. 4. *Blasphemy*. Penalty: fine, imprisonment, and corporal punishment. 5. Profane *swearing* and *cursing*. Penalty: fine, or house of correction. 6. *Witchcraft*; or, at least, the pretence thereto. Penalty: imprisonment, and pillory. 7. Religious *impostures*. Penalty: fine, imprisonment, and corporal punishment. 8. *Simony*. Penalties: forfeiture of double value; incapacity. 9. *Sabbath-breaking*. Penalty: fine. 10. *Drunkenness*. Penalty: fine, or stocks. 11. *Lewdness*. Penalties: fine; imprisonment; house of correction.

Sect. V. *Of offences against the law of nations.*

(1.) The *law* of *nations* is a system of rules, deducible by natural reason, and established by universal consent, to regulate the intercourse between independent states.

(2.) In England, the *law* of *nations* is adopted in its full extent, as part of the law of the land.

(3.) Offences against this law are principally incident to whole states or nations; but, when committed by private subjects, are then the objects of the municipal law.

(4.) Crimes against the law of *nations*, animadverted on by the laws of England, are, 1. Violation of *safe conducts*. 2. Infringement of the rights of *embassadors*. Penalty, in both: arbitrary. 3. *Piracy*. Penalty: judgment of felony, without clergy.

Sect. VI. *Of high treason.*

(1.) Crimes and misdemeanors more peculiarly offending the king and his government are, 1. *High treason*. 2. *Felonies* injurious to the prerogative. 3. *Præmunire*. 4. Other *misprisions* and *contempts*.

(2.) *High treason* may, according to the statute of Edward III. be committed, 1. By *compassing* or *imagining* the death of the king, or queen-consort, or their eldest son and heir; demonstrated by some overt act. 2. By *violating* the king's companion, his eldest daughter, or the wife of his eldest son. 3. By some overt act of *levying* war against the king in his realm. 4. By *adherence* to the king's enemies. 5. By *counterfeiting* the king's great or privy *seal*. 6. By *counterfeiting* the king's *money*, or importing counterfeit money. 7. By *killing* the chancellor, treasurer, or king's justices, in the execution of their offices.

(3.) *High treasons*, created by subsequent statutes, are such as relate, 1. To *papists*: as, the repeated defence of the pope's jurisdiction; the coming from beyond sea of a natural-born popish priest; the renouncing of allegiance, and reconciliation to the pope or other foreign power. 2. To the *coinage*, or other signatures of the king: as, counterfeiting (or, importing and uttering counterfeit) foreign coin, here current; forging the sign manual, privy signet, or privy seal; falsifying, &c. the current coin. 3. To the *protestant succession*: as, corresponding with, or remitting to, the late Pretender's sons; endeavouring to impede the succession; writing or printing, in defence of any Pretender's title, or in derogation of the act of settlement, or of the power of parliament to limit the descent of the crown.

(4.) The *punishment* of high treason, in *males*, is (generally) to be, 1. Drawn. 2. Hanged. 3. Embowelled alive. 4. Beheaded. 5. Quartered. 6. The head and quarters to be at the king's disposal. But, in treasons relating to the coin, only to be drawn, and hanged till dead. *Females*, in both cases, are to be drawn, and burned alive.

SECT. VII. *Of felonies injurious to the king's prerogative.*

(1.) FELONY is that offence which occaſions the total forfeiture of lands or goods at common law; now uſually alſo puniſhable with death, by hanging; unleſs through the benefit of clergy.

(2.) *Felonies* injurious to the king's prerogative (of which ſome are within, others without, clergy) are, 1. Such as relate to the *coin*: as, the wilful uttering of counterfeit money, &c.; (to which head ſome inferior miſdemeanors affecting the coinage may be alſo referred). 2. Conſpiring or attempting to kill a *privy counſellor*. 3. Serving *foreign ſtates*, or enliſting ſoldiers for *foreign* ſervice. 4. Embezzling the king's *armour* or *ſtores*. 5. *Deſertion* from the king's *armies*, by land or ſea.

SECT. VIII. *Of præmunire.*

(1.) PRÆMUNIRE, in its original ſenſe, is the offence of adhering to the temporal power of the Pope, in derogation of the regal authority. Penalty: outlawry, forfeiture, and impriſonment; which hath ſince been extended to ſome offences of a different nature.

(2.) Among theſe are, 1. Importing popiſh trinkets. 2. Contributing to the maintenance of popiſh ſeminaries abroad, or popiſh prieſts in England. 3. Moleſting the poſſeſſors of abbey lands. 4. Acting as broker in an uſurious contract, for more than ten *per cent*. 5. Obtaining any ſtay of proceedings in ſuits for monopolies. 6. Obtaining an excluſive patent for gunpowder or arms. 7. Exertion of purveyance or preemption. 8. Aſſerting a legiſlative authority in both or either houſe of parliament. 9. Sending any ſubject a priſoner beyond ſea. 10. Refuſing the oaths of allegiance and ſupremacy. 11. Preaching, teaching, or adviſed ſpeaking, in defence of the right of any pretender to the crown, or in derogation of the power of parliament to limit the ſucceſſion. 12. Treating of other matters by the aſſembly of peers of Scotland, convened for electing their repreſentatives in parliament. 13. Unwarrantable undertakings by unlawful ſubſcriptions to public funds.

SECT. IX. *Of miſpriſions and contempts affecting the king and government.*

(1.) MISPRISIONS and *contempts* are all ſuch high offences as are under the degree of capital.

(2.) Theſe are, 1. *Negative*, in concealing what ought to be revealed. 2. *Poſitive*, in committing what ought not to be done.

(3.) *Negative* miſpriſions are, 1. Miſpriſion of *treaſon*. Penalty: forfeiture and impriſonment. 2. Miſpriſion of *felony*. Penalty: fine and impriſonment. 3. Concealment of *treaſure trove*. Penalty: fine and impriſonment.

(4.) *Poſitive* miſpriſions or high miſdemeanors and contempts, are, 1. *Mal-adminiſtration* of public truſts, which includes the crime of *peculation*. Uſual penalties: baniſhment; fines; impriſonment; diſability. 2. Contempts againſt the king's *prerogative*. Penalty: fine, and impriſonment. 3. Contempt againſt his *perſon* and *government*. Penalty: fine, impriſonment, and infamous corporal puniſhment. 4. Contempts againſt his *title*. Penalties: fine, and impriſonment; or fine, and diſability. 5. Contempts againſt his *palaces*, or *courts* of juſtice. Penalties: fine; impriſonment; corporal puniſhment; loſs of right hand; forfeiture.

SECT. X. *Of offences againſt public juſtice.*

(1.) CRIMES eſpecially affecting the *commonwealth* are offences, 1. Againſt the public *juſtice*. 2. Againſt the public *peace*. 3. Againſt the public *trade*. 4. Againſt the public *health*. 5. Againſt the public *police* or *economy*.

(2.) Offences againſt the public *juſtice* are, 1. *Embezzling* or *vacating* records, and *perſonating* others in courts of juſtice. Penalty: judgment of felony, uſually without clergy. 2. *Compelling* priſoners to become *approvers*. Penalty: judgment of felony. 3. *Obſtructing* the execution of proceſs. 4. *Eſcapes*. 5. *Breach* of priſon. 6. *Reſcue*. Which four may (according to the circumſtances) be either felonies, or miſdemeanors puniſhable by fine and impriſonment. 7. *Returning* from *tranſportation*. This is felony, without clergy. 8. Taking *rewards* to *help* one to his ſtolen goods. Penalty: the ſame as for the theft. 9. *Receiving* ſtolen goods. Penalties: tranſportation; fine; and impriſonment.—10. *Theſtbote*. 11. Common *barretry* and ſuing in a feigned name. 12. *Maintenance*. 13. *Champerty*. Penalty, in theſe four: fine, and impriſonment. 14. *Compounding* proſecutions on penal ſtatutes. Penalty: fine, pillory, and diſability. 15. *Conſpiracy*; and threats of accuſation in order to extort money, &c. Penalties: the villenous judgment; fine; impriſonment; pillory; whipping; tranſportation. 16. *Perjury*, and ſubornation thereof. Penalties: infamy; impriſonment; fine, or pillory; and ſometimes, tranſportation or houſe of correction. 17. *Bribery*. Penalty: fine, and impriſonment. 18. *Embracery*. Penalty: infamy, fine, and impriſonment. 19. *Falſe verdict*. Penalty: the judgment in attaint. 20. *Negligence* of public officers, &c. Penalty: fine, and forfeiture of the office. 21. *Oppreſſion* by magiſtrates. 22. *Extortion* of officers. Penalty, in both: impriſonment, fine, and ſometimes forfeiture of the office.

SECT. XI. *Of offences againſt the public peace.*

OFFENCES againſt the public *peace* are, 1. *Riotous aſſemblies* to the number of *twelve*. 2. Appearing armed, or hunting in *diſguiſe*. 3. *Threatening*, or *demanding* any valuable thing, by letter.—All theſe are felonies, without clergy. 4. Deſtroying of *turnpikes*, &c. Penalties: whipping; impriſonment; judgment of felony, with and without clergy.—5. *Affrays*. 6. *Riots*, *routs*, and *unlawful aſſemblies*. 7. Tumultuous *petitioning*. 8. Forcible *entry*, and *detainer*. Penalty, in all four: fine, and impriſonment. 9. Going unuſually *armed*. Penalty: forfeiture of arms, and impriſonment. 10. Spreading *falſe news*. Penalty: fine, and impriſonment. 11. Pretended *prophecies*. Penalties: fine; impriſonment; and forfeiture. 12. *Challenges* to fight. Penalty: fine, impriſonment, and ſometimes forfeiture. 13. *Libels*. Penalty: fine, impriſonment, and corporal puniſhment.

SECT. XII. *Of offences againſt public trade.*

OFFENCES againſt the public *trade* are, 1. *Owling*. Penalties: fines; forfeiture; impriſonment; loſs of left hand; tranſportation: judgment of felony. 2. *Smuggling*. Penalties: fines; loſs of goods; judgment of felony, without clergy. 3. *Fraudulent bankruptcy*. Penalty: judgment of felony without clergy. 4. *Uſury*. Penalty: fine, and impriſonment. 5. *Cheating*. Penalties: fine; impriſonment; pillory; tumbrel; whipping, or other corporal puniſhment; tranſportation.—6. *Foreſtalling*. 7. *Regrating*. 8. *Engroſſing*. Penalties, for all three: loſs of goods; fine; impriſonment; pillory. 9. *Monopolies*, and *combinations* to raiſe the price of commodities. Penalties: fines; impriſonment; pillory; loſs of ear; infamy; and, ſometimes, the pains of *præmunire*. 10. Exerciſing a *trade*, not having ſerved as an apprentice. Penalty: fine. 11. Tranſporting, or reſiding abroad, of *artificers*. Penalties: fine; impriſonment; forfeiture; incapacity; becoming aliens.

SECT. XIII. *Of offences againſt the public health, and public police or economy.*

(1.) OFFENCES againſt the public *health* are, 1. *Irregularity*, in the time of the *plague*, or of *quarantine*. Penalties: whipping; judgment of felony, with and without clergy. 2. Selling *unwholeſome proviſions*. Penalties: amercement; pillory; fine; impriſonment; abjuration of the town.

(2.) Offences againſt the public *police* and *economy* or domeſtic order of the kingdom are, 1. Thoſe relating to *clandeſtine* and *irregular marriages*. Penalties: judgment of felony, with and without clergy. 2. *Bigamy*, or (more properly) *polygamy*. Penalty: judgment of felony.—3. *Wandering*, by *ſoldiers* or *mariners*. 4. *Remaining* in England, by *Egyptians*; or being in their *fellowſhip* one month. Both theſe are felonies, without clergy. 5. *Common nuſances*, 1*ſt*, by annoyances or purpreſtures in highways, bridges, and rivers; 2*dly*, by offenſive trades and manufactures; 3*dly*, by diſorderly houſes; 4*thly*, by lotteries; 5*thly*, by cottages; 6*thly*, by fireworks; 7*thly*, by eaveſdropping. Penalty, in all; fine.—8*thly*, By common ſcolding. Penalty: the cucking-ſtool. 6. *Idleneſs*, *diſorder*, *vagrancy*, and *incorrigible roguery*. Penalties: impriſonment; whipping; judgment of felony. 7. *Luxury*, in diet. Penalty, diſcretionary. 8. *Gaming*. Penalties: to gentlemen, fines; to others, fine and impriſonment; to cheating gameſters, fine, infamy, and the corporal pains of perjury. 9. *Deſtroying* the *game*. Penalties: fines, and corporal puniſhment.

Sect. XIV. *Of homicide.*

(1.) Crimes eſpecially affecting *individuals* are, 1. Againſt their *perſons*. 2. Againſt their *habitations*. 3. Againſt their *property*.

(2.) Crimes againſt the *perſons* of individuals are, 1. By *homicide*, or deſtroying life. 2. By other *corporal* injuries.

(3.) *Homicide* is, 1. *Juſtifiable*. 2. *Excuſable*. 3. *Felonious*.

(4.) Homicide is *juſtifiable*, 1. By neceſſity, and command of law. 2. By permiſſion of law; 1*ſt*, for the furtherance of public juſtice; 2*dly*, for prevention of ſome forcible felony.

(5.) Homicide is *excuſable*, 1. *Per infortunium*, or by miſadventure. 3. *Se defendendo*, or in ſelf-defence, by chance-medley. Penalty, in both: forfeiture of goods; which however is pardoned of courſe.

(6.) *Felonious* homicide is the killing of a human creature without juſtification or excuſe. This is, 1. Killing *one's ſelf*. 2. Killing *another*.

(7.) Killing *one's ſelf*, or *ſelf-murder*, is where one deliberately, or by any unlawful malicious act, puts an end to his own life. This is felony; puniſhed by ignominious burial, and forfeiture of goods and chattels.

(8.) Killing *another* is, 1. *Manſlaughter*. 2. *Murder*.

(9.) *Manſlaughter* is the unlawful killing of another, without malice, expreſs or implied. This is either, 1. Voluntary, upon a ſudden heat. 2. Involuntary, in the commiſſion of ſome unlawful act. Both are felony, but within clergy; except in the caſe of *ſtabbing*.

(10.) *Murder* is when a perſon, of ſound memory and diſcretion, unlawfully killeth any reaſonable creature, in being, and under the king's peace; with malice aforethought, either expreſs or implied. This is felony, without clergy; puniſhed with ſpeedy death, and hanging in chains, or diſſection.

(11.) *Petit treaſon* (being an aggravated degree of *murder*) is where the ſervant kills his maſter, the wife her huſband, or the eccleſiaſtic his ſuperior. Penalty: in men, to be drawn and hanged; in women, to be drawn and burned.

Sect. XV. *Of offences againſt the perſons of individuals.*

Crimes affecting the *perſons* of individuals, by other corporal injuries not amounting to homicide, are, 1. *Mayhem*; and alſo *ſhooting* at another. Penalties: fine; impriſonment; judgment of felony, without clergy. 2. Forcible *abduction*, and *marriage* or *defilement*, of an heireſs; which is felony: alſo, *ſtealing*, and *deflowering* or *marrying*, any woman-child under the age of *ſixteen* years; for which the penalty is impriſonment, fine, and temporary forfeiture of her lands.—3. *Rape*, and alſo *carnal knowledge*, of a woman-child under the age of *ten* years. 4. *Buggery*, with man or beaſt. Both theſe are felonies, without clergy.—5. *Aſſault*. 6. *Battery*; eſpecially of clergymen. 7. *Wounding*. Penalties, in all three: fine; impriſonment; and other corporal puniſhment. 8. *Falſe impriſonment*. Penalties: fine; impriſonment; and (in ſome atrocious caſes) the pains of *præmunire*, and incapacity of office or pardon. 9. *Kidnapping*, or forcibly ſtealing away the king's ſubjects. Penalty: fine; impriſonment; and pillory.

Sect. XVI. *Of offences againſt the habitations of individuals.*

(1.) Crimes affecting the *habitations* of individuals are, 1. *Arſon*. 2. *Burglary*.

(2.) *Arſon* is the malicious and wilful burning of the houſe, or out-houſe, of another man. This is felony; in ſome caſes within, in others without, clergy.

(3.) *Burglary* is the breaking and entering, by night, into a manſion houſe; with intent to commit a felony. This is felony without clergy.

Sect. XVII. *Of offences againſt private property.*

(1.) Crimes affecting the private *property* of individuals are, 1. *Larciny*. 2. Malicious *miſchief*. 3. *Forgery*.

(2.) *Larciny* is, 1. *Simple*. 2. *Mixed*, or *compound*.

(3.) *Simple* larciny is the felonious taking, and carrying away, of the perſonal goods of another. And it is, 1. *Grand* larciny; being above the value of twelve pence. Which is felony; in ſome caſes within, in others without, clergy. 2. *Petit* larciny; to the value of twelve pence or under. Which is alſo felony, but not capital; being puniſhed with whipping, or tranſportation.

(4.) *Mixed*, or *compound*, larciny is that wherein the taking is accompanied with the aggravation of being, 1. From the *houſe*. 2. From the *perſon*.

(5.) Larcinies from the *houſe*, by day or night, are felonies without clergy, when they are, 1. Larcinies, above *twelve pence*, from a church; or by breaking a tent or booth in a market or fair, by day or night, the owner or his family being therein;—or by breaking a dwelling-houſe by day, any perſon being therein;—or from a dwelling-houſe by day, without breaking, any perſon therein being put in fear;—or from a dwelling-houſe by night, without breaking, the owner or his family being therein and put in fear. 2. Larcinies, of *five ſhillings*, by breaking the dwelling-houſe, ſhop, or warehouſe by day, though no perſon be therein;—or, by privately ſtealing in any ſhop, warehouſe, coach-houſe, or ſtable, by day or night, without breaking, and though no perſon be therein. 3. Larcinies, of *forty ſhillings*, from a dwelling-houſe or its out-houſes, without breaking, and though no perſon be therein.

(6.) Larciny from the *perſon* is, 1. By *privately ſtealing*, from the perſon of another, above the value of twelve pence. 2. By *robbery*; or the felonious and forcible taking, from the perſon of another, in or near the highway, goods or money of any value, by putting him in fear. Theſe are both felonies without clergy. An attempt to rob is alſo felony.

(7.) Malicious *miſchief*, by deſtroying dikes, goods, cattle, ſhips, garments, fiſh-ponds, trees, woods, churches, chapels, meeting-houſes, houſes, out-houſes, corn, hay, ſtraw, ſea or river banks, hop-binds, coal-mines (or engines thereunto belonging), or any fences for incloſures by act of parliament, is felony; and, in moſt caſes, without benefit of clergy.

(8.) *Forgery* is the fraudulent making or alteration of a writing, in prejudice of another's right. Penalties: fine: im-

priſonment; pillory, loſs of noſe and ears; forfeiture; judgment of felony, without clergy.

SECT. XVIII. *Of the means of preventing offences.*

(1.) CRIMES and miſdemeanors may be *prevented*, by compelling ſuſpected perſons to give *ſecurity*: which is effected by binding them in a conditional recognizance to the king, taken in court, or by a magiſtrate.

(2.) Theſe recognizances may be conditioned, 1. To keep the *peace*. 2. To be of *good behaviour*.

(3.) They may be taken by any juſtice or conſervator of the peace, at his own diſcretion; or, at the requeſt of ſuch as are entitled to demand the ſame.

(4.) All perſons, who have given ſufficient cauſe to apprehend an intended breach of the peace, may be bound over to keep the *peace*; and all thoſe, that be not of good fame, may be bound to the *good behaviour*; and may, upon refuſal in either caſe, be committed to gaol.

SECT. XIX. *Of courts of criminal juriſdiction.*

(1.) IN the method of *puniſhment* may be conſidered, 1. The ſeveral *courts* of criminal juriſdiction. 2. The ſeveral *proceedings* therein.

(2.) The criminal *courts* are, 1. Thoſe of a *public* and general juriſdiction throughout the realm. 2. Thoſe of a *private* and ſpecial juriſdiction.

(3.) *Public* criminal courts are, 1. The high court of parliament; which proceeds by impeachment. 2. The court of the lord high ſteward; and the court of the king in full parliament: for the trial of capitally indicted peers. 3. The court of king's bench. 4. The court of chivalry. 5. The court of admiralty, under the king's commiſſion. 6. The courts of oyer and terminer, and general gaol-delivery. 7. The court of quarter ſeſſions of the peace. 8. The ſheriff's tourn. 9. The court leet. 10. The court of the coroner. 11. The court of the clerk of the market.

(4.) *Private* criminal courts are, 1. The court of the lord ſteward, &c. by ſtatute of Henry VII. 2. The court of the lord ſteward, &c. by ſtatute of Henry VIII. 3. The univerſity courts.

SECT. XX. *Of ſummary convictions.*

(1.) PROCEEDINGS in criminal courts are, 1. *Summary*. 2. *Regular*.

(2.) *Summary* proceedings are ſuch, whereby a man may be convicted of divers offences, without any formal proceſs or jury, at the diſcretion of the judge or judges appointed by act of parliament, or common law.

(3.) Such are, 1. Trials of offences and frauds againſt the laws of *exciſe* and other branches of the king's *revenue*. 2. Convictions before *juſtices* of the *peace* upon a variety of minute offences, chiefly againſt the public police. 3. *Attachments* for contempts to the ſuperior courts of juſtice.

SECT. XXI. *Of arreſts.*

(1.) REGULAR proceedings in the courts of common law are, 1. *Arreſt*. 2. *Commitment* and *bail*. 3. *Proſecution*. 4. *Proceſs*. 5. *Arraignment*, and its incidents. 6. *Plea* and *iſſue*. 7. *Trial* and *conviction*. 8. *Clergy*. 9. *Judgment*, and its conſequences. 10. *Reverſal* of judgment. 11. *Reprieve* or *pardon*. 12. *Execution*.

(2.) An *arreſt* is the apprehending, or reſtraining, of one's perſon; in order to be forthcoming to anſwer a crime whereof one is accuſed or ſuſpected.

(3.) This may be done, 1. By warrant. 2. By an officer, without warrant. 3. By a private perſon, without warrant. 4. By hue and cry.

SECT. XXII. *Of commitment and bail.*

(1.) COMMITMENT is the confinement of one's perſon in priſon, for ſafe cuſtody, by warrant from proper authority; unleſs, in bailable offences, he puts in ſufficient *bail*, or ſecurity for his future appearance.

(2.) The magiſtrate is bound to take reaſonable bail, if offered; unleſs the offender be not bailable.

(3.) Such are, 1. Perſons accuſed of treaſon; or, 2. Of murder; or, 3. Of manſlaughter, by indictment; or if the priſoner was clearly the ſlayer. 4. Priſon-breakers, when committed for felony. 5. Outlaws. 6. Thoſe who have abjured the realm. 7. Approvers, and appellees. 8. Perſons taken with the manour. 9. Perſons accuſed of arſon. 10. Excommunicated perſons.

(4.) The magiſtrate may, at his diſcretion, admit to bail, or otherwiſe, perſons not of good fame, charged with other felonies, whether as principals or as acceſſories.

(5.) If they be of good fame, he is bound to admit them to bail.

(6.) The court of king's bench, or its judges in time of vacation, may bail in any caſe whatſoever.

SECT. XXIII. *Of the ſeveral modes of proſecution.*

(1.) PROSECUTION, or the manner of accuſing offenders, is either by a previous finding of a grand jury; as, 1. By *preſentment*. 2. By *indictment*. Or, without ſuch finding, 3. By *information*. 4. By *appeal*.

(2.) A *preſentment* is the notice taken by a grand jury of any offence, from their own knowledge or obſervation.

(3.) An *indictment* is a written accuſation of one or more perſons of a crime or miſdemeanor, preferred to, and preſented on oath by, a grand jury; expreſſing, with ſufficient certainty, the perſon, time, place, and offence.

(4.) An *information* is, 1. At the ſuit of the king and a ſubject, upon penal ſtatutes. 2. At the ſuit of the king only. Either, 1. Filed by the attorney general *ex officio*, for ſuch miſdemeanors as affect the king's perſon or government: or, 2. Filed by the maſter of the crown office (with leave of the court of king's bench) at the relation of ſome private ſubject, for other groſs and notorious miſdemeanors. All differing from indictments in this; that they are exhibited by the informer, or the king's officer; and not on the oath of a grand jury.

(5.) An *appeal* is an accuſation or ſuit, brought by one private ſubject againſt another, for larciny, rape, mayhem, arſon, or homicide; which the king cannot diſcharge or pardon, but the party alone can releaſe.

SECT. XXIV. *Of proceſs upon an indictment.*

(1.) PROCESS to bring in an offender, when indicted in his abſence, is, in miſdemeanors, by *venire facias*, diſtreſs infinite, and *capias*: in capital crimes, by *capias* only: and, in both, by outlawry.

(2.) During this ſtage of proceedings, the indictment may be removed into the court of king's bench from any inferior juriſdiction, by writ of *certiorari facias*: and cognizance muſt be claimed in places of excluſive juriſdiction.

SECT. XXV. *Of arraignment, and its incidents.*

(1.) ARRAIGNMENT is the calling of the priſoner to the bar of the court, to anſwer the matter of the indictment.

(2.) Incident hereunto are, 1. The ſtanding mute of the priſoner; for which, in petit treaſon, and felonies of death, he ſhall undergo the *peine fort & dure*. 2. His confeſſion; which is either *ſimple*, or by way of *approvement*.

Sect. XXVI. *Of plea, and iſſue.*

(1.) The *plea*, or defenſive matter alleged by the priſoner, may be, 1. A plea to the juriſdiction. 2. A demurrer in point of law. 3. A plea in abatement. 4. A ſpecial plea in bar; which is, 1ſt, *Auterfoits acquit*; 2dly, *Auterfoits convict*; 3dly, *Auterfoits attaint*; 4thly, A pardon. 5. The general iſſue, not guilty.

(2.) Hereupon *iſſue* is joined by the clerk of the arraigns, on behalf of the king.

Sect. XXVII. *Of trial, and conviction.*

(1.) Trials of offences, by the laws of England, were and are, 1. By *ordeal*, of either fire or water. 2. By the *corſned*. Both theſe have been long aboliſhed. 3. By *battel*, in appeals and approvements. 4. By the *peers* of Great Britain. 5. By *jury*.

(2.) The method and proceſs of trial by *jury* is, 1. The impanelling of the jury. 2. Challenges; 1ſt, for cauſe; 2dly, peremptory. 3. *Tales de circumſtantibus*. 4. The oath of the jury. 5. The evidence. 6. The verdict, either general or ſpecial.

(3.) *Conviction* is when the priſoner pleads, or is found guilty: whereupon, in felonies, the proſecutor is entitled to, 1. His expences. 2. Reſtitution of his goods.

Sect. XXVIII. *Of the benefit of clergy.*

(1.) Clergy, or the benefit thereof, was originally derived from the uſurped juriſdiction of the Popiſh eccleſiaſtics; but hath ſince been new-modelled by ſeveral ſtatutes.

(2.) It is an exemption of the clergy from any other ſecular puniſhment for felony, than impriſonment for a year, at the court's diſcretion; and it is extended likewiſe, abſolutely, to lay peers, for the firſt offence; and to all lay commoners, for the firſt offence alſo, upon condition of branding, impriſonment, or tranſportation.

(3.) All felonies are entitled to the benefit of clergy, except ſuch as are now ouſted by particular ſtatutes.

(4.) Felons, on receiving the benefit of clergy (though they forfeit their goods to the crown), are diſcharged of all clergyable felonies before committed, and reſtored in all capacities and credits.

Sect. XXIX. *Of judgment, and its conſequences.*

(1.) Judgment (unleſs any matter be offered in arreſt thereof) follows upon conviction; being the pronouncing of that puniſhment which is expreſsly ordained by law.

(2.) *Attainder* of a criminal is the immediate conſequence, 1. Of having judgment of death pronounced upon him. 2. Of outlawry for a capital offence.

(3.) The conſequences of attainder are, 1. *Forfeiture* to the king. 2. *Corruption of blood.*

(4.) *Forfeiture* to the king is, 1. Of real eſtates, upon attainder:—in high treaſon, abſolutely, till the death of the late Pretender's ſons;—in felonies, for the king's year, day, and waſte;—in miſpriſion of treaſon, aſſaults on a judge, or battery ſitting the courts; during the life of the offender. 2. Of perſonal eſtates, upon conviction; in all treaſon, miſpriſion of treaſon, felony, excuſable homicide, petit larceny, ſtanding mute upon arraignment, the above-named contempts of the king's courts, and flight.

(5.) *Corruption* of *blood* is an utter extinction of all inheritable quality therein: ſo that, after the king's forfeiture is firſt ſatisfied, the criminal's lands eſcheat to the lord of the fee; and he can never afterwards inherit, be inherited, or have any inheritance derived through him.

Sect. XXX. *Of reverſal of judgment.*

(1.) Judgments, and their conſequences, may be *avoided*, 1. By *falſifying*, or *reverſing*, the attainder. 2. By *reprieve*, or *pardon*.

(2.) Attainders may be *falſified*, or *reverſed*, 1. Without a writ of error; for matter *dehors* the record. 2. By writ of error; for miſtakes in the judgment, or record. 3. By act of parliament; for favour.

(3.) When an *outlawry* is reverſed, the party is reſtored to the ſame plight as if he had appeared upon the *capias*. When a *judgment*, on conviction, is reverſed, the party ſtands as if never accuſed.

Sect. XXXI. *Of reprieve, and pardon.*

(1.) A reprieve is a temporary ſuſpenſion of the judgment, 1. *Ex arbitrio judicis*. 2. *Ex neceſſitate legis*; for pregnancy, inſanity, or the trial of identity of perſon, which muſt always be tried *inſtanter*.

(2.) A pardon is a permanent avoider of the judgment by the king's majeſty, in offences againſt his crown and dignity; drawn in due form of law, allowed in open court, and thereby making the offender a new man.

(3.) The king cannot pardon, 1. Impriſonment of the ſubject beyond the ſeas. 2. Offences proſecuted by appeal. 3. Common nuſances. 4. Offences againſt popular or penal ſtatutes, after information brought by a ſubject. Nor is his pardon pleadable to an impeachment by the commons in parliament.

Sect. XXXII. *Of execution.*

(1.) Execution is the completion of human puniſhment, and muſt be ſtrictly performed in the manner which the law directs.

(2.) The warrant for execution is ſometimes under the hand and ſeal of the judge; ſometimes by writ from the king; ſometimes by rule of court; but commonly by the judge's ſigning the calendar of priſoners, with their ſeparate judgments in the margin.

L A W

Law-*Language*. In England, all law proceedings were formerly written, as indeed all public proceedings were, in Norman or law French, and even the arguments of the counſel and deciſions of the court were in the ſame barbarous dialect. An evident and ſhameful badge, it muſt be owned, of tyranny and foreign ſervitude; being introduced under the auſpices of William the Norman and his ſons: whereby the obſervation of the Roman ſatiriſt was once more verified, that *Gallia cauſidicos docuit facunda Britannos*. This continued till the reign of Edward III. who, having employed his arms ſucceſsfully in ſubduing the crown of France, thought it unbe-

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ſeeming the dignity of the victors to uſe any longer the language of a vanquiſhed country. By a ſtatute, therefore, paſſed in the 36th year of his reign, it was enacted, that for the future all pleas ſhould be pleaded, ſhown, defended, anſwered, debated, and judged, in the Engliſh tongue; but be entered and inrolled in Latin: in like manner as Don Alonſo X. king of Caſtile (the great-grandfather of our Edward III.) obliged his ſubjects to uſe the Caſtilian tongue in all legal proceedings; and as, in 1286, the German language was eſtabliſhed in the courts of the empire. And perhaps, if our legiſlature had then directed that the writs themſelves, which are mandates

from the king to his ſubjects to perform certain acts or to appear at certain places, ſhould have been framed in the Engliſh language, according to the rule of our ancient law, it had not been very improper. But the record or enrolment of thoſe writs and the proceedings thereon, which was calculated for the benefit of poſterity, was more ſerviceable (becauſe more durable) in a dead and immutable language than in any flux or living one. The practiſers, however, being uſed to the Norman language, and therefore imagining they could expreſs their thoughts more aptly and more conciſely in that than in any other, ſtill continued to take their notes in law French; and of courſe, when thoſe notes came to be publiſhed, under the denomination of *reports*, they were printed in that barbarous dialect; which, joined to the additional terrors of a Gothic black letter, has occaſioned many a ſtudent to throw away his Plowden and Littleton, without venturing to attack a page of them. And yet, in reality, upon a nearer acquaintance, they would have found nothing very formidable in the language; which differs in its grammar and orthography as much from the modern French, as the diction of Chaucer and Gower does from that of Addiſon and Pope. Beſides, as the Engliſh and Norman languages were concurrently uſed by our anceſtors for ſeveral centuries together, the two idioms have naturally aſſimilated, and mutually borrowed from each other: for which reaſon the grammatical conſtruction of each is ſo very much the ſame, that I apprehend an Engliſhman (with a week's preparation) would underſtand the laws of Normandy, collected in their *grand couſtumier*, as well, if not better, than a Frenchman bred within the walls of Paris.

The Latin, which ſucceeded the French for the entry and enrolment of pleas, and which continued in uſe for four centuries, anſwers ſo nearly to the Engliſh (oftentimes word for word) that it is not at all ſurpriſing it ſhould generally be imagined to be totally fabricated at home, with little more art or trouble than by adding Roman terminations to Engliſh words. Whereas in reality it is a very univerſal dialect, ſpread throughout all Europe at the irruption of the northern nations; and particularly accommodated and moulded to anſwer all the purpoſes of the lawyers with a peculiar exactneſs and preciſion. This is principally owing to the ſimplicity, or (if the reader pleaſes) the poverty and baldneſs of its texture, calculated to expreſs the ideas of mankind juſt as they ariſe in the human mind, without any rhetorical flouriſhes, or perplexed ornaments of ſtyle: for it may be obſerved, that thoſe laws and ordinances, of public as well as private communities, are generally the moſt eaſily underſtood, where ſtrength and perſpicuity, not harmony or elegance of expreſſion, have been principally conſulted in compiling them. Theſe northern nations, or rather their legiſlators, though they reſolved to make uſe of the Latin tongue in promulging their laws, as being more durable and more generally known to their conquered ſubjects than their own Teutonic dialects, yet (either through choice or neceſſity) have frequently intermixed therein ſome words of a Gothic original; which is, more or leſs, the caſe in every country of Europe, and therefore not to be imputed as any peculiar blemiſh in our Engliſh legal latinity. The truth is, what is generally denominated *law-Latin* is in reality a mere technical language, calculated for eternal duration, and eaſy to be apprehended both in preſent and future times; and on thoſe accounts beſt ſuited to preſerve thoſe memorials which are intended for perpetual rules of action. The rude pyramids of Egypt have endured from the earlieſt ages, while the more modern and more elegant ſtructures of Attica, Rome, and Palmyra, have ſunk beneath the ſtroke of time.

As to the objection of locking up the law in a ſtrange and unknown tongue, this is of little weight with regard to records; which few have occaſion to read, but ſuch as do, or ought to, underſtand the rudiments of Latin. And beſides, it may be obſerved of the law-Latin, as the very ingenious Sir John Davis obſerves of the law-French, "that it is ſo very eaſy to be learned, that the meaneſt wit that ever came to the ſtudy of the law doth come to underſtand it almoſt perfectly in ten days without a reader."

It is true, indeed, that the many terms of art with which the law abounds are ſufficiently harſh when latinized (yet not more ſo than thoſe of other ſciences), and may, as Mr. Selden obſerves, give offence "to ſome grammarians of ſqueamiſh ſtomachs, who would rather chooſe to live in ignorance of things the moſt uſeful and important, than to have their delicate ears wounded by the uſe of a word unknown to Cicero, Salluſt, or the other writers of the Auguſtan age." Yet this is no more than muſt unavoidably happen when things of modern uſe, of which the Romans had no idea, and conſequently no phraſes to expreſs them, come to be delivered in the Latin tongue. It would puzzle the moſt claſſical ſcholar to find an appellation, in his pure latinity, for a conſtable, a record, or a deed of feoffment: it is therefore to be imputed as much to neceſſity as ignorance, that they were ſtyled in our forenſic dialect, *conſtabularius*, *recordum*, and *feoffamentum*. Thus again, another uncouth word of our ancient laws (for I defend not the ridiculous barbariſms ſometimes introduced by the ignorance of modern practiſers), the ſubſtantive *murdrum*, or the verb *murdrare*, however harſh and unclaſſical it may ſeem, was neceſſarily framed to expreſs a particular offence; ſince no other word in being, *occidere*, *interficere*, *necare*, or the like, was ſufficient to expreſs the intention of the criminal, or *quo animo* the act was perpetrated; and therefore by no means came up to the notion of murder at preſent entertained by a law; viz. a killing *with malice aforethought*.

A ſimilar neceſſity to this produced a ſimilar effect at Byzantium, when the Roman laws were turned into Greek for the uſe of the oriental empire: for, without any regard to Attic elegance, the lawyers of the imperial courts made no ſcruple to tranſlate *fidei commiſſarios*, φιδεικομμισσαριους; *cubiculum*, κουβικλειον; *filium familias*, παιδα-φαμιλιας; *repudium*, ρεπουδιον; *compromiſſum*, κομπρομισσον; *reverentia et obſequium*, ρευερεντια και οβσεκιον; and the like. They ſtudied more the exact and preciſe import of the words, than the neatneſs and delicacy of their cadence. And it may be ſuggeſted, that the terms of the law are not more numerous, more uncouth, or more difficult to be explained by a teacher, than thoſe of logic, phyſics, and the whole circle of Ariſtotle's philoſophy; nay, even of the politer arts of architecture and its kindred ſtudies, or the ſcience of rhetoric itſelf. Sir Thomas More's famous legal queſtion contains in it nothing more difficult than the definition which in his time the philoſophers currently gave of their *materia prima*, the groundwork of all natural knowledge; that it is *neque quid*, *neque quantum*, *neque quale*, *neque aliquid eorum quibus ens determinatur*; or its ſubſequent explanation by Adrian Heereboord, who aſſures us, that *materia prima non eſt corpus*, *neque per formam corporeitatis*, *neque per ſimplicem eſſentiam: eſt tamen ens, et quidem ſubſtantia, licet incompleta; habetque actum ex ſe entitativum, et ſimul eſt potentia ſubjectiva*. The law, therefore, with regard to its technical phraſes, ſtands upon the ſame footing with other ſtudies, and requeſts only the ſame indulgence.

This technical Latin continued in uſe from the time of its firſt introduction till the ſubverſion of our ancient conſtitution under Cromwell; when, among many other innovations in the law, ſome for the better and ſome for the worſe, the language of our records was altered and turned into Engliſh.

But, at the reſtoration of king Charles, this novelty was no longer countenanced; the practiſers finding it very difficult to expreſs themſelves ſo conciſely or ſignificantly in any other language but the Latin. And thus it continued without any ſenſible inconvenience till about the year 1730, when it was again thought proper that the proceedings at law ſhould be done into Engliſh, and it was accordingly ſo ordered by ſtatute 4 Geo. II. c. 26. This was done, in order that the common people might have knowledge and underſtanding of what was alleged or done for and againſt them in the proceſs and pleadings, the judgment and entries in cauſe. Which purpoſe it is doubtful how well it has anſwered; but there is reaſon to ſuſpect, that the people are now, after many years experience, altogether as ignorant in matters of law as before. On the other hand, theſe inconveniences have already ariſen from the alteration; that now many clerks and attorneys are hardly able to read, much leſs to underſtand, a record even of ſo modern a date as the reign of George I. And it has much enhanced the expence of all legal proceedings: for ſince the practiſers are confined (for the ſake of the ſtamp-duties, which are thereby conſiderably increaſed) to write only a ſtated number of words in a ſheet; and as the Engliſh language, through the multitude of its particles, is much more verboſe than the Latin; it follows, that the number of ſheets muſt be very much augmented by the change. The tranſlation alſo of technical phraſes, and the names of writs and other proceſs, were found to be ſo very ridiculous (a writ of *niſi prius*, *quare impedit*, *fieri facias*, *habeas corpus*, and the reſt, not being capable of an Engliſh dreſs with any degree of ſerioufneſs), that in two years time a new act was obliged to be made, 6 Geo. II. c. 14. which allows all technical words to continue in the uſual language, and has thereby defeated every beneficial purpoſe of the former ſtatute.

Trial by Wager of LAW, *(vadiatio legis)*; a ſpecies of trial, in the Engliſh law, ſo called, as another ſpecies is ſtyled "wager of battel," *vadiatio duelli*, (ſee BATTEL): becauſe, as in the wager of battel, the defendant gave a pledge, gage, or *vadium*, to try the cauſe by battel; ſo here he was put in ſureties or *vadios*, that at ſuch a day he will make his law, that is, take the benefit which the law has allowed him, (ſee the article TRIAL). For our anceſtors conſidered, that there were many caſes where an innocent man, of good credit, might be overborne by a multitude of falſe witneſſes; and therefore eſtabliſhed this ſpecies of trial, by the oath of the defendant himſelf: for if he will abſolutely ſwear himſelf not chargeable, and appears to be a perſon of reputation, he ſhall go free, and for ever acquitted of the debt, or other cauſe of action.

The manner of waging and making law is this: He that has waged, or given ſecurity, to make his law, brings with him into court eleven of his neighbours: a cuſtom which we find particularly deſcribed ſo early as in the league between Alfred and Guthrun the Dane; for by the old Saxon conſtitution, every man's credit in courts of law depended upon the opinion which his neighbours had of his veracity. The defendant then, ſtanding at the end of the bar, is admoniſhed by the judges of the nature and danger of a falſe oath. And if he ſtill perſiſts, he is to repeat this or the like oath: "Hear this, ye juſtices, that I do not owe unto Richard Jones the ſum of ten pounds nor any penny thereof, in manner and form as the ſaid Richard hath declared againſt me. So help me God." And thereupon his eleven neighbours or compurgators ſhall avow upon their oaths, that they believe in their conſciences that he ſaith the truth; ſo that himſelf muſt be ſworn *de fidelitate*, and the eleven *de credulitate*.

In the old Swediſh or Gothic conſtitution, wager of law was not only permitted, as it is in *criminal* caſes, unleſs the fact be extremely clear againſt the priſoner; but was alſo abſolutely required in many *civil* caſes: which an author of their own very juſtly charges as being the ſource of frequent perjury. This, he tells us, was owing to the Popiſh eccleſiaſtics, who introduced this method of purgation from their canon law; and, having ſown a plentiful crop of oaths in all judicial proceedings, reaped afterwards an ample harveſt of perjuries: for perjuries were puniſhed in part by pecuniary fines, payable to the coffers of the church. But with us in England wager of law is never *required*; and then only *admitted*, where an action is brought upon ſuch matters as may be ſuppoſed to be privately tranſacted between the parties, and wherein the defendant may be preſumed to have made ſatisfaction without being able to prove it. Therefore it is only in actions of debt upon ſimple contract, or for amercement, in actions of detinue, and of account, where the debt may have been paid, the goods reſtored, or the account balanced, without any evidence of either. And by ſuch wager of law (when admitted) the plaintiff is perpetually barred; for the law, in the ſimplicity of the ancient times, preſumed that no one would forſwear himſelf for any worldly thing. Wager of law, however, lieth in a real action, where the tenant alleges he was not legally ſummoned to appear, as well as in mere perſonal contracts.

The wager of law was never permitted but where the defendant bore a fair and unreproachable character; and it was alſo confined to ſuch caſes where a debt might be ſuppoſed to be diſcharged, or ſatisfaction made in private, without any witneſſes to atteſt it: and many other prudential reſtrictions accompanied this indulgence. But at length it was conſidered, that (even under all its reſtrictions) it threw too great a temptation in the way of indigent or profligate men: and therefore by degrees new remedies were deviſed, and new forms of action were introduced, wherein no defendant is at liberty to wage his law. So that now no plaintiff need at all apprehend any danger from the hardineſs of his debtor's conſcience, unleſs he voluntarily chooſes to rely on his adverſary's veracity, by bringing an obſolete, inſtead of a modern, action. Therefore, one ſhall hardly hear at preſent of an action of *debt* brought upon a ſimple contract: that being ſupplied by an action of *treſpaſs on the caſe* for the breach of a promiſe or *aſſumpſit*; wherein, though the ſpecific debt cannot be recovered, yet damages may, equivalent to the ſpecific debt. And this being an action of treſpaſs, no law can be waged therein. So, inſtead of an action of *detinue* to recover the very thing detained, an action of treſpaſs on the caſe in *trover and converſion* is uſually brought; wherein, though the horſe or other ſpecific chattel cannot be had, yet the defendant ſhall pay damages for the converſion equal to the value of the chattel; and for this treſpaſs alſo no wager of law is allowed. In the room of actions of *account*, a bill in equity is uſually filed; wherein, though the defendant anſwers upon his oath, yet ſuch oath is not concluſive to the plaintiff; but he may prove every article by other evidence, in contradiction to what the defendant has ſworn. So that wager of law is quite out of uſe, being avoided by the mode of bringing the action; but ſtill it is not out of force. And therefore, when a new ſtatute inflicts a penalty, and gives an action of debt for recovering it, it is uſual to add, "in which no wager of law ſhall be allowed:" otherwiſe an hardy delinquent might eſcape any penalty of the law, by ſwearing he had never incurred, or elſe had diſcharged it.

Cuſtom-Houſe LAWS. The expedient of exacting duties on goods imported or exported, has been adopted by every commercial nation in Europe. The attention of the Britiſh le-

giſlature has not been confined to the object of raiſing a revenue alone; but they have attempted by duties, exemptions, drawbacks, bounties, and other regulations, to direct the national trade into thoſe channels that contribute moſt to the public benefit. And, in order to obtain every requiſite information, all goods, exported or imported, whether liable to duty or not, are required to be entered at the reſpective cuſtom-houſes; and from theſe entries accounts are regularly made up of the whole Britiſh trade, diſtinguiſhing the articles, their quantity and value, and the countries which ſupply or receive them.

The objects of the Britiſh legiſlature may be reduced to the following heads:

Firſt, To encourage the employment of Britiſh ſhipping and ſeamen, for the purpoſe of ſupplying our navy when public exigencies require.

Secondly, To increaſe the quantity of money in the nation, by prohibiting the exportation of Britiſh coin, by encouraging exportation, and diſcouraging importation, and by promoting agriculture, fiſheries, and manufactures. For theſe purpoſes, it is penal to entice certain manufacturers abroad, or export the tools uſed in their manufactures; the exportation of raw materials is, in moſt inſtances, prohibited; and their importation permitted free from duty, and ſometimes rewarded with a bounty. The exportation of ſome goods, manufactured to a certain length only (for example, white cloth), is loaded with a duty, but permitted duty-free when the manufacture is carried to its full extent. The importation of rival manufactures is loaded with heavy duties, or abſolutely prohibited. Theſe reſtrictions are moſt ſevere towards nations with which the balance of trade is ſuppoſed againſt us, or which are conſidered as our moſt formidable rivals in power or commerce. Upon this principle the commerce with France, till of late years, laboured under the heavieſt reſtrictions.

Thirdly, To ſecure us plenty of neceſſaries for ſubſiſtence and manufacture, by diſcouraging the exportation of ſome articles that conſume by length of time, and regulating the corn-trade according to the exigencies of the ſeaſons.

Fourthly, To ſecure the trade of the colonies to the mother country, and preſerve a mutual intercourſe, by encouraging the produce of their ſtaple commodities, and reſtraining their progreſs in theſe manufactures which they receive from us in exchange.

The foundation of our commercial regulations is the famous act of navigation, which was firſt enacted during the time of the commonwealth, and adopted by the firſt parliament after the reſtoration. The ſubſtance of this act, and ſubſequent amendments, is as follows:

1. Goods from Aſia, Africa, and America, may not be imported, except in Britiſh ſhips duly navigated, or ſhips belonging to the Britiſh plantations; and they can only be imported from the place of their production or manufacture, or the port where they are uſually firſt ſhipped for tranſportation. Goods of the Spaniſh or Portugueſe plantations, imported from Spain and Portugal in Britiſh ſhips, bullion and ſome other inconſiderable articles are excepted.

The reſtriction on European goods is not univerſal, but extends to ſeveral of the bulkieſt articles. Ruſſian goods, maſts, timber, boards, ſalt, pitch, roſin, tar, hemp, flax, raiſins, figs, prunes, olives, oil, corn, ſugar, potaſhes, wine, and vinegar, may not be imported except in ſhips belonging to Great Britain or Ireland, legally manned; nor Turkey goods and currants, except in ſhips Britiſh built; or in ſhips belonging to the country where theſe goods are produced or manufactured, or firſt ſhipped for exportation; and, if imported in foreign ſhips, they pay alien's duty.

In order to entitle a ſhip to the privileges of a Britiſh ſhip, it muſt be built in Britain, and belong entirely to Britiſh ſubjects; and the maſter, and three-fourths of the mariners, muſt be Britiſh ſubjects, except in caſe of death or unavoidable accidents. In time of war, the proportion of Britiſh mariners required is generally confined to one-fourth; and the ſame proportion only is required in the Greenland fiſhery.

No goods may be imported into, or exported from, the plantations in Aſia, Africa, or America, except in ſhips built in Britain, Ireland, or the plantations, or prize-ſhips, manned by Britiſh ſubjects, duly regiſtered and legally navigated.

The following goods, enumerated in the act of navigation and ſubſequent acts, may not be exported from the plantations, except to ſome other plantation or to Britain: Tobacco, cotton-wool, indigo, ginger, fuſtic and other dying-wood, melaſſes, hemp, copper-ore, beaver-ſkins and other furs, pitch, tar, turpentine, maſts, yards and boltſprits, coffee, pimento, cocoa-nuts, whale-fins, raw ſilk, pot and pearl aſhes. Rice and ſugar were formerly comprehended in this liſt, but their exportation is now permitted under certain reſtrictions.

Iron may not be imported to Europe, except to Ireland; and none of the non-enumerated may be imported to any country north of Cape Finiſterre, except the Bay of Biſcay and Ireland.

2. For the more effectual prevention of ſmuggling, no goods may be imported in veſſels belonging to Britiſh ſubjects, and no wine in any veſſel whatever, unleſs the maſter have a manifeſt on board, containing the name, meaſure, and built of the ſhip, the place to which it belongs, and a diſtinct enumeration of the goods on board, and places where they were laden. If the ſhip be cleared from any place under his majeſty's dominions, the manifeſt muſt be atteſted by the chief officer of the cuſtoms, or chief magiſtrate, who is required to tranſmit a copy thereof to the place of deſtination. Shipmaſters muſt deliver copies of this manifeſt to the firſt cuſtom-houſe officer who goes on board within four leagues of the ſhore, and alſo to the firſt who goes on board within the limits of any port; and muſt deliver the original manifeſt to the cuſtom-houſe at their arrival, and make report of their cargo upon oath. If the report diſagree with the manifeſt, or either diſagree with the cargo on board, the ſhip-maſter is liable in the penalty of 200l. The proprietors of the goods muſt enter them, and pay the duties within 20 days; otherwiſe they may be carried to the cuſtom-houſe, and ſold by auction, if not relieved within ſix months; and the overplus of the value, after paying duty and charges, paid to the proprietors.

3. The importation of cattle, beef, mutton, and pork, except from Ireland, woollen cloths, malt, and various articles of hard-ware, cutlery, and earthen-ware, is prohibited: alſo the following goods from Germany and the Netherlands; olive-oil, pitch, tar, potaſhes, roſin, ſalt, tobacco, wines, except Rheniſh wine, and Hungary wines from Hamburgh.

4. The importation of various other goods is reſtricted by particular regulations reſpecting the time and place of importation, the packages, the burden of the ſhip, the requiſition of a licence, and other circumſtances.

To guard more effectually againſt clandeſtine trade, the importation of ſome articles is only permitted in ſhips of a certain burden, whoſe operations are not eaſily concealed. Spirits muſt be imported in ſhips of 100 tons or upwards, except rum, and ſpirits of Britiſh plantations, which are only reſtricted to 70 tons; wine, 60 tons; tea, tobacco, and ſnuff, 50 tons; ſalt, 40 tons. Wine, ſpirits, and tobacco, are alſo reſtricted in reſpect of the packages in which they may be imported.

5. Diamonds and precious ſtones, flax, flax-ſeed, linen-rags, beaver-wool, wool for clothiers, linen-yarn unbleached, and moſt drugs uſed in dyeing, may be imported duty free.

6. All goods imported are liable to duties, except ſuch as are expreſsly exempted. The revenue of cuſtoms is of great antiquity in Britain, but was new-modelled at the reſtoration of Charles II. A ſubſidy of tonnage on wines, and of poundage, or 1 s. per pound value of other goods, was granted during the king's life, and, after ſeveral prolongations, rendered perpetual. A book of rates was compoſed for aſcertaining theſe values; and articles not rated paid duty according to the value, as affirmed upon oath by the importer. If the goods be valued too low by the importer, the cuſtom-houſe officer may ſeize them, upon paying to the proprietor the value he ſwore to, and 10 per cent. for profit; ſuch goods to be ſold, and the overplus paid into the cuſtoms. Various additional duties have been impoſed; ſome on all goods, ſome on particular kinds; ſome according to the rates, ſome unconnected with the rates; ſome with an allowance of certain abatements, ſome without any allowance; the greater part to be paid down in ready money, and a few for which ſecurity may be granted; often with variations, according to the ſhip's place and circumſtances of importation. The number of branches amounted to upwards of 50; and ſometimes more than 10 were chargeable on the ſame articles. By this means the revenue of the cuſtoms has become a ſubject of much intricacy. The inconveniences which this gave riſe to are now removed by the conſolidation act; which appoints one fixed duty for each article free from fractions, inſtead of the various branches to which they were formerly ſubject.

7. Goods of moſt kinds may be exported duty free when regularly entered; and thoſe that have paid duty on importation are generally entitled to drawback of part, ſometimes of the whole, when re-exported within three years, upon certificate that the duties were paid on importation, and oath of their identity. In ſome caſes, a bounty is given on manufactured goods, when the materials from which they are manufactured have paid duty on importation; and manufactures ſubject to exciſe have generally the whole or part of the exciſe duties returned.

8. The following goods are prohibited to be exported: white-aſhes, horns, unwrought hides of black-cattle, tallow, coin, braſs, copper, engines for knitting ſtockings, tools for cotton, linen, woollen, ſilk, iron and ſteel manufactures; wool, woolfells, woollen yarn, fullers earth, fulling clay, and tobacco pipe clay.

9. The object of the laws reſpecting the corn trade is to encourage agriculture, by not only permitting the free exportation, but rewarding it with a bounty when the prices are low, and checking the importation by a heavy duty; and, to prevent ſcarcity, by prohibiting the exportation when the prices are high, and permitting importation at an eaſy duty. Various temporary laws have been enacted for theſe purpoſes, and ſometimes other expedients employed in times of ſcarcity, ſuch as prohibiting the diſtillery from corn, and manufacture of ſtarch. And by a permanent law 1773, the low duties and bounties are regulated as under:

	Low duty.	Bounty.
Wheat at or above	48 s. per qr. 6 d.	under 44 s. 5 s.
Rye, - - -	32 s. 3 d.	28 s. 3 s.
Peaſe and beans,	32 s. 3 d.	28 s. no bounty.
Oats, - - -	16 s. 2 d.	14 s. 2 s.
Barley, - - -	24 s. 2 d.	22 s. 2 s. 6 d.

The duties, when the prices are lower than in the firſt column, amount to a prohibition. When the prices are higher than in the column prefixed to the bounty, no exportation is permitted. When oats are under the bounty price, oatmeal is entitled to a bounty of 2 s. 6 d. per quarter.

10. Bounties are allowed on the exportation of refined ſugar, ſail-cloth, linen under limited prices, ſilk ſtuffs of Britiſh manufacture, cordage, ſpirits when barley is under 24 s. beef, pork, and the following kinds of fiſh, ſalmon, herrings, pilchards, cod, ling, flake, and ſprats.

Various other bounties are allowed for the encouragement of our fiſheries. Ships from 150 to 300 tons employed in the Greenland whale fiſhery, and conforming to the regulations preſcribed, are allowed 30 s. per ton. Veſſels employed in the herring fiſhery receive 20 s. per ton, beſides a bounty on the herrings caught and cured, amounting in ſome caſes to 4 s. per barrel. Other bounties are granted to a limited number of the moſt ſucceſsful veſſels employed in the herring and Newfoundland fiſheries, and in the ſouthern whale-fiſhery.

It is unneceſſary and impracticable, in this place, to enter into a full detail of our cuſtom-houſe laws. Indeed, all that can be admitted into a work of this kind, muſt convey but very imperfect information; and even that little becomes uſeleſs in a ſhort time from alterations in the law. We have therefore only marked the general outlines in the preſent article; which, however, will be ſufficient to enable the reader to judge of the principles upon which the Britiſh legiſlature has acted. How far the means employed have contributed to the ends propoſed, and how far the ends themſelves are always wiſe; or whether a trade encumbered by fewer reſtrictions would not prove more extenſive and beneficial; has been a ſubject of much diſcuſſion; and of late a more liberal ſyſtem has been embraced in our commercial treaty with France, and in other regulations.

Mercantile Laws. The laws relating to commercial and maritime affairs approach nearer to uniformity through the different countries of Europe, than thoſe on other ſubjects. Some of the fundamental regulations have been taken from the Roman law; others have been ſuggeſted by experience, during the progreſs of commerce; and the whole have been gradually reduced to a ſyſtem, and adopted into the laws of trading nations, but with ſome local varieties and exceptions.

The Britiſh legiſlature has enacted many ſtatutes reſpecting commerce; yet the greater part of our mercantile law is to be collected from the deciſions of our courts of juſtice, founded on the cuſtom of merchants. A proof of ſuch cuſtom, where no direct ſtatute interferes, determines the controverſy, and becomes a precedent for regulating like caſes afterwards. The exiſtence of a cuſtom not formerly recogniſed, is, in England, determined by a jury of merchants.

The moſt common mercantile contracts are thoſe between buyer and ſeller; between factor and employer; between partners; between the owners, maſters, mariners, and freighters of ſhips; between inſurers and the owners of the ſubject inſured; and between the parties concerned in tranſacting bills of exchange. See Factorage, Sale, Partnership, Insurance, Bill, &c. and the next article.

Maritime Laws. The moſt ancient ſyſtem of maritime laws is that of Rhodes, which was in force during the time of the Grecian empire, and afterwards incorporated into the Roman law. Although, in ſome parts, not applicable to the preſent ſtate of trade, and, in others, now hardly intelligible, it contains the ground-work of the moſt equitable and beneficial rules obſerved in modern commerce. A like ſyſtem was ſet forth by Richard I. of England, called the *Statutes of Oleron*; and another by the town of Wiſby, in the iſland of Gothland. From theſe ſyſtems, improved and enlarged in the

courſe of time, our general maritime law is derived. The juriſdiction of matters purely maritime belongs, in England, to the court of admiralty, which proceeds on the civil law; but their proceedings are ſubject to the controul, and their deciſions to the review, of the ſuperior courts.

We ſhall here conſider the obligations which ſubſiſt between the maſters or owners of ſhips, the freighters, and the furniſhers of proviſions or repairs.

1. *Maſters and Freighters.* A charter-party is a contract betweeen the maſter and freighters, in which the ſhip and voyage is deſcribed, and the time and conditions of performing it are aſcertained.

The freight is moſt frequently determined for the whole voyage, without reſpect to time. Sometimes it depends on the time.

In the former caſe, it is either fixed at a certain ſum for the whole cargo, or ſo much *per* ton, barrel-bulk, or other weight or meaſure; or ſo much *per cent.* on the value of the cargo. This laſt is common on goods ſent to America; and the invoices are produced to aſcertain the value.

The burden of the ſhip is generally mentioned in the contract, in this manner, *one hundred tons, or thereby;* and the number mentioned ought not to differ above five tons, at moſt, from the exact meaſure. If a certain ſum be agreed on for the freight of the ſhip, it muſt all be paid, although the ſhip, when meaſured, ſhould prove leſs, unleſs the burden be *warranted.* If the ſhip be freighted for *tranſporting* cattle or ſlaves, at ſo much a head, and ſome of them die on the paſſage, freight is only due for ſuch as are delivered alive; but, if for *lading* them, it is due for all that were put on board.

When a whole ſhip is freighted, if the maſter ſuffers any other goods beſides thoſe of the freighter to be put on board, he is liable for damages.

It is common to mention the number of days that the ſhip ſhall continue at each port to load or unload. The expreſſion uſed is, *work weather days*; to ſignify, that Sundays, holidays, and days when the weather ſtops the work, are not reckoned. If the ſhip be detained longer, a daily allowance is often agreed on, in name of *demurrage.*

If the voyage be completed in terms of the agreement, without any misfortune, the maſter has a right to demand payment of the freight before he delivers the goods. But if the ſafe delivery be prevented by any fault or accident, the parties are liable according to the following rules:

If the merchant do not load the ſhip within the time agreed on, the maſter may engage with another, and recover damages.

If the merchant load the ſhip, and recall it after it has ſet ſail, he muſt pay the whole freight; but if he unload it before it ſets ſail, he is liable for damages only.

If a merchant loads goods which it is not lawful to export, and the ſhip be prevented from proceeding on that account, he muſt pay the freight notwithſtanding.

If the ſhipmaſter be not ready to proceed on the voyage at the time agreed on, the merchant may load the whole or part of the cargo on board another ſhip, and recover damages; but chance, or notorious accident, by the marine law, releaſes the maſter from damages.

If an embargo be laid on the ſhip before it ſails, the charter-party is diſſolved, and the merchant pays the expence of loading and unloading; but if the embargo be only for a ſhort limited time, the voyage ſhall be performed when it expires, and neither party is liable for damages.

If the ſhipmaſter ſails to any other port than that agreed on, without neceſſity, he is liable for damages; if through neceſſity, he muſt ſail to the port agreed on at his own expence.

If a ſhip be taken by the enemy, and retaken or ranſomed, the charter-party continues in force.

If the maſter transfer the goods from his own ſhip to another without neceſſity, and they periſh, he is liable for the value; but if his own ſhip be in imminent danger, the goods may be put on board another ſhip at the riſk of the owner.

If a ſhip be freighted out and home, and a ſum agreed on for the whole voyage, nothing is due till it return; and the whole is loſt if the ſhip be loſt on the return.

If a certain ſum be ſpecified for the homeward voyage, it is due, although the factor abroad ſhould have no goods to ſend home.

In the caſe of a ſhip freighted to Madeira, Carolina, and home, a particular freight fixed for the homeward voyage, and an option reſerved for the factor at Carolina to decline it, unleſs the ſhip arrived before 1ſt of March: the ſhipmaſter, foreſeeing he could not arrive there within that time, and might be diſappointed of a freight, did not go there at all. He was found liable in damages, as the obligation was abſolute on his part, and conditional only on the other.

If the goods be damaged without fault of the ſhip or maſter, the owner is not obliged to receive them and pay freight, but he muſt either receive the whole or abandon the whole; he cannot chooſe thoſe that are in beſt order, and reject the others. If the goods be damaged through the inſufficiency of the ſhip, the maſter is liable for the ſame; but if it be owing to ſtreſs of weather, he is not accountable. It is cuſtomary for ſhipmaſters, when they ſuſpect damage, to take a *proteſt againſt wind and weather* at their arrival. But as this is the declaration of a party, it does not bear credit, unleſs ſupported by collateral circumſtances.

If part of the goods be thrown overboard or taken by the enemy, the part delivered pays freight.

The ſhipmaſter is accountable for all the goods received on board by himſelf or mariners, unleſs they periſh by the act of God or of the king's enemies.

Shipmaſters are not liable for leakage on liquors, nor accountable for the contents of packages, unleſs packed and delivered in their preſence.

Upon a principle of equity, that the labourer is worthy of his hire, differences ariſing with regard to freight, when the caſe is doubtful, ought rather to be determined in favour of the ſhipmaſter.

2. *Ship and Owners with Creditors.* When debts are contracted for proviſions or repairs to a ſhip, or ariſe from a failure in any of the above-mentioned obligations, the ſhip and tackle, and the owners, are liable for the debt, as well as the maſter.

By the mercantile law, the owners are liable in all caſes, without limitation; but by ſtatute, they are not liable for embezzlement beyond their value of ſhip, tackle, and freight.

A ſhipmaſter may pledge his ſhip for neceſſary repairs during a voyage; and this hypothecation is implied by the maritime law when ſuch debts are contracted. This regulation is neceſſary, and is therefore adopted by all commercial nations; for, otherwiſe, the maſter might not find credit for neceſſary repairs, and the ſhip might be loſt. If repairs be made at different places, the laſt are preferable.

The relief againſt the ſhip is competent to the court of admiralty in England, only when repairs are furniſhed during the courſe of a voyage; for the neceſſity of the caſe extends no further. If a ſhip be repaired at home (*e.g.* upon the river Thames), the creditor is only entitled to relief at common law.

The creditor may ſue either the maſters or owners; but if he undertook the work on the ſpecial promiſe of the one, the other is not liable.

If the maſter buys proviſions on credit, the owners are lia-

ble for the debt, though they have given him money to pay them.

If a ſhip be mortgaged, and afterwards loſt at ſea, the owners muſt pay the debt; for the mortgage is only an additional ſecurity, though there be no expreſs words to that purpoſe in the covenant.

If a ſhip be taken by the enemy, and ranſomed, the owners are liable to pay the ranſom, though the ranſomer die in the hands of the captors.

3. *Owners of ſhip and cargo with each other.* There is a mutual obligation which ſubſiſts between all the owners of a ſhip and cargo. In time of danger, it is often neceſſary to incur a certain loſs of part for the greater ſecurity of the reſt; to cut a cable; to lighten the ſhip, by throwing part of the goods overboard; to run it aſhore; or the like: and as it is unreaſonable that the owners of the thing expoſed for the common ſafety ſhould bear the whole loſs, it is defrayed by an equal contribution among the proprietors of the ſhip, cargo, and freight. This is the famous *Lex Rhodia de jactu*, and is now called a *general average*.

The cuſtom of valuing goods which contribute to a general average is not uniform in all places. They are generally valued at the price they yield at the port of deſtination, charges deducted; and goods thrown overboard are valued at the price they would have yielded there. Sailors wages, clothes and money belonging to paſſengers, and goods belonging to the king, pay no general average; but proprietors of gold and ſilver, in caſe of goods being thrown overboard, contribute to the full extent of their intereſt.

The following particulars are charged as general average: Damage ſuſtained in an engagement with the enemy; attendance on the wounded, and rewards given for ſervice in time of danger, or gratuities to the widows or children of the ſlain; ranſom; goods given to the enemy in the nature of ranſom; charges of bringing the ſhip to a place of ſafety when in danger from the enemy, or waiting for convoy; charges of quarantine; goods thrown overboard; maſts or rigging cut; holes cut in the ſhip to clear it of water; pilotage, when a leak is ſprung; damage, when voluntarily run aground, and expence of bringing it afloat; goods loſt by being put in a lighter; the long boat loſt in lightening the ſhip in time of danger; hire of cables and anchors; charges of laying in ballaſt, victualling, and guarding the ſhip when detained; charges at law in reclaiming the ſhip and cargo; intereſt and commiſſion on all theſe deburſements.

Though goods put on board a lighter, and loſt, are charged as a general average; yet if the lighter be ſaved, and the ſhip with the reſt of the goods be loſt, the goods in the lighter belong to their reſpective proprietors, without being liable to any contribution.

If part of the goods be plundered by a pirate, the proprietor or ſhipmaſter is not entitled to any contribution.

The eſſential circumſtances that conſtitute a general average are theſe: the loſs muſt be the effect of a voluntary action; and the object of that action the common ſafety of the whole. Quarantine, which is allowed, ſeems not to fall within this deſcription.

4. *Quarantine.* See QUARANTINE.

5. *Wrecks.* See WRECK.

6. *Impreſs.* See IMPRESSING.

7. *Inſurance.* See INSURANCE.

Game-LAWS. See the article GAME.

Sir William Blackſtone, treating of the alterations in our laws, and mentioning franchiſes granted of chaſe and free warren, as well to preſerve the breed of animals, as to indulge the ſubject, adds, "From a ſimilar principle to which, though the foreſt laws are now mitigated, and by degrees grown entirely obſolete; yet from this root has ſprung a *baſtard ſlip*, known by the name of the *game law*, now arrived to and wantoning in its higheſt vigour: both founded upon the ſame unreaſonable notion of permanent property in wild creatures; and both productive of the ſame tyranny to the commons; but with this difference, that the foreſt-laws eſtabliſhed only one mighty hunter throughout the land; *the game laws have raiſed a little* Nimrod *in every manor.* And in one reſpect the ancient law was much leſs unreaſonable than the modern; for the king's grantee of a chaſe or free warren might kill game in every part of his franchiſe; but now, though a freeholder of leſs than 100l. a year *is forbidden to kill partridge upon his own eſtate*, yet nobody elſe (not even the lord of the manor, unleſs he hath a grant of free-warren), can do it without *committing a treſpaſs* and *ſubjecting himſelf to an action.*

Under the article GAME, the deſtroying ſuch beaſts and fowls as are ranked under that denomination was obſerved (upon the old principles of the foreſt-law) to be a treſpaſs and offence in all perſons alike, who have not authority from the crown to kill game (which is royal property) by the grant of either a free-warren, or at leaſt a manor of their own. But the laws called the *game-laws* have alſo inflicted additional puniſhments (chiefly pecuniary) on perſons guilty of this general offence, unleſs they be people of ſuch rank or fortune as is therein particularly ſpecified. All perſons, therefore, of what property or diſtinction ſoever, that kill game out of their own territories, or even upon their own eſtates, without the king's licence expreſſed by the grant of a franchiſe, are guilty of the firſt original offence of encroaching on the royal prerogative. And thoſe indigent perſons who do ſo, without having ſuch rank or fortune as is generally called a *qualification*, are guilty, not only of the original offence, but of the aggravations alſo created by the ſtatutes for preſerving the game: which aggravations are ſo ſeverely puniſhed, and thoſe puniſhments ſo implacably inflicted, that the offence againſt the king is ſeldom thought of, provided the miſerable delinquent can make his peace with the lord of the manor. The only rational footing upon which this offence, thus aggravated, can be conſidered as a crime, is, that in low and indigent perſons it promotes idleneſs, and takes them away from their proper employments and callings; which is an offence againſt the public police and economy of the commonwealth.

The ſtatutes for preſerving the game are many and various, and not a little obſcure and intricate; it being remarked, that in one ſtatute only, 5 Anne, c. 14. there is falſe grammar in no fewer than ſix places, beſides other miſtakes: the occaſion of which, or what denomination of perſons were probably the penners of theſe ſtatutes, it is unneceſſary here to inquire. It may be in general ſufficient to obſerve, that the *qualifications* for killing game, as they are uſually called, or more properly the exemptions from the penalties inflicted by the ſtatute law, are, 1. The having a freehold eſtate of 100l. *per annum*; there being fifty times the property required to enable a man to kill a partridge, as to vote for a knight of the ſhire. 2. A leaſehold for 99 years of 150l. *per annum.* 3. Being the ſon and heir apparent of an eſquire (a very looſe and vague deſcription) or perſon of ſuperior degree. 4. Being the owner or keeper of a foreſt, park, chaſe, or warren. For unqualified perſons tranſgreſſing theſe laws, by killing game, keeping engines for that purpoſe, or even having game in their cuſtody, or for perſons (however qualified) that kill game, or have it in poſſeſſion, at unſeaſonable times of the year, or unſeaſonable hours of the day or night, on Sundays or on Chriſtmas day, there are various penalties aſſigned, corporal and pecuniary, by different ſtatutes (after-mentioned), on any

of which, but only on one at a time, the juſtices may convict in a ſummary way, or (in moſt of them) proſecutions may be carried on at the aſſizes. And, laſtly, by ſtatute 28 Geo. II. c. 12. no perſon, however qualified to kill, may make merchandiſe of this valuable privilege, by ſelling or expoſing to ſale any game, on pain of like forfeiture as if he had no qualification.

The ſtatutes above referred to are as follow: No perſon ſhall take pheaſants or partridges with engines on another man's ground, without licence, on pain of 10l. Stat. 11 Hen. VII. c. 13. If any perſon ſhall take or kill any pheaſants or partridges with any net in the night-time, they ſhall forfeit 20s. for every pheaſant, and 10s. for every partridge taken: and hunting with ſpaniels in ſtanding corn incurs a forfeiture of 40s. 23 Eliz. c. 10. Thoſe who kill any pheaſant, partridge, duck, heron, hare, or other game, are liable to a forfeiture of 20s. for every fowl and hare; and ſelling, or buying to ſell again, any hare, pheaſant, &c. the forfeiture is 10s. for each hare, &c. 1 Jac. I. c. 17. Alſo pheaſants or partridges are not to be taken between the firſt of July and the laſt of Auguſt, on pain of impriſonment for a month, unleſs the offenders pay 20s. for every pheaſant, &c. killed: and conſtables, having a juſtice of peace's warrant, may ſearch for game and nets in the poſſeſſion of perſons not qualified by law to kill game or to keep ſuch nets, 7 Jac. I. c. 11. Conſtables, by a warrant of a juſtice of peace, are to ſearch houſes of ſuſpected perſons for game: and if any game be found upon them, and they do not give a good account how they came by the ſame, they ſhall forfeit for every hare, pheaſant, or partridge, not under 5s. nor exceeding 20s. And inferior tradeſmen hunting, &c. are ſubject to the penalties of the act, and may likewiſe be ſued for treſpaſs. If officers of the army or ſoldiers kill game without leave, they forfeit 5l. an officer, and 10s. a ſoldier, 4 & 5 W. and M. c. 23. Higglers, chapmen, carriers, inn-keepers, victuallers, &c. having in their cuſtody hare, pheaſant, partridge, heath-game, &c. (except ſent by ſome perſon qualified to kill game), ſhall forfeit for every hare and fowl 5l. to be levied by diſtreſs and ſale of their goods, being proved by one witneſs before a juſtice; and for want of diſtreſs ſhall be committed to the houſe of correction for three months: one moiety of the forfeiture to the informer, and the other to the poor. And ſelling game, or offering the ſame to ſale, incurs the like penalty; wherein hare and other game found in a ſhop, &c. is adjudged an expoſing to ſale: killing hares in the night is liable to the ſame penalties: and if any perſons ſhall drive wild-fowls with nets, between the firſt day of July and the firſt of September, they ſhall forfeit 5s. for every fowl; 5 Ann. c. 14. 9 Ann. c. 25. If any unqualified perſon ſhall keep a gun, he ſhall forfeit 10l. and perſons being qualified may take guns from thoſe that are not, and break them; 21 & 22 Car. II. c. 25. and 33 H. VIII. c. 6. One juſtice of peace, upon examination and proof of the offence, may commit the offender till he hath paid the forfeiture of 10l. And perſons, not qualified by law, keeping dogs, nets, or other engines to kill game, being convicted thereof before a juſtice of peace, ſhall forfeit 5l. or be ſent to the houſe of correction for three months; and the dogs, game, &c. ſhall be taken from them, by the ſtatute 5 Ann. If a perſon hunt upon the ground of another, ſuch other perſon cannot juſtify killing of his dogs, as appears by 2 Roll. Abr. 567. But it was otherwiſe adjudged, Mich. 33 Car. II. in C. B. 2 Cro. 44. and ſee 3. Lev. xxviii. In actions of debt, *qui tam*, &c. by a common informer on the ſtatute 5 Ann. for 15l. wherein the plaintiff declared on two ſeveral counts, one for 10l. for killing two partridges, the other for 5l. for keeping an engine to deſtroy the game, not being qualified, &c. the plaintiff had a verdict for 5l. only: this action was brought by virtue of the ſtat. 8 Geo. I. See ſtat. 9 Geo. I. c. 22. See likewiſe 24 Geo. II. c. 34. for the better preſervation of the game in Scotland. By the ſtat. 26 Geo. II. c. 2. all ſuits and actions brought by virtue of ſtat. 3 Geo. I. c. —— for the recovery of any pecuniary penalty, or ſum of money, for offences committed againſt any law for the better preſervation of the game, ſhall be brought before the end of the ſecond term after the offence committed.

By 28 Geo. II. c. 12. perſons ſelling, or expoſing to ſale, any game, are liable to the penalties inflicted by 5 Ann. c. 14. on higglers, &c. offering game to ſale: and game found in the houſe or poſſeſſion of a poulterer, ſaleſman, fiſhmonger, cook, or paſtry-cook, is deemed expoſing thereof to ſale.

By 2 Geo. III. c. 19 after the 1ſt of June, 1762, no perſon may take, kill, buy or ſell, or have in his cuſtody, any partridge, between 12th February and 14th September, or pheaſant between 1ſt February and 1ſt October, or heath-fowl between 1ſt January and 20th Auguſt, or grouſe between 1ſt December and 25th July, in any year; pheaſants taken in their proper ſeaſon, and kept in mews, or breeding places, excepted: and perſons offending in any of the caſes aforeſaid, forfeit 5l. per bird, to the proſecutor, to be recovered, with full coſts, in any of the courts at Weſtminſter. By this act, likewiſe, the whole of the pecuniary penalties under the 8 Geo. I. c. 19. may be ſued for, and recovered to the ſole uſe of the proſecutor, with double coſts; and no part thereof to go to the poor of the pariſh.

By 5 Geo. III. c. 14. perſons convicted of entering warrens in the night-time, and taking or killing coneys there, or aiding or aſſiſting therein, may be puniſhed by tranſportation, or by whipping, fine, or impriſonment. Perſons convicted on this act, not liable to be convicted under any former act. This act does not extend to the deſtroying coneys in the day-time, on the ſea and river-banks in the county of Lincoln, &c. No ſatisfaction to be made for damages occaſioned by entry, unleſs they exceed 1s. It may not be improper to mention an act lately made, and not yet repealed, viz. 10 Geo. III. c. 19. for preſervation of the game, which ſhows the importance of the object. It is thereby enacted, That if any perſon kill any hare, &c. between ſun-ſetting and ſun-riſing, or uſe any gun, &c. for deſtroying game, he ſhall for the firſt offence be impriſoned for any time not exceeding ſix nor leſs than three months; if guilty of a ſecond offence, after conviction of a firſt, to be impriſoned for any time not exceeding twelve months nor leſs than ſix; and ſhall alſo, within three days after the time of his commitment, either for the firſt or for any other offence, be once publicly whipped.

By 25 Geo III. c. 50. and 31 Geo. III. c. 21. every perſon in Great Britain (the royal family excepted), who ſhall, after July 1, 1785, uſe any dog, gun, net, or other engine, for the taking or deſtruction of game (not as acting as gamekeeper), ſhall deliver in a paper or account in writing, containing his name and place of abode, to the clerk of the peace or his deputy, and annually take out a certificate thereof; and every ſuch certificate ſhall be charged with a ſtamp-duty of 2l. 2s. (and an additional 1l. 1s. by 31 Geo. III. c. 21.) making in the whole 3l. 3s.—Every deputation of a gamekeeper ſhall be regiſtered with the clerk of the peace, and ſuch gamekeeper ſhall annually take out a certificate thereof; which certificate ſhall be charged with a ſtamp duty of 10s. 6d. (and an additional 10s. 6d. by 31 Geo. III. c. 21), making in the whole 1l. 1s.—The duties to be under the management of the commiſſioners of the ſtamp office.

From and after the ſaid 1ſt of July, 1785, the clerk of the peace ſhall annually deliver to perſons requiring the ſame, duly ſtamped, a certificate or licence according to the form therein

mentioned, for which he ſhall be entitled to demand 1s. for his trouble; and on refuſal or neglect to deliver the ſame, forfeit 20l.—Every certificate to bear date the day when iſſued, and to continue in force until the 1ſt day of July then following, on penalty of 20l.

After the 1ſt day of July, 1785, any perſon that ſhall uſe any greyhound, hound, pointer, ſetting-dog, ſpaniel, or other dog, or any gun, net, or engine, for taking or killing of game, without a certificate, is liable to the penalty of 20l. And if any gamekeeper ſhall, for the ſpace of 20 days after the ſaid 1ſt day of July, or if any gamekeeper thereafter to be appointed ſhall, for the ſpace of 20 days next after ſuch appointment, neglect or refuſe to regiſter his deputation and take out a certificate thereof, he is liable to the penalty of 20l.

The clerks of the peace are to tranſmit to the ſtamp-office in London alphabetical liſts of the certificates granted in every year before the 1ſt day of Auguſt, under penalty of 20l. Theſe liſts are to be kept at the ſtamp-office in London, and there to be inſpected on payment of 1s.: And the commiſſioners of the ſtamp duties are, once or oftener in every year, as ſoon as ſuch liſts are tranſmitted to them, to cauſe the ſame to be publiſhed in the newſpapers circulating in each county, or ſuch public paper as they ſhall think moſt proper.

If any gamekeeper, who ſhall have regiſtered his deputation, and taken out a certificate thereof, ſhall be changed, and a new gamekeeper appointed in his ſtead, the firſt certificate is declared null and void, and the perſon acting under the ſame after notice, is liable to the penalty of 20l. And any perſon in purſuit of game, who ſhall refuſe to produce his certificate, or to tell his name and place of abode, or ſhall give in any falſe or fictitious name or place of abode to any perſon requiring the ſame, who ſhall have obtained a certificate, is liable to the penalty of 50l.

The certificates are not to authorize perſons to kill game at any time prohibited by law, nor to give any perſon any right to kill game, unleſs ſuch perſon ſhall be qualified ſo to do by the laws now in being, but ſhall be liable to the ſame penalties as if this act had not paſſed. [So that though by this act qualified and unqualified perſons are equally included, yet, having a certificate does not give an unqualified perſon a right to kill game: the point of right ſtill ſtands upon the former acts of parliament; and any unqualified perſon killing game without a certificate, is not only liable to the penalty inflicted by this act, but alſo to all the former penalties relating to the killing of game, &c.]

Witneſſes refuſing to appear on juſtices' ſummons, or appearing and refuſing to give evidence, forfeit 10l. The certificates obtained under deputations, not to be given in evidence for killing of game by a gamekeeper out of the manor, in reſpect of which ſuch deputation or appointment was given and made. Perſons counterfeiting ſtamps to ſuffer death as felons.

Penalties exceeding 20l. are to be recovered in any of his majeſty's courts of record at Weſtminſter; and penalties not exceeding 20l. are recoverable before two juſtices, and may be levied by diſtreſs. The whole of the penalties go to the informer.

Military LAW. See MILITARY and MARINE.

LAW (JOHN), the famous projector, was the eldeſt ſon of a goldſmith burgeſs in Edinburgh, by Elizabeth Campbell, heireſs of Laurieſton near that city; and was born about the year 1681. He was bred to no buſineſs; but poſſeſſed great abilities, and a very fertile invention. He had the addreſs, when but a very young man, to recommend himſelf to the king's miniſters in Scotland to arrange and fit the revenue accounts, which were in great diſorder at the time of ſettling the equivalent before the union of the kingdoms. The attention of the Scottiſh parliament being alſo turned to the contrivance of ſome means for ſupplying the kingdom with money, and facilitating the circulation of ſpecie, for want of which the induſtry of Scotland languiſhed; he propoſed to them, for theſe purpoſes, the eſtabliſhment of a bank of a particular kind, which he ſeems to have imagined might iſſue paper to the amount of the whole value of all the lands in the country: but this ſcheme the parliament by no means thought it expedient to adopt.

His father dying about the year 1704, Law ſucceeded to the ſmall eſtate of Laurieſton; but the rents being inſufficient for his expences, he had recourſe to gaming. He was tall and graceful in his perſon, and much addicted to gallantry and finery; and giving a ſort of *ton* at Edinburgh, he went commonly by the name of *Beau Law*. He was forced to fly his country, however, in the midſt of his career, in conſequence of having fought a duel and killed his antagoniſt; and in ſome of the French literary gazettes it is ſaid that he ran off with a married lady. In his flight from juſtice he viſited Italy; and was baniſhed from Venice and Genoa, becauſe he contrived to drain the youths of theſe cities of their money, by his ſuperiority in calculation, that is, by being a cheat and a ſharper. He wandered over all Italy, living on the event of the moſt ſingular bets and wagers, which ſeemed to be advantageous to thoſe who were curious after novelty; but which were always of the moſt certain ſucceſs with regard to him. He arrived at Turin, and propoſed his ſyſtem to the duke of Savoy, who ſaw at once, that, by deceiving his ſubjects, he would in a ſhort time have the whole money of the kingdom in his poſſeſſion: but that ſagacious prince aſking him how his ſubjects were to pay their taxes when all their money ſhould be gone, Law was diſconcerted, not expecting ſuch a queſtion.

Having been baniſhed from Italy, and thus repulſed at Turin, Law proceeded to Paris, where he was already known as a projector. In the lifetime of Louis XIV. he had tranſmitted his ſchemes to Deſmareſt and to Chamillard, who had rejected them as dangerous innovations. He now propoſed them to the Duc d'Orleans, who deſired Noailles to examine them, to be as favourable in his report as poſſible, and to remark ſuch of them as were practicable. Noailles called in the aſſiſtance of ſeveral merchants and bankers, who were averſe to the ſyſtem. Law then propoſed the eſtabliſhment of a bank, compoſed of a company, with a ſtock of ſix millions. Such an inſtitution promiſed to be very advantageous to commerce. An arret of the 2d March, 1716, eſtabliſhed this bank, by authority, in favour of Law and his aſſociates; two hundred thouſand ſhares were inſtituted of one thouſand livres each; and Law depoſited in it to the value of two or three thouſand crowns, which he had accumulated in Italy by gaming or otherwiſe. This eſtabliſhment very much diſpleaſed the bankers, becauſe at the beginning buſineſs was tranſacted here at a very ſmall premium, which the old financiers had charged very highly. Many people had at firſt little confidence in this bank; but when it was found that the payments were made with quickneſs and punctuality, they began to prefer its notes to ready money. In conſequence of this, ſhares roſe to more than 20 times their original value; and in 1719 their valuation was more than 80 times the amount of all the current ſpecie in the kingdom. But the following year, this great fabric of falſe credit fell to the ground, and almoſt overthrew the French government, ruining ſome thouſands of families; and it is remarkable, that the ſame deſperate game was played by the South Sea directors in England, in the ſame fatal year, 1720. Law being exiled as ſoon as the credit of his projects began to fail, retired to Venice, where he died in 1729.

The principles upon which Law's original ſcheme was founded, are explained by himſelf in *A Diſcourſe concerning*

Money and Trade, which he publiſhed in Scotland, where (as we have ſeen) he firſt propoſed it. "The ſplendid but viſionary ideas which are ſet forth in that and ſome other works upon the ſame principles (Dr. Adam Smith obſerves), ſtill continue to make an impreſſion upon many people, and have perhaps in part contributed to that exceſs of banking which has of late been complained of both in Scotland and in other places."

LAW (Edmund), D. D. biſhop of Carliſle, was born in the pariſh of Cartmel in Lancaſhire, in the year 1703. His father, who was a clergyman, held a ſmall chapel in that neighbourhood; but the family had been ſituated at Aſkham, in the county of Weſtmoreland. He was educated for ſome time at Cartmel ſchool, afterwards at the free grammar-ſchool at Kendal; from which he went, very well inſtructed in the learning of grammar ſchools, to St. John's college in Cambridge.

Soon after taking his firſt degree, he was elected fellow of Chriſt-college, and during his reſidence there, he became known to the public by a tranſlation of Archbiſhop King's Eſſay upon the Origin of Evil, with copious notes; in which many metaphyſical ſubjects, curious and intereſting in their own nature, are treated of with great ingenuity, learning, and novelty. To this work was prefixed, under the name of a Preliminary Diſſertation, a very valuable piece, written by the reverend Mr. Gay of Sidney college. Whilſt at Chriſt-college, he alſo undertook and went through a very laborious part in preparing for the preſs an edition of Stephens's Theſaurus.

Dr. Law held the ſee of Carliſle almoſt 19 years; during which time he twice only omitted ſpending the ſummer months in his dioceſe. In the year 1787 he paid this viſit in a ſtate of great weakneſs and exhauſtion; and died at Roſe about a month after his arrival there, on the 14th day of Auguſt, and in the 84th year of his age.

The life of this prelate was ſpent in inceſſant reading and thought, almoſt entirely directed to metaphyſical and religious inquiries. Beſides the works already mentioned, he publiſhed, in 1734 or 1735, a very ingenious *Inquiry into the Ideas of Space, Time*, &c. in which he combats the opinions of Dr. Clarke and his adherents on theſe ſubjects.

The biſhop was interred with due ſolemnity in his cathedral church, in which a handſome monument is erected to his memory.

LAWENBURG, Duchy, a territory of Germany, in the circle of Lower Saxony, bounded by the duchy of Holſtein on the north and weſt, by the duchy of Mecklenburg on the eaſt; and by the duchy of Lunenburgh, from which it is ſeparated by the river Elbe, on the weſt; being about 85 miles long, and 20 broad. The chief towns are Lawenburg, Mollen, Wittemburg, and Ratzeburg. It belongs to the elector of Hanover.

LAWENBURG, a city of Germany in the circle of Lower Saxony, and capital of a duchy of the ſame name. It is a ſmall but populous town, ſituated on the Elbe, under the brow of a very high hill, from whence there is a delightful proſpect over the adjacent country. It has a caſtle on an eminence, and is convenient for trade. E. long. 10. 51. N. lat. 53. 36.

LAWENBURG, a town of Germany in Farther Pomerania, and the chief place of a territory of the ſame name, belonging to the elector of Brandenburg.

LAWERS, an eminent engraver, who flouriſhed about the middle of the 16th century. He was a native of Flanders, and probably ſtudied under Paul Pontius, whoſe ſtyle of engraving he frequently imitated. He poſſeſſed a conſiderable ſhare of merit; but was by no means equal to that great maſter, either in the excellency of the handling of the graver, or knowledge of drawing. He engraved from ſeveral painters; but his beſt works are from the pictures of Rubens.

LAWES (HENRY), a celebrated muſician, and the Purcell of his time. He was a ſervant to Charles I. in his public and private muſic, and ſet ſome of the works of almoſt every poet of eminence in that reign. The Comus of Milton, and ſeveral of the lyrics of Waller, were ſet by him; and both theſe poets have done him honour in their verſes. He compoſed a conſiderable number of pſalm-tunes in the *Cantica Sacra*, for three voices and an organ; and many more of his compoſitions are to be ſeen in a work called *Select airs and dialogues*; alſo in the *Treaſury of Muſic*, and the *Muſical companion*. He died in 1662.

LAWES (William), was brother to the former, and a moſt capital muſician. He made above 30 ſeveral ſorts of muſic for voices and inſtruments; nor was there any inſtrument then in uſe, but he compoſed to it as aptly as if he had ſtudied that alone. In the muſic ſchool at Oxford are two large manuſcript volumes of his works in ſcore for various inſtruments. He was a commiſſary under general Gerard in the civil war, and, to the great regret of the king, was killed at the ſiege of Cheſter in 1645.

LAWINGEN, a town of Germany, in the circle of Suabia; formerly imperial, but now ſubject to the duke of Neuburg. Here the duke of Bavaria, in 1704, fortified his camp to defend his country againſt the Britiſh forces and their allies commanded by the duke of Marlborough, who forced their intrenchments. It is ſeated on the Danube, in E. long. 10. 29. N. lat. 38. 32.

LAWLESS COURT, a court ſaid to be held annually on King's Hill at Rochford in Eſſex, on the Wedneſday morning after Michaelmas-day at cock crowing, where they whiſper, and have no candle, nor any pen and ink, but only a coal. Perſons who owe ſuit, or ſervice, and do not appear, forfeit double their rent every hour they are miſſing. This ſervile attendance, Cambden informs us, was impoſed on the tenants for conſpiring at the like unſeaſonable hour to raiſe a commotion. The court belongs to the honour of Raleigh, and to the earl of Warwick; and is called *lawleſs*, from its being held at an unlawful hour.

LAWN, a ſpacious plain in a park, or adjoining to a noble ſeat. As to the dimenſions of a lawn: In a large park, it ſhould be as extenſive as the ground will permit; and, if poſſible, it ſhould never be leſs than 50 acres: but in gardens of a moderate extent, a lawn of 10 acres is ſufficient; and in thoſe of the largeſt ſize, 15 acres. The beſt ſituation for a lawn is in the front of the houſe: and here, if the houſe front the eaſt, it will be extremely convenient; but the moſt deſirable aſpect for a lawn is that of the ſouth-eaſt. As to the figure of the lawn, ſome recommend an exact ſquare, others an oblong ſquare, ſome an oval, and others a circular figure: but neither of theſe are to be regarded. It ought to be ſo contrived, as to ſuit the ground; and there ſhould be trees planted for ſhade on the boundaries of the lawn; ſo the ſides may be broken by irregular plantations of trees, which, if there are not ſome good proſpects beyond the lawn, ſhould bound it on every ſide, and be brought round pretty near to each end of the houſe. If in theſe plantations round the lawn the trees are placed irregularly, ſome breaking much forwarder on the lawn than others, and not crowded too cloſe together, they will make a better appearance than any regular plantations can poſſibly do; and if there are variety of trees, properly diſpoſed, they will have a good effect; but only thoſe which make a fine appearance, and grow large, ſtraight, and handſome, ſhould be admitted here. The moſt proper trees for this purpoſe are the elm, oak, cheſnut, and beech; and if there are ſome clumps of ever-green trees intermixed with the others, they will add to the beauty of the whole, eſpecially in

the winter-ſeaſon; the beſt ſorts for this purpoſe are lord Weymouth's pine, and the ſilver and ſpruce firs.

LAWN, in manufactures, a fine ſort of linen, remarkable for being uſed in the ſleeves of biſhops.

LAWRENCE (St.), the largeſt river in North America, proceeding from the lake Ontario, from which it runs a courſe of 700 miles to the Atlantic ocean. It is navigable as far as Quebec, which is above 400 miles; but beyond Montreal it is ſo full of ſhoals and rocks, that it will not admit large veſſels without danger, unleſs the channel be very well known.

LAWSONIA, Egyptian privet: A genus of the monogynia order, belonging to the octandria claſs of plants; and in the natural method ranking with thoſe of which the order is doubtful. The calyx is quadrifid; the petals four; the ſtamina four in pairs; the capſule is quadrilocular and polyſpermous. There are two ſpecies, the inermis and ſpinoſa, both natives of India. Some authors take the firſt to be the plant termed by the Arabians *henna* or *alhenna*; the pulveriſed leaves of which are much uſed by the eaſtern nations for dyeing their nails yellow: but others, Dr. Haſſelquiſt in particular, attribute that effect to the leaves of the other ſpecies of Egyptian privet which bears prickly branches. It is probable, that neither ſet of writers are miſtaken, and that the ſhrub in queſtion is a variety only of the thorny lawſonia, rendered mild by culture.

Alhenna grows naturally and is cultivated throughout India, as alſo in Egypt, Paleſtine, and Perſia. In thoſe countries, ſays Haſſelquiſt, it flowers from May to Auguſt. The leaves being pulveriſed, are made with water into a paſte, which the inhabitants of thoſe countries bind on the nails of their hands and feet, keeping it on all night. The deep yellow colour that is thus obtained is conſiderably permanent, not requiring to be renewed for ſeveral weeks. It would ſeem that this cuſtom is very ancient in Egypt; the nails of ſome mummies being found dyed in this manner. The dried flowers of henna afford a fragrant yet ſickly ſmell.

LAWYER, ſignifies a counſellor, or one that is learned or ſkilled in the law. See Counsellor, Barrister, and Serjeant.

LAY, a kind of ancient poem among the French, conſiſting of very ſhort verſes. There were two ſorts of lays; the *great* and the *little*. The firſt was a poem conſiſting of twelve couplets of verſes, of different meaſures. The other was a poem conſiſting of ſixteen or twenty verſes, divided into four couplets.

Theſe lays were the lyric poetry of the old French poets, who were imitated by ſome among the Engliſh. They were principally uſed on melancholy ſubjects, and are ſaid to have been formed on the model of the trochaic verſes of the Greek and Latin tragedies. Father Mourgues gives us an extraordinary inſtance of one of theſe ancient lays, in his Treatiſe of French Poetry:

Sur l'appuis du monde
Que faut-il qu'on fonde
D'eſpoir?
Cette mer profonde,
En debris feconde,
Fait voir
Calme au matin, l'onde
Et l'orage y gronde
Le ſoir.

Lay-*Brothers*, among the Romaniſts, thoſe pious but illiterate perſons, who devote themſelves in ſome convent to the ſervice of the religious. They wear a different habit from that of the religious; but never enter into the choir, nor are preſent at the chapters; nor do they make any other vow except of conſtancy and obedience. In the nunneries there are alſo layſiſters.

Lay-*Man*, one who follows a ſecular employment, and has not entered into holy orders.

LAYERS, in gardening, are tender ſhoots or twigs of trees, laid or buried in the ground, till, having ſtruck root, they are ſeparated from the parent tree, and become diſtinct plants. The propagating trees by *layers* is done in the following manner: The branches of the trees are to be ſlit a little way, and laid under the mould for about half a foot; the ground ſhould be firſt made very light, and after they are laid they ſhould be gently watered. If they will not remain eaſily in the poſition they are put in, they muſt be pegged down with wooden hooks: the beſt ſeaſon for doing this is, for evergreens, toward the end of Auguſt, and, for other trees, in the beginning of February. If they are found to have taken root, they are to be cut off from the main plant the ſucceeding winter, and planted out. If the branch is too high from the ground, a tub of earth is to be raiſed to a proper height for it. Some pare off the rind, and others twiſt the branch before they lay it: but this is not neceſſary. The end of the layer ſhould be about a foot out of the ground; and the branch may be either tied tight round with a wire, or cut upwards from a joint, or cut round for an inch or two at the place, and it is a good method to pierce ſeveral holes through it with an awl above the part tied with the wire.

LAYING the land, in navigation, the ſtate of motion which increaſes the diſtance from the coaſt, ſo as to make it appear lower and ſmaller; a circumſtance which evidently ariſes from the intervening convexity of the ſurface of the ſea. It is uſed in contradiction to *raiſing* the land, which is produced by the oppoſite motion of approach towards it. See Land.

LAZAR house, or Lazaretto, a public building, in the nature of an hoſpital, to receive the poor, and thoſe afflicted with contagious diſtempers. In ſome places, lazarettos are appointed for the performance of quarantine; in which caſe, thoſe are obliged to be confined in them who are ſuſpected to have come from places infected with the plague.

LAYSTOFF, or Lowestoff, a town of Suffolk 117 miles from London, ſeems to hang over the ſea, and its chief buſineſs is fiſhing for cod in the North Sea, and for herring, mackarel, and ſprats, at home. The church being three furlongs off, there is a chapel in the place. Having been a part of the ancient demeſnes of the crown, this town has a charter and a ſeal, by the former of which the inhabitants are exempted from ſerving on juries. Here is a market on Wedneſday, and two fairs in the year. Some take this to be the moſt eaſtern part of Britain.

LAZULI, or *Lapis* Lazuli, a ſpecies of zeolite belonging to the claſs of argillaceous earths. See Clay. It is of a blue colour. That which is of a fine blue inclining to purple, has obtained the name of Oriental; but the pale blue is leſs eſteemed. It is frequently variegated with yellow, and white ſhining veins and ſpeckles; which the common people take for gold and ſilver, though they are in truth nothing but marcaſites. The lapis lazuli has the following properties: 1. It retains its blue colour for a long time in a calcining heat; but changes at laſt to a brown. 2. It melts eaſily in the fire to a white frothy ſlag; which puffs up greatly when expoſed to the flame of a blow-pipe; but with a ſtrong heat in a covered veſſel, it becomes clear and ſolid, with blue clouds in it. 3. It does not ferment with acids; but, if boiled with oil of vitriol it ſlowly diſſolves, and loſes its blue colour. On adding a ſolution of fixed alkali, it precipitates a white earth, which be-

ing ſcorified with borax, yields a ſilver-coloured regulus, varying in bigneſs according to the different ſpecimens of the ſtone. 4. By ſcorification with lead, it yields ſilver, ſometimes in the quantity of two ounces to a hundred weight of the ſtone. 5. Oil of vitriol diſcovers the preſence of ſilver more certainly in lapis lazuli than ſpirit of nitre. 6. On adding ſpirit of ſal ammoniac to any ſolution either of crude or calcined lapis lazuli, no blue colour is produced; a certain proof that it does not depend on copper; which is further confirmed by the fixity of the blue colour in the fire, and the colour of the ſlag or glaſs. 7. It is ſomewhat harder than the other kinds of zeolite, but does not approach to the hardneſs of quartz or other ſiliceous ſtones in general; for the pureſt and fineſt lapis lazuli may be rubbed into a white powder by means of ſteel, though it takes a poliſh like marble. 8. When perfectly calcined, it is a little attracted by the loadſtone; and when ſcorified with lead, the ſlag becomes of a greeniſh colour, not like that produced by copper, but ſuch as is always produced by iron mixed with a calcareous ſubſtance.

Mongez informs us, that ſome of the parts of lapis lazuli will ſtrike fire with ſteel. According to Cronſtedt, it is ſeldom found pure; but generally full of veins of quartz, limeſtone, and marcaſite: but for the experiments by which the above-mentioned qualities were determined, the pureſt pieces were picked; ſuch as had been examined through a magnifying glaſs, and judged as free from heterogeneous mixture as poſſible. Our author expreſſes a wiſh that ſuch as are in poſſeſſion of any quantity of the ſtone would make farther experiments, in order to determine what ſubſtance it is which produces the blue colour ſo conſtant in the fire, ſince it cannot depend either on copper or iron; for though theſe metals, on certain occaſions, give a blue colour, yet they never produce any other but what inſtantly vaniſhes in the fire, and is deſtroyed by means of an alkali. "What is mentioned in ſeveral books (ſays he) can by no means be objected here; ſince in theſe proceſſes the ſilver employed is mixed with copper and other ſubſtances which contain a volatile alkali, whereby the blue colour is produced."

In the year 1761 M. Margraaf publiſhed ſome experiments on the lapis lazuli; in which he agrees in a great meaſure with Cronſtedt. According to him, the lapis lazuli does not contain any copper; but he found in it a calcareous and gypſeous ſubſtance, though he took care to pick out the very pureſt bits he could find. Engeſtrom, however, is of opinion, that the calcareous ſubſtance is not eſſential to lapis lazuli; as Cronſtedt ſays, that the lapis lazuli he tried did not ferment with acids. He farther mentions, that when diſſolved in any of the mineral acids, it always turned them into a jelly. Some of his experiments alſo ſeem to indicate, that all kinds of lapis lazuli do not contain ſilver, though many of them do.

Lapis lazuli is found in many parts of the world; but that of Aſia and Africa is much ſuperior both in beauty and real value to the Bohemian and German kind, which is too often ſold in its place.

LEACHLADE, a town of Glouceſterſhire, 12 miles eaſt from Cirencester, 29 miles from Glouceſter, and 60 from London. The river Thames waters it on the ſouth and eaſt ſides, and divides it from Wiltſhire and Berkſhire. The Leach runs through the north ſide of the pariſh. The Thames river is navigable for barges of 50 tons burden, but want of water one part of the year makes the navigation very uncertain. Here is a ſmall market on Tueſday, and two fairs in the year. The church is a large handſome building, with double aiſles, ſupported by two rows of fluted pillars.

LEAD, one of the imperfect metals, of a dull white colour inclining to blue, the leaſt ductile, the leaſt elaſtic, and the leaſt ſonorous, of the whole, poſſeſſes a conſiderable degree of ſpecific gravity, reaching from 11.3 to 11.479. It is found,

1. *Native.* Cronſtedt and ſome other mineralogiſts have doubted whether native lead was ever found in the earth, but the matter is now decided by innumerable teſtimonies. It appears from the Philoſophical Tranſactions for 1772, that ſome ſmall pieces of native lead were found in the county of Monmouth in Wales. It is ſaid alſo to be found in the Vivarais in France. Bomare mentions a curious ſpecimen of native lead kept in the collection of the abbé Nolin at Paris, that had been found in the lead mines of *Pompean*, near Rennes in Brittany. It was very malleable, could be cut with a knife without crumbling, and eaſily melted over the flame of a candle. It weighed about two pounds; was imbedded in an earthy lead ore of a reddiſh colour; and had a flaty vein that went through the middle of it.

2. *Lead ſpar*, is ſometimes tranſparent, but generally opake, and cryſtallized in regular forms of a laminar or ſtriated texture. Lead ochre, or native ceruſs, is the ſame ſubſtance, but in a looſe form, or indurated and ſhapeleſs. Sometimes it is found in a ſilky form. Both contain ſome iron, calcareous earth, and clay; and both grow red or yellowiſh when heated. They effervesce with acids, and afford from 60 to 80 or 90 *per cent.* of lead. They are found in Brittany, Lorrain, Germany, and England.

M. Sage, of the royal academy of Paris, pretended that the white lead ore from Poulawen in the county of Bretagne in France, was mineralized by the marine acid; but his miſtake was detected by the commiſſioners of that academy. This ore, according to the ſame academicians, is compoſed of ſtriated cryſtals, of a whitiſh pale red or grey colour. There is a lead ore of this kind ſometimes grey and ſometimes yellow, which is very heavy. Its ſtructure is either lamellated or fibrous, and its laminæ can hardly be ſeparated; but it is friable, and may be cut with a knife. Sometimes it is cryſtallized; and ſometimes its fibres are extremely thin, ſemitranſparent, and have a ſilky look. They effervesce with acids, decrepitate in the fire, and ſeem to loſe the aërial acid by which the lead is mineraliſed.

The ſparry lead ore has often a ſemitranſparency like the ſparry fluor; its cryſtals being generally terminated by hexahedral priſms, or cylindrical columns, ſtriated, and apparently compoſed of a great number of filaments. Theſe ſparry cryſtals are always found in the ſame places with the galenas or ſulphurated lead ores; and ſeem to be formed from their decompoſition after the loſs of their ſulphur; ſo that it is not uncommon to find galenas which are beginning to paſs into a ſtate of white lead. There is a black ore of lead, which may be ſuppoſed to be in an intermediate ſtate betwixt the white lead ore and galena, as it ſeems to be a true white lead tinged by the hepatic vapours of the ſulphur on its parting from the galena. There is alſo a green tranſparent lead, having a more or leſs yellowiſh caſt. It frequently has no regular form, and appears like a kind of moſs. When this green ore is cryſtallized, it conſiſts of hexahedral truncated priſms, terminated by ſix-ſided pyramids, either entire or truncated near the baſe. Profeſſor Brunnich tells us, that the green and the black lead ores from Saxony, and the Hungarian blue ores, are priſmatic. According to Kirwan and Mongez, the green lead ores are either cryſtallized in needles as in Brittany, or in a looſe powder as in Saxony; but moſtly adhering to and inveſting quartz. They owe their green colour to iron, ſeldom containing any copper, and are very rare. Brunnich mentions a ſapphire-coloured ore once found among ſome white lead ſpar at Wendiſh Lemen. It was eaſily melted by the blow-pipe. Natural red-lead or minium has been found in ſome Siberian mines. It is found either cryſtallized, or in ſhapeleſs maſſes,

or in powder, in which it agrees with the brown or yellow ores. Dr. J. R. Forſter brought ſome of this cryſtallized red lead ore from Ruſſia. The cryſtals were cubical, and the colour ſeemed rather pale. The red Siberian ores are perfectly rhombic; thoſe from Bohemia have a cubical or rhomboidal form. Sulphur and arſenic have been found in the red ones, but the others have not been ſufficiently inveſtigated. Moſt of them effervеſce with acids.

3. *Arſenical lead ſpar.* Cronſtedt ſays, that he tried an ore of this kind from an unknown place in Germany, and found that no metal could be melted from it by means of the blow-pipe, as could be done by other ſpars; but by doing it in a crucible, that part of the arſenic which did not fly off was likewiſe reduced, and found in the form of grains diſperſed, and forced into the lead. Another ore ſimilar to this, and which likewiſe was not eaſily reduced by means of the blow-pipe, always ſhot into polygonal, but chiefly hexagonal cryſtals, after being melted, having ſhining ſurfaces. Profeſſor Brunnich obſerves, that theſe ores effervеſce with acids, and contain 40 *per cent.* of lead.

4. The *bley-glanz* of the Germans contains lead mineraliſed with ſulphur alone, and of this there are two or three varieties. At Villach in Auſtria there is ſaid to be found a potters lead-ore containing not the ſmalleſt portion of ſilver.

5. *Lead mineraliſed by the vitriolic acid,* is generally in the form of a white maſs, ſoluble in 18 times its quantity of water. Sometimes it is blackiſh, and cryſtallized in very long ſtriæ, or in friable ſtalactites; this laſt variety effloreſces in the air, and is converted into a true vitriol of lead. According to Mr. Kirwan, it does not effervеſce nor is ſoluble in other acids, but may be reduced by laying it on a burning coal. It originates from the decompoſition of ſulphurated lead ores. Dr. Withering informs us, that it is found in great quantity in the iſland of Angleſey; but united to iron, and not reducible by the blow-pipe or charcoal.

6. *Lead mineraliſed by the phoſphoric acid,* was lately diſcovered by Mr. Gahn. It is of a greeniſh, yellow, or reddiſh colour, and does effervеſce with acids. After ſolution in nitrous acid, the lead may be precipitated from this ore by the vitriolic acid. An hundred grains of lead are produced from 137 of this precipitate waſhed and dried. The decanted liquor evaporated to dryneſs affords the phoſphoric acid, from which the inflammable compound may be produced by diſtillation with charcoal. Seven ounces of this lead ore from the neighbourhood of Friburg, treated in the manner juſt mentioned, yielded by diſtillation 144 grains of phoſphorus. A compound ſimilar to this ore may be obtained by mixing pure phoſphoric acid (that is, ſuch as is combined with the volatile alkali, for the foſſile alkali in the microcoſmic ſalt hinders the operation) with red lead.

7. *Galena,* or *potters' ore,* in which the metal is mineraliſed by ſulphurated ſilver. According to Mr. Kirwan it is the moſt common of all the lead ores, of a blueiſh dark lead colour, formed of cubes of a moderate ſize, or in grains of a cubic figure whoſe corners have been cut off; its texture is lamellar, and its hardneſs varying in different ſpecimens. That which is formed into grains is ſuppoſed to be the richeſt in ſilver; but even this contains only about one or one and a half *per cent.* that is, about 12 or 18 ounces *per* quintal; and the pooreſt not above 60 grains. Ores that yield about half an ounce of ſilver *per* quintal are barely worth the extracting. Different ſpecimens alſo vary in the quantity of ſulphur they contain, from 15 to 25 *per cent.* and that which contains the leaſt is in ſome degree malleable. The proportion of iron in this ore is very ſmall, but the lead is from 60 to 85 *per cent.* M. Monnet aſſerts, that galena is inſoluble in the nitrous acid; but Dr. Watſon has ſhown, that it is completely diſſolved by the acid when diluted. The ſpecific gravity of galena is from 7.000 to 7.780. It yields a yellow flag when melted.

M. Fourcroy diſtinguiſhes ſeveral varieties of this ore. 1. Cubic galena, the cubes of which are of various ſizes, and found either ſingle or in groups; it is often found with the angles truncated, and is common at Freyberg 2. In maſſes, without any regular configuration; very common at St. Maire. 3. With large facets. It does not compoſe regular cryſtals, but is entirely formed of large laminæ. 4. With ſmall facets, appearing like mica, compoſed of white and very brilliant ſcales. It is called white ſilver ore, becauſe it contains a conſiderable quantity of that metal. 5. Small grained galena, ſo called becauſe it has a very cloſe grain. It is likewiſe very rich in ſilver, and is found with the foregoing ore. No galena, excepting that of Carinthia, is known to be without ſilver; but it has been obſerved, that thoſe which afford the moſt ſilver have the ſmalleſt facets. 6. Galena cryſtallized like lead ſpar, in hexagonal priſms or cylindrical columns, contains little ſilver, and ſeems to be merely ſpathoſe lead, mineraliſed without having loſt its form. Cryſtals of pure ſpathoſe lead entirely covered with a very fine galena, are ſometimes found in the ſame piece, together with others which are changed into galena throughout.

8. *Antimonial Lead-ore,* in which the metal is mineralized by ſulphur with ſilver and regulus of antimony. This is of the ſame colour with galena, but its texture is different, being radiated, filamentous, or ſtriated. When heated, it yields a white ſmoke; and it affords from 40 to 50 *per cent.* of lead, and from half an ounce to two ounces of ſilver *per* quintal.

9. *Pyritous lead-ore,* mineraliſed by ſulphur with ſilver and a large proportion of iron. This is of a brown or yellowiſh colour; of an oblong or ſtalactitical form; friable; and of a lamellar, ſtriated, or looſe texture; affording 18 or 20 *per cent.* of lead at moſt, which is obtained merely by melting it, the iron detaining the ſulphur. It is only a mixture of galena with the brown pyrites.

10. *Lead mineraliſed by arſenic,* was lately diſcovered in Siberia. It is of a pale colour externally, but internally of a deep red. It is for the moſt part cryſtallized in rhomboidal parallelopipeds, or irregular pyramids. Lehman ſays, that it contains ſulphur, arſenic, and about 34 *per cent.* of lead; and Mr. Pallas ſays, that it contains ſome ſilver alſo. It was found near Catherineburg in Siberia; and Lehman ſays, that on being reduced to powder, it reſembled the beſt carmine. A ſpecimen examined by Mongez was of a yellow-greeniſh colour, and was found among quartz in the ſame country, and contained ſome arſenic. Both theſe, according to M. Magellan, may be eaſily reduced by means of a blow-pipe.

11. *Stony or ſandy lead-ores,* conſiſt either of the calciform or the galena kind, intimately mixed and diffuſed through ſtones and earth, chiefly of the calcareous or barytic genus. To this ſpecies Mongez refers the earthy lead ore, falſely called *native maſſicot,* found in the lead mines of Pompean in Brittany, principally in ſolid pieces. Theſe are either yellowiſh or grey: they appear bright like glaſs when broken, and effervеſce with acids; whence it appears that the ore contains fixed air. Sometimes it is mixed with clay.

12. The mine of Morngenſtern at Freyberg has a peculiar variety of lead ore containing ſilver, and which deſerves to be noticed on account of its yellowiſh brown colour, and likewiſe on account of its ſingular figure, which conſiſts of ſlender cylinders. Sometimes it is found in dendritical forms, like the *knit cobalt.*

Moſt of the ores of lead contain ſilver; and thoſe kinds of galena which do not, are very ſcarce. In Hungary and Tranſylvania, the lead ore contains a quantity of gold as well as ſilver. Sometimes the potters ores are found ſo poor in ſilver, that it is not worth the expence of extracting it. Theſe, when free from mixtures of the rock, are employed without any fuſion

to glaze earthen ware; and a conſiderable trade is carried on in the Mediterranean with ſuch ores from the mines of Sardinia and France.

Lead expoſed to heat, melts long before it is ignited. By a ſtrong heat it becomes volatile, and flies off in vapours. If ſuffered to cool very ſlowly, and the melted portion be poured off from that which is become ſolid, it is found to be cryſtallized in quadrangular pyramids. When melted with the contact of air, it ſoon becomes covered with a grey dull pellicle, which by proper management is converted into minium, as explained under the article CHEMISTRY; and by this operation it becomes heavier by about ten pounds in the hundred, though it is ſaid that at Nuremberg it gains twice as much. By too much heat minium loſes its beautiful red colour, and aſſumes that of a pale yellow: by a heat ſtill more violent, it melts into a tranſparent glaſs, ſo fuſible that it penetrates the crucible and eſcapes. But if one part of ſand be added to three parts of calx of lead, the ſand melts, by the aſſiſtance of the calx, into a beautiful amber-coloured glaſs. With two parts of lead and one of ſand, it reſembles a topaz. A ſimilar quantity of the calx of lead, added to common glaſs, does not alter its tranſparence, but gives it a greater degree of weight, and more eſpecially a kind of unctuouſneſs, which renders it capable of being cut and poliſhed more eaſily without breaking. This glaſs is very proper for making achromatic lenſes; but is ſubject to veins, and to have a gelatinous appearance. "The Engliſh (ſays M. Fourcroy) call it *flint glaſs*; our workmen find great difficulty in ſelecting pieces of any conſiderable magnitude, exempt from ſtriæ, in that which is imported from England." This great imperfection ſeems, in Macquer's opinion, to depend on the principles of the glaſs not being uniformly combined: for that purpoſe it is neceſſary that it ſhould be kept in fuſion for a long time; but as the lead would by that means be diſſipated, the flint-glaſs would loſe a part of its denſity and unctuouſneſs, which are its chief merit.

M. Magellan tells us, that it is the pureſt calx of lead called *minium*, made immediately from the metal, and the moſt pure quartzous ſand, with pure mineral alkali, or rather with good nitre, that produce, when properly melted, the beſt flint-glaſs. The greater the proportion of red-lead, the heavier is the glaſs, and of courſe its refraction the greater; an eſſential requiſite for ſuch glaſs as is employed for the lenſes of achromatic teleſcopes. It muſt, however, be obſerved, that glaſs made with lead has the defect of being of unequal denſity, for want of a perfect mixture of all its parts; ſo that it is extremely difficult to find pieces of a few inches diameter among hundred weights of this glaſs, that ſhall be quite free from filaments and ſtriæ. By chance the late Mr. Dollond procured a pot of pure flint glaſs, from which he made the admirable triple object lenſes of three feet and a half focus, which have been ſo much admired; but no ſuch other glaſs has yet been found, though very conſiderable premiums have been offered for the method of producing the beſt kind of glaſs for optical inſtruments.

All the calces of lead, eſpecially minium, have a great attraction for fixed air. If therefore we ſhould deſire a calx of lead in perfect purity, it muſt be kept defended from the contact of air, or ſlightly calcined before it is uſed, in order to ſeparate the fixed air it may have abſorbed. When expoſed to the air, it tarniſhes in proportion to the dampneſs of the air, and contracts a white ruſt, which is not a pure calx, but combined with the fixed air imbibed from the atmoſphere. It is not altered by pure water; and therefore we muſt conclude, that the whitiſh cruſt with which the internal part of lead pipes through which water runs is uſually covered, muſt be owing to the ſaline ſubſtances contained in the water.

"All the phenomena of the calcination of lead (ſays M. Magellan), and of its reduction to the metallic ſtate, ſhow that it has the ſmalleſt adheſion to phlogiſton; as appears by the ſimple action of fire, which ſeparates both, whilſt their attraction is equally quick in its reduction to the metallic ſtate. A common wafer, which owes its colour to red-lead, by being burned in the flame of a candle, immediately exhibits pure globules or little drops of the metal. The readineſs with which lead parts with its phlogiſton is ſhown by the curious experiment lately performed at Paris by Doctor Luzuriagu penſioner of the court of Spain. He put four ounces of lead-ſhot wetted with water into a pint bottle filled with atmoſpheric air, and cloſed with a ſtopple. Having ſhaken it ſeveral times, a black powder was produced, which ſoon turned white: on opening the bottle at the end of 24 hours, the air was found to have loſt a fifth part of its bulk, and to have become phlogiſticated. Dephlogiſticated air was ſtill more reduced in bulk; but the contrary took place when inflammable air was employed."

Cauſtic alkaline lixivia, boiled on lead, diſſolve a ſmall quantity of it, and corrode more. It has been obſerved, that plants do not thrive ſo well in leaden as in earthen veſſels.

In Holland, and perhaps in other places, it has been cuſtomary to correct the moſt offenſive expreſſed oils, as that of rape-ſeed and rancid oils of almonds or olives, by impregnating them with lead. This dangerous abuſe may be diſcovered by mixing a little of that oil with a ſolution of orpiment made in lime-water: for, on ſhaking them together, and ſuffering them to reſt, the oil, if it has any ſaturnine tint, will appear of an orange-red; but if pure, of a pale yellowiſh one. A ſimilar abuſe has alſo been practiſed with acid wines, which diſſolve as much of the lead as communicate a ſweetiſh taſte. This is diſcovered in a ſimilar manner; and upon this principle is founded the *liquor probatorius*, or teſt-liquor. This liquor is nothing elſe than a ſolution of orpiment or liver of ſulphur in lime-water. If a few drops of this ſolution be put in a glaſs of the ſuſpected liquor, it will exhibit a precipitation like a dark-coloured cloud. This is owing to the attachment of the lead to the ſulphur in the orpiment. If lead, or its calces, in powder, be mixed with a ſolution of hepar ſulphuris, a decompoſition enſues, but the alkali is not thus deprived of its ſulphur. Inſtead of this, it is re-converted into vitriolated tartar: the lead ſeizes the phlogiſton of the ſulphur, and allows the vitriolic acid to unite with the alkali.

Lead unites with moſt other metals. It cannot, however, be united with iron: but if both are expoſed to the fire in a proper veſſel, the lead ſcorifies the iron by ſeizing on its phlogiſton; after which it melts with the calx into a dark-coloured glaſs. This property which lead poſſeſſes, of reducing all the imperfect metals to a glaſs, is the reaſon of its being uſed in the purification of gold and ſilver; neither of which can be touched by it, but remain pure in the bottom of the cupel. This proceſs is the more complete by reaſon of the great efficacy of lead in diſſolving earthy bodies. In this reſpect it is ſo powerful a flux, that no earthen veſſel or crucible can contain it when fuſed, of whatever materials the veſſel be made. A mixture of raw and burned clay ſtands the action of lead for the greateſt length of time; but at laſt this alſo gives way, and is corroded in the ſides.

Litharge, a ſort of refuſe of lead, is employed in the compoſition of all the finer glaſſes called *paſtes*, which are deſigned as imitations of precious ſtones. The addition of litharge renders them more ſolid and brilliant. The principal ingredients are the pureſt of flint, purified alkali, borax, and litharge; the other additions, chiefly of metallic calces, are added, merely for the ſake of tingeing them with various colours.

Lead is employed in making of various veſſels, as ciſterns for water, large boilers for chemical and other purpoſes, &c. It is frequently mixed with tin by the pewterers; a practice which M. Fourcroy ſets forth as very dangerous, and gives the

following proceſs for detecting it: "Diſſolve two ounces of the ſuſpected metal in five ounces of a good pure nitrous acid. The calx of tin is to be waſhed with four pounds of diſtilled water, and dried, and the water evaporated by the heat of a water-bath. By this evaporation nitre of lead is procured; which being calcined, the weight of the reſidue ſhows the quantity of metal contained in the tin, allowing a few grains for the augmentation of weight ariſing from calcination, as well as the other metallic ſubſtances, ſuch as zinc and copper, which the tin under examination may contain. Bayan and Charlard by this method aſcertained, that fine wrought tin or pewter contains about 10 pounds of lead in the 100; and that the common tin ſold in France under that name, often contains 25 pounds in the ſame quantity; an enormous doſe, ſufficient to expoſe thoſe who uſe veſſels made of this compoſition to the greateſt danger."

There are ſeveral methods uſed by pewterers to diſcover the fineneſs of tin. This is done in ſome caſes by ſimple inſpection, the judgment being aſſiſted by the weight and noiſe produced in bending the metal. But the beſt method is by trying the ſpecific gravity of the metal; which will diſcover a very ſmall quantity of lead, the difference betwixt the two metals being ſo conſiderable.

Lead, when taken into the human body, is productive of various and fatal diſorders, particularly a dangerous kind of colic terminating in a palſy; and as all the common earthen ware is glazed with minium, the uſe of it is far from being void of danger. Fountains, or veſſels of lead which contain water, often communicate a noxious quality to it when ſuffered to remain long full. Its vapour is dangerous to the workmen who melt it, and the fumes falling upon the graſs render it poiſonous to the cattle who eat it; the fiſh who inhabit the waters near ſmelting-houſes ſoon die, nor is it ſafe for any animal to drink of it. In caſes of poiſoning by lead, briſk emetics and purges are recommended. Navier preſcribes liver of ſulphur and hepatic waters. Neither the internal uſe of lead, nor even the external uſe is ſafe; for, certain it is, that all workmen who handle lead much, are ſubject to the colic above-mentioned from the habitual contact of the metal or its calces, even though they neither take it internally, nor are expoſed to its fumes. In paralytic affections from lead, ſmall doſes of calomel, given daily till a ptyaliſm comes on, is found to be the moſt effectual mode of treatment.

Black-Lead *(Plumbago)*, a genus of inflammable ſubſtances, frequently confounded with *molybdæna*; the appearance of which is nearly the ſame, though the qualities are very different. Black lead, when pure, is extremely black; but when freſh cut, appears of a blueiſh white, and ſhining like lead. It is micaceous, and minutely ſcaly; eaſily broken, and of a granular and dull appearance when broken. Its tract on paper is much darker than that of molybdæna, which has a fine ſilvery appearance; by which means they are eaſily diſtinguiſhed from one another. Black lead is too ſoft to ſtrike fire with ſteel; it is inſoluble in acids; but in a very ſtrong fire, when expoſed to the air at the ſame time, it is entirely volatile, leaving only a little iron and a ſmall quantity of ſiliceous earth. It may be decompoſed by deflagration with nitre; but the common fluxes are not capable of procuring its fuſion. Its ſpecific gravity is from 1.987 to 2.267. According to Scheele, this ſubſtance conſiſts of phlogiſton combined with aërial acid: but M. Pelletier has ſhown, that when pure it neither produces fixed nor inflammable air; both which, when found, are entirely owing to the ſubſtances that are mixed with it. Mr. Scheele ſays, that one part of plumbago requires ten of nitre to decompoſe it, but charcoal only five. The concluſion drawn from hence, *viz.* that plumbago contains twice as much phlogiſton as charcoal, however, is by no means juſt; for the phlogiſton may be defended from the action of the nitre, by means we cannot poſſibly know, in the one and not in the other. Dr. Prieſtley's experiments on the diſſipation of charcoal into inflammable air alſo ſhow, that charcoal is little or nothing elſe than mere phlogiſton, ſo that no ſubſtance whatever can contain *more*. From theſe experiments Mr. Kirwan concludes, that 100 parts of plumbago contain 67 of phlogiſton; becauſe 100 grains of nitre contain 33 of real nitrous acid; all of which are decompoſed when it receives as much phlogiſton as is neceſſary to convert it into nitrous acid, or a little more. But 33 grains of nitrous acid are converted into nitrous air by 67 grains of phlogiſton; the remaining 33 parts may be water, or other volatile ſubſtance. By the experiments of Meſſrs. Gahn and Hielm, it appears, that 100 grains of plumbago, calcined in a muffle, loſt 90 grains in weight; the remainder being a ferruginous earth, and the ſulphureous ſmell ſhowed that it contained ſome pyrites, both which were accidental to the black lead. M. Pelletier, however, as has already been hinted, affirms, that plumbago is volatilized in a ſtrong fire, without producing any aërial vapour whatever; whence we muſt conclude, that the plumbago uſed by Scheele had not been quite pure. In cloſe veſſels, however, all agree that black lead ſuſtains a vehement fire for a long time without any ſenſible diminution of weight. This is ſimilar to charcoal; which for a long time was ſuppoſed to be indeſtructible in cloſe veſſels; but Dr. Prieſtley has ſhown, that in a very violent fire, in cloſe veſſels, charcoal begins to emit inflammable air, and continues to do ſo without any end of the proceſs that he could perceive; whence it is probable, that in this way alſo charcoal might be entirely diſperſed, provided we could find veſſels capable of ſuſtaining ſuch a long and vehement heat. No experiments have been made with black-lead in this way, either with the ſolar heat *in vacuo*, or with a violent heat in an iron or other veſſel capable of reſiſting a long continued heat.

Cronſtedt, when treating of this mineral, obſerves, that "Mr. Pott examined it in cloſe veſſels, and Mr. Quiſt in an open fire; from which difference in the mode of treatment, different notions had ariſen: becauſe the black-lead, when treated in cloſe veſſels, or when immediately put into a ſtrong charcoal fire, is almoſt unalterable; but in a calcining heat, becomes almoſt entirely volatile. This is the caſe with ſeveral of the other mineral phlogiſtons; and from this we may in general learn, how neceſſary it is to examine the mineral bodies by many and different methods, and to endeavour to multiply the experiments more than has hitherto been done."

With regard to the reduction of metallic calces, which ought to be accompliſhed by this *phlogiſtic* ſubſtance, M. Pelletier affirms, that it cannot be done unleſs the black-lead be mixed with fixed alkali, in the ſame manner as when charcoal is employed in ſuch circumſtances. It cannot be combined with iron, as Bergman aſſerts; nor with any other metal, though it may be ſimply interſperſed betwixt its particles. M. Pelletier indeed owns, that there is a kind of plumbago found ſwimming over the melted iron in large furnaces where iron-ores are ſmelted; but he thinks that this muſt have been naturally mixed with the mineral. It is alſo the only known plumbago of a very diſtinct lamellar form; as he obſerved in the pieces obtained from the iron-works at Vallancy in the French province of Berry.

Black-lead is found of different kinds; *viz.* 1. Of a ſteel-grained and dull texture; naturally black, but when rubbed affording a dark lead colour. 2. Of a granulated and ſcaly appearance at the ſame time. It is found in different countries, as Germany, France, Spain, the Cape of Good Hope, and America; but generally in ſmall quantities, and of very different qualities. The beſt ſort, however, and the fitteſt of all for making pencils, is that met with in the county of Cumberland in England. It is found in ſuch plenty at a place

called *Borrowdale* in this county, that hence not only the whole iſland of Britain, but the whole continent of Europe, may be ſaid to be ſupplied. "I have ſeen (ſays M. Magellan) various ſpecimens from different countries; but their coarſe texture and bad quality cannot bear any compariſon with that of Borrowdale; though it ſometimes, but ſeldom, contains pyritaceous particles of iron. It is but a few years ago that this mine ſeemed to be almoſt exhauſted; but by digging ſome few yards through the ſtrata underneath, according to the advice of an experienced miner, whoſe opinion had been long unattended to, a very thick and rich vein of the beſt black-lead has been diſcovered, to the great joy of the proprietors and advantage of the public."

The principal uſe of black-lead is for making pencils for drawing; which have the advantage of marking paper very diſtinctly for a time, though their traces may afterwards be intirely rubbed out by ſoft bread or elaſtic gum. To form the pencils, the lead is cut into thin parallelopipeds, and put into quadrangular grooves cut in pieces of cypreſs wood; and a ſlit being glued over, they are worked into ſmall cylinders like quills. A coarſer kind are made by working up the powder of black-lead with ſulphur, or ſome mucilaginous ſubſtance; but theſe anſwer only for carpenters, or ſome very coarſe drawings. One part of plumbago with three of clay, and ſome cows hair, makes an excellent coating for retorts, as it keeps its form even after the retorts have melted. The famous crucibles of Ypſen are formed of plumbago mixed with clay. Theſe are known in Britain by the name of Heſſian crucibles; but a manufacture of the ſame kind is now eſtabliſhed at Chelſea in the neighbourhood of London, where crucibles are manufactured nearly of the ſame quality with the foreign ones. The powder of black-lead ſerves alſo to cover the ſtraps for razors; and it is with it that the caſt-iron work, ſuch as ſtoves, &c. receive a gloſs on their ſurface. An application, however, perhaps as uſeful as any other, is that of black-lead to ſmooth the ſurfaces of wooden work which are ſubjected to much friction, as wooden ſcrews, packers preſſes, &c.; neither greaſy nor oily ſubſtances, nor ſoapy ointments, produce ſuch a good effect upon them.

Poiſon of LEAD. See LEAD, and POISON.

Sheet LEAD. See PLUMBERY.

LEAF, a part of a plant extended into length and breadth in ſuch a manner as to have one ſide diſtinguiſhable from the other. This is Miller's definition. Linnæus denominates leaves "the organs of motion, or muſcles of the plant."—The leaves are not merely ornamental to plants; they ſerve very uſeful purpoſes, and make part of the organs of vegetation.

The greater number of plants, particularly trees, are furniſhed with leaves: in muſhrooms, and ſhrubby horſe-tail, they are totally wanting. Ludwig defines leaves to be fibrous and cellular proceſſes of the plant, which are of various figures, but generally extended into a plain membranaceous or ſkinny ſubſtance. They are of a deeper green than the footſtalks on which they ſtand, and are formed by the expanſion of the veſſels of the ſtalk, among which, in ſeveral leaves, the proper veſſels are diſtinguiſhed by the particular taſte, colour, and ſmell, of the liquors contained within them.

By the expanſion of the veſſels of the ſtalk, are produced ſeveral ramifications or branches, which, croſſing each other mutually, form a kind of net; the meſhes or interſtices of which are filled up with a tender cellular ſubſtance, called the *pulp*, *pith*, or *parenchyma*. This pulpy ſubſtance is frequently conſumed by certain ſmall inſects, whilſt the membranous net remaining untouched exhibits the genuine ſkeleton of the leaf.

The net in queſtion is covered externally with an epidermis or ſcarf-ſkin, which appears to be a continuation of the ſcarf-ſkin of the ſtalk, and perhaps of that of the ſtem. M. Deſfaiſſure, a judicious naturaliſt, has attempted to prove, that this ſcarf-ſkin, like that of the petals, is a true bark, compoſed itſelf of an epidermis and cortical net; theſe parts ſeem to be the organs of perſpiration, which ſerve to diſſipate the ſuperfluous juices.

The cortical net is furniſhed, principally on the ſurface of the leaf, with a great number of ſuckers or abſorbent veſſels, deſtined to imbibe the humidity of the air. The upper ſurface, turned towards heaven, ſerves as a defence to the lower, which looks downward; and this diſpoſition is ſo eſſential to the vegetable economy, that, if a branch is overturned in ſuch a manner as to deſtroy the natural direction of the leaves, they will, of themſelves, in a very ſhort time, reſume their former poſition; and that as often as the branch is thus overturned.

Leaves, then, are uſeful and neceſſary organs; trees periſh when totally diveſted of them. In general, plants ſtript of any of their leaves, cannot ſhoot vigorouſly: witneſs thoſe which have undergone the depredations of inſects; witneſs, likewiſe, the very common practice of ſtripping off ſome of the leaves from plants, when we would ſuſpend their growth, or diminiſh the number of their ſhoots. This method is ſometimes obſerved with corn and the eſculent graſſes; and, in cold years, is practiſed on fruit-trees and vines, to render the fruit riper and better coloured: but in this caſe it is proper to wait till the fruits have acquired their full bulk, as the leaves contribute greatly to their growth, but hinder, when too numerous, that exquiſite rectifying of the juices, which is ſo neceſſary to render them delicious and palatable.

When vegetation ceaſes, the organs of perſpiration and inſpiration become ſuperfluous. Plants, therefore, are not always adorned with leaves: they produce new ones every year; and every year the greater part are totally diveſted of them, and remain naked during the winter. See PLANT.

LEAF-*Inſect*. See CIMEX.

LEAF, in clocks and watches, an appellation given to the notches of their pinions.

Gold-LEAF, uſually ſignifies fine gold beaten into plates of an exceeding thinneſs, which are well known in the arts of gilding, &c. The preparation of gold-leaf, according to Dr. Lewis, is as follows:

"The gold is melted in a black-lead crucible, with ſome borax, in a wind-furnace, called by the workmen a *wind-hole*: as ſoon as it appears in perfect fuſion, it is poured out into an iron ingot mould, ſix or eight inches long, and three quarters of an inch wide, previouſly greaſed, and heated, ſo as to make the tallow run and ſmoke, but not to take flame. The bar of gold is made red-hot, to burn off the unctuous matter, and forged on an anvil into a long plate, which is further extended, by being paſſed repeatedly between poliſhed ſteel rollers, till it becomes a ribbon as thin as paper. Formerly the whole of this extenſion was procured by means of the hammer, and ſome of the French workmen are ſtill ſaid to follow the ſame practice: but the uſe of the flatting-mill both abridges the operation, and renders the plate of more uniform thickneſs. The ribbon is divided by compaſſes, and cut with ſheers into equal pieces, which conſequently are of equal weights: theſe are forged on an anvil till they are an inch ſquare; and afterwards well nealed, to correct the rigidity which the metal has contracted in the hammering and flatting. Two ounces of gold, or 960 grains, the quantity which the workmen uſually melt at a time, make 150 of theſe ſquares, whence each of them weighs ſix grains and two-fifths; and as 902 grains of gold make a cubic inch, the thickneſs of the ſquare plates is about the 766th part of an inch.

"In order to the further extenſion of theſe pieces into fine leaves, it is neceſſary to interpoſe ſome ſmooth body between

them and the hammer, for ſoftening its blow, and defending them from the rudeneſs of its immediate action: as alſo, to place between every two of the pieces ſome proper intermedium, which, while it prevents their uniting together, or injuring one another, may ſuffer them freely to extend. Both theſe ends are anſwered by certain animal membranes.

"The gold-beaters uſe three kinds of membranes; for the outſide cover, common parchment made of ſheep-ſkin; for interlaying with the gold, firſt the ſmootheſt and cloſeſt vellum, made of calf-ſkin; and afterwards the much finer ſkins of ox-gut, ſtript off from the large ſtraight gut ſlit open, curiouſly prepared on purpoſe for this uſe, and hence called *gold-beater's ſkin*. The preparation of theſe laſt is a diſtinct buſineſs, practiſed by only two or three perſons in the kingdom, ſome of the particulars of which I have not ſatisfactorily learned. The general proceſs is ſaid to conſiſt, in applying one upon another, by the ſmooth ſides, in a moiſt ſtate, in which they readily cohere and unite inſeparably; ſtretching them on a frame, and carefully ſcraping off the fat and rough matter, ſo as to leave only the fine exterior membrane of the gut; beating them between double leaves of paper, to force out what unctuoſity may remain in them; moiſtening them once or twice with an infuſion of warm ſpices; and laſtly, drying and preſſing them. It is ſaid, that ſome calcined gypſum, or plaſter of Paris, is rubbed with a hare's foot both on the vellum and the ox-gut ſkins, which fills up ſuch minute holes as may happen in them, and prevents the gold-leaf from ſticking, as it would do to the ſimple animal-membrane. It is obſervable, that, notwithſtanding the vaſt extent to which the gold is beaten between theſe ſkins, and the great tenuity of the ſkins themſelves, yet they ſuſtain continual repetitions of the proceſs for ſeveral months, without extending or growing thinner. Our workmen find, that, after 70 or 80 repetitions, the ſkins, though they contract no flaw, will no longer permit the gold to extend between them; but that they may be again rendered fit for uſe by impregnating them with the virtue which they have loſt, and that even holes in them may be repaired by the dexterous application of freſh pieces of ſkin: a microſcopical examination of ſome ſkins that had been long uſed plainly ſhowed theſe repairs. The method of reſtoring their virtue is ſaid in the *Encyclopédie* to be, by interlaying them with leaves of paper moiſtened with vinegar white-wine, beating them for a whole day, and afterwards rubbing them over as at firſt with plaſter of Paris. The gold is ſaid to extend between them more eaſily, after they have been uſed a little, than when they are new.

"The beating of the gold is performed on a ſmooth block of black marble, weighing from 200 to 600 pounds, the heavier the better; about nine inches ſquare on the upper ſurface, and ſometimes leſs, fitted into the middle of a wooden frame, about two feet ſquare, ſo as that the ſurface of the marble and the frame form one continuous plane. Three of the ſides are furniſhed with a high ledge; and the front, which is open, has a leather flap faſtened to it, which the gold-beater takes before him as an apron, for preſerving the fragments of gold that fall off. Three hammers are employed, all of them with two round and ſomewhat convex faces, though commonly the workman uſes only one of the faces: the firſt, called the *cutch-hammer*, is about four inches in diameter, and weighs 15 or 16 pounds, and ſometimes 20, though few workmen can manage thoſe of this laſt ſize: the ſecond, called the *ſhodering-hammer*, weighs about 12 pounds, and is about the ſame diameter: the third, called the *gold-hammer*, or *finiſhing-hammer*, weighs 10 or 11 pounds, and is nearly of the ſame width. The French uſe four hammers, differing both in ſize and ſhape from thoſe of our workmen: they have only one face, being in figure truncated cones. The firſt has very little convexity, is near five inches in diameter, and weighs 14 or 15 pounds: the ſecond is more convex than the firſt, about an inch narrower, and ſcarcely half its weight: the third, ſtill more convex, is only about two inches wide, and four or five pounds in weight: the fourth or finiſhing hammer is near as heavy as the firſt, but narrower by an inch, and the moſt convex of all. As theſe hammers differ ſo remarkably from ours, I thought proper to inſert them, leaving the workmen to judge what advantage one ſet may have above the other.

"A hundred and fifty of the pieces of gold are interlaid with leaves of vellum, three or four inches ſquare, one vellum leaf being placed between every two of the pieces, and about 20 more of the vellum leaves on the outſides; over theſe is drawn a parchment caſe, open at both ends, and over this another in a contrary direction, ſo that the aſſemblage of gold and vellum leaves is kept tight and cloſe on all ſides. The whole is beaten with the heavieſt hammer, and every now and then turned upſide down, till the gold is ſtretched to the extent of the vellum; the caſe being from time to time opened for diſcovering how the extenſion goes on, and the packet, at times, bent and rolled as it were between the hands, for procuring ſufficient freedom to the gold, or, as the workmen ſay, to make the gold work. The pieces, taken out from between the vellum leaves, are cut in four with a ſteel knife; and the 600 diviſions, hence reſulting, are interlaid, in the ſame manner, with pieces of the ox-gut ſkins five inches ſquare. The beating being repeated with a lighter hammer till the golden plates have again acquired the extent of the ſkins, they are a ſecond time divided in four: the inſtrument uſed for this diviſion is a piece of cane cut to an edge, the leaves being now ſo light, that the moiſture of the air or breath condenſing on a metalline knife would occaſion them to ſtick to it. Theſe laſt diviſions being ſo numerous, that the ſkins neceſſary for interpoſing between them would make the packet too thick to be beaten at once, they are parted into three parcels, which are beaten ſeparately, with the ſmalleſt hammer, till they are ſtretched for the third time to the ſize of the ſkins: they are now found to be reduced to the greateſt thinneſs they will admit of; and indeed many of them, before this period, break or fail. The French workmen, according to the minute detail of this proceſs given in the *Encyclopédie*, repeat the diviſion and the beating once more; but as the ſquares of gold, taken for the firſt operation, have four times the area of thoſe uſed among us, the number of leaves from an equal area is the ſame in both methods, *viz.* 16 from a ſquare inch. In the beating, however ſimple the proceſs appears to be, a good deal of addreſs is requiſite, for applying the hammers ſo as to extend the metal uniformly from the middle to the ſides: one improper blow is apt not only to break the gold leaves, but to cut the ſkins.

"After the laſt beating, the leaves are taken up by the end of a cane inſtrument, and, being blown flat on a leather-cuſhion, are cut to a ſize, one by one, with a ſquare frame of cane made of a proper ſharpneſs, or with a frame of wood edged with cane: they are then fitted into books of 25 leaves each, the paper of which is well ſmoothed, and rubbed with red-bole to prevent their ſticking to it. The French, for ſizing the leaves, uſe only the cane-knife; cutting them firſt ſtraight on one ſide, fitting them into the book by the ſtraight ſide, and then paring off the ſuperfluous parts of the gold about the edges of the book. The ſize of the French gold-leaves is from ſomewhat leſs than three inches to three and three quarters ſquare; that of ours, from three inches to three and three-eighths.

"The proceſs of gold-beating is conſiderably influenced by the weather. In wet weather, the ſkins grow ſomewhat damp, and in this ſtate make the extenſion of the gold more tedious.

The French are said to dry and press them at every time of using; with care not to overdry them, which would render them unfit for farther service. Our workmen complain more of frost, which appears to affect the metalline leaves themselves: in frost, a gold-leaf cannot easily be blown flat, but breaks, wrinkles, or runs together.

"Gold-leaf ought to be prepared from the finest gold; as the admixture of other metals, though in too small a proportion to sensibly affect the colour of the leaf, would dispose it to lose of its beauty in the air. And indeed there is little temptation to the workman to use any other; the greater hardness of alloyed gold occasioning as much to be lost in point of time and labour, and in the greater number of leaves that break, as can be gained by any quantity of alloy that would not be at once discoverable by the eye. All metals render gold harder and more difficult of extension: even silver, which in this respect seems to alter its quality less than any other metal, produces with gold a mixture sensibly harder than either of them separately, and this hardness is in no art more felt than in the gold-beater's. The French are said to prepare what is called the *green gold-leaf*, from a composition of one part of copper and two of silver with eighty of gold. But this is probably a mistake: for such an admixture gives no greenness to gold: and I have been informed by our workmen, that this kind of leaf is made from the same fine gold as the highest gold-coloured sort, the greenish hue being only a superficial teint induced upon the gold in some part of the process: this greenish leaf is little otherwise used than for the gilding of certain books.

"But though the gold-beater cannot advantageously diminish the quantity of gold in the leaf by the admixture of any other substance with the gold, yet means have been contrived, for some particular purposes, of saving the precious metal, by producing a kind of leaf called *party-gold*, whose basis is silver, and which has only a superficial coat of gold upon one side: a thick leaf of silver and a thinner one of gold, laid flat on one another, heated and pressed together, unite and cohere; and being then beaten into fine leaves, as in the foregoing process, the gold, though its quantity is only about one-fourth of that of the silver, continues every where to cover it, the extension of the former keeping pace with that of the latter."

LEAGUE, a measure of length, containing more or fewer geometrical paces, according to the different usages and customs of countries. A league at sea, where it is chiefly used by us, being a land-measure mostly peculiar to the French and Germans, contains 3000 geometrical paces, or three English miles. The French league sometimes contains the same measure, and in some parts of France it consists of 3500 paces: the mean or common league consists of 2400 paces, and the little league of 2000. The Spanish leagues are larger than the French, 17 Spanish leagues making a degree, or 20 French leagues, or 69½ English statute miles. The Dutch and German leagues contain each four geographical miles. The Persian leagues are pretty near of the same extent with the Spanish; that is, they are equal to four Italian miles: which is pretty near to what Herodotus calls the length of the Persian parasang, which contained 30 stadia, eight whereof, according to Strabo, make a mile. The word comes from *leuca*, or *leuga*, an ancient Gaulish word for an itinerary measure, and retained in that sense by the Romans. Some derive the word *leuca* from λευκος, "white;" as the Gauls, in imitation of the Romans, marked the spaces and distances of their roads with white stones.

LEAGUE, an alliance or confederacy between princes and states for their mutual aid, either in attacking some common enemy, or in defending themselves. The word comes from *liga*, which in the corrupt Latin was used for a *confederacy*: *Lyga quis cum alio ligatur*.

Leagues, among the Greeks, were of three sorts: 1. Σπονδη, Συνθηκη, or Ειρηνη, whereby both parties were obliged to cease from hostilities, without even molesting the allies of each other; 2. Επιμαχια, whereby they engaged to lend assistance to each other in case of invasion; and, 3. Συμμαχια, whereby they engaged to have the same friends and enemies, and to assist each other upon all occasions. All these leagues were confirmed with oaths and imprecations, and sacrifices. The victims most generally used were a boar, ram, or goat, sometimes all three; and sometimes bulls and lambs. They cut out the testicles of the animal, and stood upon them while they swore; and some of the hair of the victim was distributed to all present. Then they cut the animal's throat, which was called οσχια τεμνειν, in Latin, *ferire fœdus*.—This done, they repeated their oaths and imprecations, calling the gods to witness the honesty of their intentions. A libation was then made of wine, which at this time was mixed, to imply their conjunction and union: while this was pouring out, they prayed that the blood of him who should break the treaty might be poured out in like manner. Upon these occasions no part of the victim was eaten. Still further to increase the solemnity of this obligation, the league was engraven upon brass, fixed up in places of public concourse, and sometimes read at the solemn games. Some exchanged certain Συμβολα or *tesseræ* upon the occasion, and frequently sent ambassadors, on some appointed day, to keep them in mind of their engagements to each other.

The ceremonies of the Romans in making leagues were performed by the *Feciales*. See FECIALES.

LEAGUES *of the Grisons*, are a part of Switzerland, consisting of three subdivisions, *viz.* the upper league, the league of the house of God, and the league of the ten jurisdictions. See the article GRISONS.

The LEAGUE, by way of eminence, denotes that famous one on foot in France from the year 1576 to 1593. Its intent was to prevent the succession of Henry IV. who was of the reformed religion, to the crown; and it ended with his abjuration of that faith. The *leaguers*, or confederates, were of three kinds. The *zealous leaguers* aimed at the utter destruction not only of the Huguenots, but also of the ministry. The *Spanish leaguers* had principally in view the transferring the crown of France to the king of Spain, or the infanta his daughter. The *moderate leaguers* aimed only at the extirpation of Calvinism, without any alteration of the government.

LEAK, at sea, is a hole in the ship, through which the water comes in. A ship is said to *spring a leak* when she begins to *leak*, or to let in the water. The manner of stopping a leak is to put into it a plug wrapped in oakum and well tarred, or in a tarpawling clout, which keeps out the water, or nailing a piece of sheet lead on the place. Seamen sometimes stop a leak by thrusting a piece of salt beef into it. The sea-water, says Mr. Boyle, being fresher than the brine imbibed by the beef, penetrates into its body, and causes it to swell so as to bear strongly against the edges of the broken plank, and thereby stops the influx of the water.—A ready way to find a leak in a ship is to apply the narrower end of a speaking trumpet to the ear, and the other to the side of the ship where the leak is supposed to be; then the noise of the water issuing in at the leak will be heard distinctly, whereby it may be discovered.

LEAKAGE, the state of a vessel that leaks, or lets water or other liquid ooze in or out.

LEAKAGE, in commerce, is an allowance of 12 *per cent.* in the customs, allowed to importers of wines for the waste or damage it is supposed to have received in the passage: an allowance of two barrels in 22 is also made to the brewers of ale and beer by the excise-office.

LEAKE (Richard), maſter gunner of England, was born at Harwich in 1629, and was bred to the ſea. At the reſtoration he was made maſter-gunner of the Princeſs, a frigate of fifty guns; and in the firſt Dutch war diſtinguiſhed himſelf by his ſkill and bravery in two extraordinary actions; one againſt 15 ſail of Dutch men of war; and another in 1667 againſt two Danes in the Baltic, in which the commanding officers of the Princeſs being killed or deſperately wounded, the command, according to the rules of war at that time, fell to the gunner. In 1669 he was promoted to be gunner of the Royal Prince, a firſt-rate man of war. He was engaged, with his two ſons Henry and John, in the battle againſt Van Tromp, in 1673; when the Royal Prince had all her maſts ſhot away, near 400 of her men killed and diſabled, and moſt of her upper tier of guns diſmounted. As ſhe lay thus like a wreck, a great Dutch man of war came down upon her with two fire-ſhips, either to burn or carry her off; and Captain Rooke, afterwards Sir George, thinking it impoſſible to defend her, ordered the men to ſave their lives, and the colours to be ſtruck. Mr. Leake hearing this, ordered the lieutenant off the quarter-deck, and took the command upon himſelf, ſaying, "The Royal Prince ſhall never be given up to the enemy while I am alive to defend her." The undaunted ſpirit of the brave gunner inſpired the ſmall reſidue of the ſhip's company with reſolution: they returned with alacrity to the fight, and, under the direction of this valiant gunner and his two ſons, ſunk both the fire-ſhips, and obliged the man of war to ſheer off; and having thus ſaved the Royal Prince, he brought her into Chatham. But Mr. Leake's joy in obtaining this victory was damped by the loſs of Henry, his eldeſt ſon, who was killed near him. Soon after, Mr. Leake was preferred to the command of a yacht, and alſo made gunner of Whitehall. In 1677 he obtained a grant for life of the office of maſter-gunner of England, and ſtore-keeper of the ordnance at Woolwich. By theſe poſts he had full ſcope for his genius. He accordingly, among other things, invented the cuſhee-piece; and contrived to fire a mortar by the blaſt of a piece, which has been uſed ever ſince. He was alſo the principal contriver of what the French call *infernals*, uſed at the bombardment at St. Maloes in 1693. Mr. Leake had a ſurpriſing genius for all inventions of this kind; and had frequent trials of ſkill with French and Dutch gunners and engineers in Woolwich warren, at which king Charles II. and the duke of York were often preſent, and he never failed to excel all his competitors: nor was he leſs ſkilled in the art of making compoſitions for fireworks; of which he likewiſe made frequent trials with equal ſucceſs.

Leake (Sir John), an Engliſh admiral, diſtinguiſhed by his bravery and ſucceſs, was born in 1656, and was taught mathematics and gunnery by Mr. Richard Leake his father, who was maſter-gunner of England. Entering early into the navy, he diſtinguiſhed himſelf under his father in 1673, in the memorable engagement between Sir Edward Spragg and Van Tromp, when but 16 years of age; and being afterwards made captain, he ſignalized himſelf, among other occaſions, by executing the deſperate attempt of convoying ſome victuallers into Londonderry, which obliged the enemy to raiſe the ſiege; and at the famous battle of La Hogue. In 1702, being made commodore of a ſquadron, he deſtroyed the French trade and ſettlements at Newfoundland, and reſtored the Engliſh to the poſſeſſion of the whole iſland. On his return he was created rear-admiral; ſoon after, he was made vice-admiral of the blue, and was afterwards knighted. He was engaged with admiral Rooke in taking Gibraltar: ſoon after which, he particularly diſtinguiſhed himſelf in the general engagement off Malaga; when commanding the leading ſquadron of the van, conſiſting only of ſix ſhips, he drove that of the enemy, conſiſting of 13, out of the line of battle, ſo diſabled that they never returned to the fight. In 1705 he relieved Gibraltar, which the French had beſieged by ſea, and the Spaniards by land, ſo ſeaſonably, that the enemy was to have attacked the town that very night in ſeveral places, and would undoubtedly have made themſelves maſters of it. Five hundred Spaniards had, by the help of rope-ladders, climbed up the rocks by a way that was thought inacceſſible. At the ſame time they had got a great number of boats to land 3000 men at the New Mole, who, by making a vigorous aſſault on the ſide next the ſea, were to draw the garriſon to oppoſe that attack, while the 500 concealed men ruſhed into the town. Theſe being the next day drawn by hunger out of their ambuſcade, were diſcovered; on which Sir John aſſiſting the garriſon with ſailors and marines, they were attacked with ſuch vigour, that, though they had taken an oath not to ſurrender to the Engliſh, 190 common ſoldiers and 30 officers took quarter; 200 were killed on the ſpot; and the reſt, who endeavoured to make their eſcape, fell headlong down the rock. He was ſoon after made vice-admiral of the white, and then twice relieved that fortreſs. The laſt time, he attacked five ſhips of the French fleet coming out of the bay, of whom two were taken, and two ran aſhore and were deſtroyed: baron Pointi died ſoon after, of the wounds he received in the battle; and in a few days the enemy raiſed the ſiege. In the year 1705, Sir John was engaged in the reduction of Barcelona; and the next year relieved that city, when it was reduced to the laſt extremity, and obliged king Philip to raiſe the ſiege. Soon after he took the city of Carthagena; from whence proceeding to Alicant and Joyce, both theſe ſubmitted to him; and he concluded the exploits of that year with the reduction of the city and iſland of Majorca. Upon his return home, prince George of Denmark made him a preſent of a ring valued at 400l. and he had the honour of receiving 1000l. from the queen as a reward for his ſervices. Upon the unhappy death of Sir Cloudeſly Shovel, in 1707, he was made admiral of the white, and commander in chief of her majeſty's fleet; and the next year, ſurpriſing a convoy of the enemy's corn, he ſent it to Barcelona, and thus ſaved both that city and the confederate army from the danger of famine: ſoon after, convoying the new queen of Spain to king Charles her conſort, her majeſty made him a preſent of a diamond ring of 500 pounds value. He then proceeded to the iſland of Sardinia, which he reduced to the obedience of king Charles; and ſoon after aſſiſted the lord Stanhope in the conqueſt of Minorca. Then returning home, he was appointed one of the council to the lord high admiral; and in 1709, was made rear-admiral of Great Britain. He was ſeveral times choſen member of parliament for Rocheſter; and in 1712 conducted the Engliſh forces to take poſſeſſion of Dunkirk. But upon the acceſſion of king George I. he was ſuperſeded, and allowed a penſion of 600l. a-year. After this he lived privately till his death, which happened at his houſe in Greenwich in 1720.

Leake (Stephen Martin, Eſq.) ſon of Captain Martin, went through different ranks in the heralds' college till he came to be Garter. He was the firſt perſon who wrote profeſſedly on our Engliſh coins, two editions of his "Hiſtorical Account" of which were publiſhed by him with plates, under the title of *Nummi Britannici Hiſtoria*, London, 1726, 8vo; the ſecond, much improved, London, 1745, 8vo. He printed, in 1750, "The Life of Sir John Leake, knight, admiral of the fleet," &c. to whom he was indebted for a conſiderable eſtate; which the Admiral deviſed to truſtees for the uſe of his ſon for life; and upon his death to Captain Martin (who married Lady Leake's ſiſter) and his heirs: By which means it came to the Captain's ſon; who, in gratitude to the memory of Sir John Leake, wrote an accurate account of his life, of

which only 50 copies were printed. In 1766 he printed alſo 50 copies of "The Statutes of the Order of the Garter," 4to. He died in 1773; and was buried in his chancel in the pariſh-church of Thorp in Eſſex, of which manor he was lord.

LEANDER, in poetic hiſtory, a young man of Abydos in Aſia. He uſed to ſwim over the Helleſpont by night to viſit Hero, his miſtreſs, who ſet forth a light to guide him: but in a tempeſtuous winter-night he was drowned; upon which Hero ſeeing him dead on the ſhore, caſt herſelf headlong from the tower, and died alſo. See HERO.

LEAO, in natural hiſtory, a mineral ſubſtance approaching to the nature of the lapis lazuli, found in the Eaſt Indies, and of great uſe in the Chineſe porcelain manufactures, being the fineſt blue they are poſſeſſed of. This ſtone is found in the ſtrata of pit-coal, or in thoſe of a yellowiſh or reddiſh earth in the neighbourhood of the veins of coal. There are often found pieces of it lying on the ſurface of the ground, and theſe are a ſure indication that more will be found on digging. It is generally found in oblong pieces of the ſize of a finger, not round, but flat. Some of this is very fine, and ſome coarſe and of a bad colour. The latter is very common; but the fine ſort is ſcarce, and greatly valued. It is not eaſy to diſtinguiſh them at ſight, but they are found by experiment; and the trying one piece is generally ſufficient for judging of the whole mine, for all that is found in the ſame place is uſually of the ſame ſort.

The manner of preparing it for uſe is this: They firſt waſh it very clean, to ſeparate it from the earth, or any other foulneſs it may have: they then lay it at the bottom of their baking furnaces; and when it has been thus calcined for three or four hours, it is taken out, and powdered very fine in large mortars of porcelain, with ſtone peſtles faced with iron. When the powder is perfectly fine, they pour in boiling water, and grind that with the reſt; and when it is thoroughly incorporated, they add more, and finally pour it off after ſome time ſettling. The remainder at the bottom of the mortar, which is the coarſer part, they grind again with more water; and ſo on till they have made the whole fine, excepting a little dirt or grit. When this is done, all the liquors are mixed together, and well ſtirred. They are ſuffered to ſtand two or three minutes after this, and then poured off with the powder remaining in them: this is ſuffered to ſubſide gradually, and is the fine blue uſed in their beſt works, our common ſmalt ſerving for the blue of all the common china ware.

LEAP, in muſic, is when the ſong does not proceed by conjoint degrees, as when between each note there is an interval of a third, a fourth, fifth, &c.

LEAP-*Year*. See YEAR, and CHRONOLOGY.

Lover's LEAP. See LEUCATA.

LEAPING, or VAULTING, was an exerciſe much uſed both amongſt the Greeks and Romans. The Grecians called it Αλμα, and performed it with weights upon their heads and ſhoulders. Sometimes they carried the weights in their hands, which were of different figures, but generally oval, and made with holes, or covered with thongs, through which the contenders put their fingers. Theſe weights were called Αλτηρες. The conteſt was, who could leap the higheſt and fartheſt. The place from whence they jumped was called Βαλης, and that to which they leaped Εσκαμμενα, becauſe the ground was there dug up. This exerciſe was performed in the ſame manner by the Romans.

LEAR, the name of a Britiſh king ſaid in old chronicles to have ſucceeded his father Bladud, about A. M. 3160. The ſtory of this king and his three daughters is well known from Shakeſpeare's excellent tragedy founded on it.

LEASE, from the French *laiſer*, *demittere*, "to let," in law, a demiſe, or letting of lands, tenements, or hereditaments, unto another for life, term of years, or at will, for a rent reſerved. A leaſe is either written, called an *indenture*, *deed-poll*, or *leaſe* in writing; or by word of mouth, called *leaſe-parole*. All eſtates, intereſts of freehold, or terms for years in lands, &c. not put in writing and ſigned by the parties, ſhall have no greater effect than as eſtates at will; unleſs it be of leaſes not exceeding three years from the making, wherein the rent reſerved ſhall be two-thirds of the value of the things demiſed. Leaſes exceeding three years muſt be made in writing; and if the ſubſtance of a leaſe be put in writing, and ſigned by the parties, though it be not ſealed, it ſhall have the effect of a leaſe for years, &c.

An *aſſignment* differs from a leaſe only in this: that by a leaſe one grants an intereſt leſs than his own, reſerving to himſelf a reverſion; in aſſignments he parts with the whole property, and the aſſignee ſtands to all intents and purpoſes in the place of the aſſignor.

LEASE and *Releaſe*, a ſpecies of conveyance uſed in the Engliſh law, firſt invented by Serjeant Moore, ſoon after the Statute of Uſes, and now the moſt common of any, and therefore not to be ſhaken; though very great lawyers (particularly Mr. Noy) have formerly doubted its validity. It is thus contrived: A leaſe, or rather bargain and ſale, upon ſome pecuniary conſideration, for one year, is made by the tenant of the freehold to the leſſee or bargainee. Now this, without any inrolment, makes the bargainor ſtand ſeiſed to the uſe of the bargainee, and veſts in the bargainee the *uſe* of the term for a year; and then the ſtatute immediately annexes the *poſſeſſion*. He therefore, being thus in poſſeſſion, is capable of receiving a releaſe of the freehold and reverſion, which muſt be made to a tenant in poſſeſſion: and accordingly, the next day, a releaſe is granted to him. This is held to ſupply the place of livery of ſeiſin; and ſo a conveyance by leaſe and releaſe is ſaid to amount to a feoffment.

LEASH, among ſportſmen, denotes three creatures of any kind; but chiefly gre-hounds, foxes, bucks, and hares.

The term *leaſh* alſo ſignifies a line to hold in a hunting dog; and a ſmall long thong of leather, by which a falconer holds his hawk.

LEASING-MAKING, in Scotland, denotes the uttering of words tending to excite diſcord between the king and his people; alſo called *verbal ſedition*.

LEATHER, the ſkin of ſeveral ſorts of beaſts dreſſed and prepared for the uſe of various manufacturers, whoſe buſineſs it is to make them up.

Dyeing of LEATHER. *Blue* is given by ſteeping the ſubject a day in urine and indigo, then boiling it with alum: or it may be given by tempering the indigo with red-wine, and waſhing the ſkins therewith. *Red* is given by waſhing the ſkins, and laying them two hours in galls, then wringing them out, dipping them in a liquor made with liguſtrum, alum, and verdigreaſe in water; and laſtly, in a dye made of brazil-wood, boiled with ley. *Purple* is given by wetting the ſkins with a ſolution of roche alum in warm water; and, when dry again, rubbing them with the hand with a decoction of logwood in colder. *Green* is given by ſmearing the ſkin with ſap-green and alum-water boiled. *Dark green* is alſo given with ſteel-filings and ſal armoniac ſteeped in urine till ſoft, then ſmeared over the ſkin; which is to be dried in the ſhade. *Sky-colour* is given with indigo ſteeped in boiling water, and the next morning warmed and ſmeared over the ſkin. *Yellow*, by ſmearing the ſkin over with aloes and linſeed-oil diſſolved and ſtrained; or by infuſing it in weld. *Orange-colour* is given by ſmearing with fuſtic berries boiled in alum-water; or, for a deep orange, with turmeric.

Proceſſes for dyeing LEATHER Red *and* Yellow, *as practiſed in* Turkey, *with directions for preparing and tanning the Skins; as communicated by Mr.* Phillippo, *a native of* Armenia, *who*

received from the Society for the Encouragement of Arts, &c. one hundred pounds, and alſo the gold medal of the Society, as a reward for diſcovering this ſecret

1. *Firſt Preparation of the Skins, both for Red and Yellow Leather, by dreſſing them in Lime.* Let the ſkins, dried with the hair on, be firſt laid to ſoak in clean water for three days; let them then be broken over the fleſh ſide, put into freſh water for two days longer, and afterwards hung up to drain half an hour. Let them now be broken on the fleſh ſide, limed in cold lime on the ſame ſide, and doubled together with the grain-ſide outward. In this ſtate they muſt be hung up within-doors over a frame for five or ſix days, till the hair be looſe; which muſt then be taken off, and the ſkins returned into the lime-pit for about three weeks. Take them out, and let them be well worked fleſh and grain, every ſixth or ſeventh day during that time; after which, let them be waſhed ten times in clear water, changing the water at each waſhing. They are next to be prepared in drench, as below mentioned.

2. *Second Preparation of the Skins for both the Red and Yellow Dyes by drenching.* After ſqueezing the water out of the ſkins, put them into a mixture of bran and water, warm as new milk, in the following proportions; viz. about three pounds of bran for five ſkins, and water ſufficient to make the mixture moderately fluid, which will be about a gallon to each pound of bran. In this drench let the ſkins lie three days; at the end of which time they muſt be well worked, and afterwards returned into the drench two days longer. They muſt then be taken out and rubbed between the hands; the water ſqueezed from them, and the bran ſcraped off clear from both ſides of the ſkins. After this they muſt be again waſhed ten times in clear water, and the water ſqueezed out of them.

Thus far the preparatory proceſs of all the ſkins, whether intended to be dyed red or yellow, is the ſame; but afterwards thoſe which are to be dyed red, muſt be treated as follows:

3. *Preparation in Honey and Bran, of the Skins that are to be dyed Red.* Mix one pound of honey with three pints of lukewarm water, and ſtir them together till the honey is diſſolved. Then add two double handfuls of bran; and taking four ſkins (for which the above quantity of the mixture will be ſufficient) work them well in it one after another. Afterwards fold up each ſkin ſeparately into a round form, with the fleſh ſide inwards; and lay them in an earthen pan, or other proper veſſel; if in the ſummer, by the ſide of each other; but in the winter, on the top of each other. Place the veſſel in a ſloping poſition, ſo that ſuch part of the fluid as may ſpontaneouſly drain from the ſkins may paſs from them. An acid fermentation will then riſe in the liquor, and the ſkins will ſwell conſiderably. In this ſtate they muſt continue for ſeven or eight days; but the moiſture that drains from them muſt be poured off once or twice a-day as occaſion may require. After this a further preparation in ſalt is neceſſary; and which muſt be performed in the following manner.

4. *Preparation in Salt, of the Skins to be dyed Red.* After the ſkins have been fermented in the honey and bran as above mentioned, let them be taken out of that mixture on the eighth or ninth day, and well rubbed with dry common ſea-ſalt, in the proportion of about half a pound to each ſkin; the ſalt muſt be well rubbed and worked with them. This will make them contract again, and part with a further conſiderable quantity of moiſture; which muſt be ſqueezed out by drawing each ſkin ſeparately through the hands. They muſt next be ſcraped clean on both ſides from the bran, ſuperfluous ſalt, and moiſture that may adhere to them. After which, dry ſalt muſt be ſtrewed over the grain-ſide, and well rubbed in with the hand. They are then to be doubled with the fleſh ſide outwards, lengthwiſe from neck to tail, and a little more dry ſalt muſt be thinly ſtrewed over the fleſh-ſide, and rubbed in; for the two laſt operations, about a pound and a half of ſalt will be ſufficient for each ſkin. They muſt then be put, thus folded on each other, between two clean boards, placed ſloping, breadthwiſe; and a heavy weight laid on the upper board, in order gradually to preſs out what moiſture they will thus part with. In this ſtate of preſſure, they muſt be continued two days or longer, till it is convenient to dye them, for which they will then be duly prepared.

5. *Preparation of the Red Dye, in a proper Proportion for four Skins.* Put eight gallons of water into a copper, with ſeven ounces of ſhenan tied up in a linen bag. Light a fire under a copper; and when the water has boiled about a quarter of an hour, take out the bag of ſhenan, and put into the boiling fluid or lixivium, 1ſt, two drams of alum; 2dly, two drams pomegranate bark; 3dly, three quarters of an ounce of turmeric; 4thly, three ounces of cochineal; 5thly, two ounces of loaf-ſugar. Let the whole mixture boil about ſix minutes; then cover the fire, and take out a quart of liquor, putting it into a flat earthen pan; and when it is as cold as new milk, take one ſkin, folded lengthwiſe, the grain-ſide outwards, and dip it in the liquor, rubbing it gently with the hands. Then taking out the ſkin, hang it up to drain, and throw away the ſuperfluous dye. Proceed in the ſame manner with the remaining three ſkins; repeating the operation of each ſkin ſeparately, eight times, ſqueezing the ſkins by drawing them through the hands before each freſh dipping. Lay them now on one ſide of a large pan, ſet ſloping, to drain off as much of the moiſture as will run from them without preſſure, for about two hours, or till they are cold; then tan them as below directed.

6. *Tanning the Red Skins.* Powder four ounces of the beſt white galls in a marble mortar, ſifting it through a fine ſieve. Mix the powder with about three quarts of water, and work the ſkins well in this mixture for half an hour or more, folding up the ſkins four-fold. Let them lie in this tan for 24 hours, when they muſt be worked again as before; then taken out, ſcraped clean on both ſides from the firſt galls, and put into a like quantity of freſh galls and water. In this freſh mixture they muſt be again well worked for three quarters of an hour: then folded up as before, and left in the freſh tan for three days. On the fourth day they muſt be taken out, waſhed clean from the galls in ſeven or eight freſh quantities of water, and then hung up to dry.

7. *Manner of dreſſing the Skins after they are tanned.* When the ſkins have been treated as above, and are very near dry, they ſhould be ſcraped with the proper inſtrument or ſcraper on the fleſh-ſide, to reduce them to a proper degree of thickneſs. They are then to be laid on a ſmooth board, and glazed by rubbing them with a ſmooth glaſs. After which they muſt be oiled, by rubbing them with olive-oil, by means of a linen rag, in the proportion of one ounce and a half of oil for four ſkins: they are then to be grained on a graining-board, lengthwiſe, breadthwiſe, and cornerwiſe, or from corner to corner.

8. *Preparations with Galls, for the Skins to be dyed Yellow.* After the four ſkins are taken out of the drench of bran, and clean waſhed as before directed in the ſecond article, they muſt be very well worked, half an hour or more, in a mixture of a pound and an half of the beſt white galls, finely powdered, with two quarts of clean water. The ſkins are then to be ſeparately doubled lengthwiſe, rolled up with the fleſh ſide outwards, laid in the mixture, and cloſe preſſed down on each other, in which ſtate they muſt continue two whole days. On the third day let them be again worked in the tan; and afterwards ſcraped clean from the galls, with an ivory or braſs inſtrument (for no iron muſt touch them). They muſt then be put into a freſh tan, made of two pounds of galls finely pow-

dered, with about three quarts of water, and well worked therein 15 times. After this they muſt be doubled, rolled up as before, and laid in the ſecond tan for three days. On the third day a quarter of a pound of white ſea-ſalt muſt be worked into each ſkin; and the ſkins doubled up as before, and returned into the tan, till the day following, when they are to be taken out, and well waſhed ſix times in cold water, and four times in water lukewarm. The water muſt be then well ſqueezed out, by laying the ſkins under preſſure, for about half an hour, between two boards, with a weight of about 200 or 300 pounds laid upon the uppermoſt board, when they will be ready for the dye.

9. *Preparation of the Yellow Dye, in the proper Proportion for four Skins.* Mix ſix ounces of caſſiari gehira, or dgehira, or the berries of the eaſtern rhamnus, with the ſame quantity of alum; and pound them together till they be fine, in a marble or braſs mortar, with a braſs peſtle. Then dividing the materials, thus powdered, into three equal parts of four ounces each, put one of thoſe three parts into about a pint and a half of water, in a china or earthen veſſel, and ſtir the mixture together. Let the fluid ſtand to cool, till it will not ſcald the hand. Then ſpreading one of the ſkins flat on a table, in a warm room, with the grain-ſide uppermoſt, pour a fourth part of the tingeing liquor, prepared as above directed, over the upper or grain-ſide, ſpreading it equally over the ſkin with the hand, and rubbing it well in. Afterwards do the like with the other three ſkins, for which the mixture firſt made will be ſufficient.

This operation muſt be repeated twice more on each ſkin ſeparately, with the remaining eight ounces of the powder of the berries, and alum, with the above-mentioned due proportions of hot water, put to them as before directed.

The ſkins, when dyed, are to be hung up on a wooden frame, without being folded, with the grain ſide outwards, about three quarters of an hour to drain; when they muſt be carried to a river or ſtream of running water, and well waſhed therein ſix times or more. After this they muſt be put under preſſure for about an hour, till the water be well ſqueezed out; afterwards the ſkins muſt be hung up to dry in a warm room.

This being done, the ſkins are to be dreſſed and grained as before directed for thoſe dyed red; except the oiling, which muſt be omitted.

Blacking-LEATHER. In the tanning of leather it is ſo much impregnated with the aſtringent parts of oak-bark, or with that matter which ſtrikes a black with green vitriol, that rubbing it over three or four times with a ſolution of the vitriol, or with a ſolution of iron made in vegetable acids, is ſufficient for ſtaining it black. Of this we may be convinced by dropping a little of the ſolution on the unblacked ſide of common ſhoe leather. This operation is performed by the currier; who, after the colouring, gives a gloſs to the leather with a ſolution of gum arabic and ſize made in vinegar. Where the previous aſtringent impregnation is inſufficient to give due colour, and for thoſe ſorts of leather which have not been tanned, ſome galls or other aſtringents are added to the ſolution of iron; and in many caſes, particularly for the finer ſorts of leather, and for renewing the blackneſs, ivory or lamp-black is uſed. A miſture of either of theſe with linſeed oil makes the common oil-blacking. For a ſhining blacking, ſmall beer or water are taken inſtead of oil, in the quantity of about a pint to an ounce of the ivory-black, with the addition of half an ounce of brown ſugar, and as much gum-arabic. The white of an egg, ſubſtituted for the gum, makes the black more ſhining, but is ſuppoſed to hurt the leather, and make it apt to crack. It muſt be obvious, however, that all theſe compoſitions admit of a great many variations.

Gilding of LEATHER. Take glair of the whites of eggs, or gum-water, and with a bruſh rub over the leather with either of them: then lay on the gold or ſilver, and, letting them dry, burniſh them. See the articles GILDING and BURNISHING.

To driſt or cover LEATHER *with Silver or Gold.* Take brown red; grind or move it on a ſtone with a muller, adding water and chalk; and when the latter is diſſolved, rub or lightly daub the leather over with it, till it looks a little whitiſh; and then lay on the leaf-ſilver or gold before the leather is quite dry, laying the leaves a little over each other, that there may not be the leaſt part uncovered; and when they have well cloſed with the leather, and are ſufficiently dried on and hardened, rub them over with an ivory poliſher, or the foretooth of a horſe.

LEAVEN, a piece of ſour dough, uſed to ferment and render light a much larger quantity of dough or paſte. See BREAD, BARM, and BAKING. Leaven was ſtrictly forbidden by the law of Moſes during the ſeven days of the paſſover; and the Jews, in obedience to this law, very carefully purified their houſes from all leaven as ſoon as the vigil of the feaſt began. Nothing of honey or leaven was to have place in any thing preſented to the Lord, upon his altar, during this ſolemnity. If, during the feaſt, the leaſt particle of leaven was found in their houſes, they imagined the whole was polluted, for a little leaven leaveneth the whole lump. Leaven, in its figurative ſenſe, ſignifies the bad paſſions of envy and malice, and rancour, which ſour the temper, and extend their ferment over the ſocial affections; whereas unleavened bread implies ſincerity and truth. It is frequently uſed for any kind of moral contagion.

LEBADEA, or LEBADIA, an ancient town of Bœotia, on the borders of Phocis, ſituated between Helicon and Chæronea, near Coronæa. In it ſtood the oracle of Jupiter Trophonius, which whoever went to conſult deſcended into a ſubterraneous gulf.

LEBEDA, an ancient ſea-port town of Africa, in the kingdom of Tripoli, with a pretty good harbour, and an old caſtle, ſeated on the Mediterranean ſea; in E. lon. 14. 50. N. lat. 32. 10.

LEBEDOS, reckoned among the twelve ancient cities of Ionia, was ſituated to the ſouth of Smyrna. It was the reſidence of ſtage-players, and the place where they met from all parts of Ionia, as far as the Helleſpont, and celebrated annual games in honour of Bacchus. (Strabo.) It was overthrown by Lyſimachus, who removed the inhabitants to Epheſus; ſcarce ever after recovering itſelf, and becoming rather a village than a town. (Horace.)

LEBEN, or LEBENA (anc. geog.), one of the port-towns of the Gortynians, near the promontory Leon, on the ſouth-eaſt ſide of Crete; famous for a temple of Æſculapius, in imitation of that of Cyrenaica.

LEBRIXA, an ancient, ſtrong, and pleaſant town of Spain, in Andaluſia; ſeated on a territory abounding in corn, wine, and a great number of olive trees, of whoſe fruit they make the beſt oil in Spain. W. long. 5. 32. N. lat. 36. 12.

LEBUS, a town of Germany, in the circle of Upper Saxony, and in the marquiſate of Brandenburg, with a biſhop's ſee, ſeculariſed in favour of the houſe of Brandenburgh. It is ſeated on the river Oder, in E. long. 14. 55. N. lat. 52. 28.

LECCE, a rich, populous, and moſt beautiful town of Italy, in the kingdom of Naples and in the Terra d'Otranto, of which it is the chief place, and the ſee of a biſhop. E. long. 18. 20. N. lat. 40. 38.

LECCO, a town of Italy, in the duchy of Milan, ſeated on the eaſtern ſide of the lake Como. E. long. 9. 21. N. lat. 45. 52.

LECHLADE, a town of Glouceſterſhire in England, ſeated at the confluence of the river Lech with the Thames. W. long. 2. 15. N. lat. 51. 42.

LECHNICH, a town of Germany in the circle of the Lower Rhine, and in the electorate of Cologne. E. long. 6. 35. N. lat. 50. 40.

LECTI, beds or couches, were of two kinds amongſt the Romans, as being deſtined to two different uſes, to lie upon at entertainments, and to repoſe upon for nightly reſt. The firſt were called *lecti triclinares*, the other *lecti cubicularii*. See BEDS.

LECTICA, was a litter or vehicle, in which the Romans were carried. It was of two kinds, covered and uncovered. The covered lectica is called by Pliny *cubiculum viatorum*, a traveller's bed-chamber: And indeed we are informed that Auguſtus frequently ordered his ſervants to ſtop his litter that he might ſleep upon the road. This vehicle was carried by ſix or eight men called *lecticarii*. The lectica differed from the *ſella*, for in the firſt the traveller could recline himſelf for ſleep, in the latter he was obliged to ſit. The lectica was invented in Bithynia; the ſella was a Roman machine, and eſteemed the more honourable of the two. Lectica was alſo the name of the funeral bed or bier for carrying out the dead.

LECTICARII, among the Romans, ſervants who carried the LECTICA.

LECTICARIUS was alſo an officer in the Greek church, whoſe buſineſs it was to bear off the bodies of thoſe who died, and to bury them. Theſe were otherwiſe denominated *decani* and *copiatæ*.

LECTIO, *reading*. Conſidered in a medicinal view, it is ſaid by Celſus, lib. i. cap. 4. to be bad, eſpecially after ſupper, for thoſe whoſe heads are weak; and in lib. i. cap. 8. he recommends reading with an audible voice for ſuch as have weak ſtomachs. It is alſo directed by Paulus Æginetus as an exerciſe, lib. i. cap. 19.

LECTISTERNIUM, a ſolemn ceremony obſerved by the Romans in times of public danger, wherein an entertainment was prepared with great magnificence, and ſerved up in the temples. The gods were invited to partake of the good cheer, and their ſtatues placed upon couches round the table in the ſame manner as men uſed to ſit at meat. The firſt lectiſternium held at Rome was in honour of Apollo, Latona, Diana, Hercules, Mercury, and Neptune, to put a ſtop to a contagious diſtemper which raged amongſt the cattle, in the year of Rome 354. At theſe feaſts the Epulones preſided, and the ſacred banquet was called *epulum*. See EPULO, EPULUM, &c. Something like the lectiſternium was occaſionally obſerved amongſt the Greeks, according to Caſaubon.

LECTORES, among the Romans, ſervants in great men's houſes, who were employed in reading while their maſters were at ſupper. They were called by the Greeks ANAGNOSTÆ.

LECTOURE, an ancient and ſtrong town of France, in the department of Gers and late province of Armagnac, with a caſtle. It was lately an epiſcopal ſee, and is ſituate on a mountain, at the foot of which runs the river Gers, 12 miles eaſt of Condom. E. long. 0. 42. N. lat. 43. 56.

LECTURERS, in England, are an order of preachers in pariſh churches, diſtinct from the rector, vicar, and curate. They are choſen by the veſtry, or chief inhabitants of the pariſh, ſupported by voluntary ſubſcriptions and legacies, and are uſually the afternoon preachers in the Sunday ſervice. The term is alſo more generally applied to thoſe who preach on Sunday, or on any ſtated day of the week, in churches, or other places of public worſhip. By 13 & 14 Car. II. cap. 4. lecturers in churches, unlicenſed, and not conforming to the liturgy, ſhall be diſabled, and ſhall alſo ſuffer three months impriſonment in the common gaol; and two juſtices, or the mayor in a town corporate, ſhall, upon certificate from the ordinary, commit them accordingly. Where there are lectures founded by the donations of pious perſons, the lecturers are appointed by the founders without any interpoſition or conſent of rectors of churches, &c. though with the leave and approbation of the biſhop; ſuch as that of Lady Moyer's at St. Paul's. But the lecturer is not entitled to the pulpit, without the conſent of the rector or vicar, who is poſſeſſed of the freehold of the church.

LEDA, (fab. hiſt.) a daughter of king Theſpius and Eurythemis, who married Tyndarus king of Sparta. She was ſeen bathing in the river Eurotas by Jupiter, when ſhe was ſome few days advanced in her pregnancy, and the god, ſtruck with her beauty, reſolved to deceive her. He perſuaded Venus to change herſelf into an eagle, while he aſſumed the form of a ſwan, and after this metamorphoſis Jupiter, as if fearful of the tyrannical cruelty of the bird of prey, fled through the air into the arms of Leda, who willingly ſheltered the trembling ſwan from the aſſaults of his ſuperior enemy. The careſſes with which the naked Leda received the ſwan, enabled Jupiter to avail himſelf of his ſituation, and nine months after this adventure the wife of Tyndarus brought forth two eggs, of one of which ſprung Pollux and Helena, and of the other Caſtor and Clytemneſtra. The two former were deemed the offſpring of Jupiter, and the others claimed Tyndarus for their father. Some mythologiſts attribute this amour to Nemeſis, and not to Leda; and they farther mention, that Leda was entruſted with the education of the children which ſprung from the eggs brought forth by Nemeſis. To reconcile this diverſity of opinions, others maintain that Leda received the name of *Nemeſis* after death. Homer and Heſiod make no mention of the metamorphoſis of Jupiter into a ſwan, whence ſome have imagined that the fable was unknown to theſe two ancient poets, and probably invented ſince their age.

LEDBURY, a town of Herefordſhire in England. It is a well-built town ſeated on a rich clay ſoil, and inhabited moſtly by clothiers, who carry on a pretty large trade. W. long. 2. 27. N. lat. 52. 6.

LEDESMA, an ancient and ſtrong town of Spain, in the kingdom of Leon, ſeated on the river Tome, in W. long. 5. 25. N. lat. 47. 2.

LEDGER, the principal book wherein merchants enter their accounts. See BOOK-KEEPING.

LEDUM, MARSH CISTUS, or *Wild Roſemary*: a genus of the monogynia order, belonging to the decandria claſs of plants; and in the natural method ranking under the 18th order, *Bicornes*. The calyx is quinquefid: the corolla plain and quinquepartite; the capſule quinquelocular, and opening at the baſe. There is but one ſpecies, viz. the paluſtre, with very narrow leaves. This grows naturally upon bogs and moſſes in many parts of Yorkſhire, Cheſhire, and Lancaſhire; riſing with a ſlender ſhrubby ſtalk about two feet high, dividing into many ſlender branches, garniſhed with narrow leaves, not much unlike thoſe of heath. The flowers are produced in ſmall cluſters at the end of the branches, and are ſhaped like thoſe of the ſtrawberry-tree, but ſpread open wider at top. Theſe are of a reddiſh colour, and in the natural places of their growth are ſucceeded by ſeed-veſſels filled with ſmall ſeeds which ripen in autumn.—This plant is with great difficulty kept in a garden; for as it naturally grows upon bogs, unleſs the plants have a ſimilar ſoil they will not thrive. They muſt be procured from the places of their growth, and taken up with good roots, otherwiſe they will not live.

LEE, an epithet uſed by ſeamen to diſtinguiſh that part of the hemiſphere to which the wind is directed, from the other part whence it ariſes; which latter is accordingly called *to windward*. This expreſſion is chiefly uſed when the wind croſſes the line of a ſhip's courſe, ſo that all on one ſide of her is called to *windward*, and all on the oppoſite ſide *to leeward*, Hence,

Under the LEE, implies farther to the leeward, or farther from that part of the horizon whence the wind blows: as,

Under the LEE *of the Shore*; *i. e.* at a ſhort diſtance from the ſhore which lies to windward. This phraſe is commonly underſtood to expreſs the ſituation of a veſſel anchored, or ſailing under the weather-ſhore, where there is always ſmoother water, and leſs danger of heavy ſeas, than at a great diſtance from it.

LEE-*Larches*, the ſudden and violent rolls which a ſhip often takes to the leeward in a high ſea, particularly when a large wave ſtrikes her on the weather-ſide.

LEE-*Side*, all that part of a ſhip or boat which lies between the maſt and the ſide fartheſt from the direction of the wind; or otherwiſe, the half of a ſhip, which is preſſed down towards the water by the effort of the ſails, as ſeparated from the other half by a line drawn through the middle of her length. That part of the ſhip which lies to windward of this line is accordingly called the *weather ſide*. Thus admit a ſhip to be ſailing ſouthward, with the wind at eaſt, then is her ſtarboard or right ſide the *lee-ſide*; and the larboard, or left, the *weather-ſide*.

LEE-*Way*. See NAVIGATION.

LEE (NATHANIEL), a very eminent dramatic poet of the laſt century, was the ſon of a clergyman, who gave him a liberal education.—He received his firſt rudiments of learning at Weſtminſter ſchool; from whence he went to Trinity-college, Cambridge.—Coming to London, however, his inclination prompted him to appear on the theatre; but he was not more ſucceſsful in repreſenting the thoughts of other men, than many a genius beſides, who have been equally unfortunate in treading the ſtage, although they knew ſo well how to write for it. He produced eleven tragedies, all of which contain a very great portion of true poetic enthuſiaſm. None, if any, ever felt the paſſion of love more truly; nor could any one deſcribe it with more tenderneſs. Addiſon commends his genius highly; obſerving, that none of our Engliſh poets had a happier turn for tragedy, although his natural fire and unbridled impetuoſity hurried him beyond all bounds of probability, and ſometimes were quite out of nature. The truth is, this poet's imagination ran away with his reaſon; ſo that at length he became quite crazy; and grew ſo mad, that his friends were obliged to confine him in bedlam, where he made that famous witty reply to a coxcomb ſcribbler, who had the cruelty to jeer him with his misfortune, by obſerving that it was an eaſy thing to write like a madman:—"No (ſaid Lee), it is not an eaſy thing to write like a madman; but it is very eaſy to write like a fool." Lee had the good fortune to recover the uſe of his reaſon ſo far as to be diſcharged from his melancholy confinement; but he did not long ſurvive his enlargement, dying at the early age of 34. Cibber, in his Lives of the Poets, ſays he periſhed unfortunately in a night-ramble in London ſtreets.—His Theodoſius and Alexander the Great are ſtock plays, and to this day are often acted with great applauſe. The late Mr. Barry was particularly fortunate in the character of the Macedonian Hero.

LEECH, in zoology. See HIRUDO.

LEECHES in a ſhip, the borders or edges of a ſail which are either ſloping or perpendicular. The leeches of all ſails whoſe tops and bottoms are parallel to the deck, or at right angles to the maſt, are denominated from the ſhip's ſide, and the ſail to which they belong; as the *ſtarboard*-leech of the main-ſail, the *lee*-leech of the fore-top-ſail, &c. But the ſails which are fixed obliquely on the maſts have their leeches named from their ſituation with reſpect to the ſhip's length; as the *fore*-leech of the mizen, the *after*-leech of the jib or fore-ſtay ſail, &c.

LEECH-*Lines*, certain ropes faſtened to the middle of the leeches of the main ſail and fore-ſail, and communicating with blocks under the oppoſite ſides of the top, whence they paſs downwards to the deck, ſerving to truſs up thoſe ſails to the yard as occaſion requires. See BRAILS.

LEECH-*Rope*, a name given to that part of the bolt-rope to which the border or ſkirt of a ſail is ſewed. In all ſails whoſe oppoſite leeches are of the ſame length, it is terminated above the earing, and below the clue. See BOLT-*Rope*, CLUE, and EARING.

LEEDS, a town of the Weſt Riding of Yorkſhire, 196 miles from London, has a magnificent ſtone-bridge over the river Aire to the ſuburbs. It was incorporated by king Charles I. with a chief alderman, nine burgeſſes, and 20 aſſiſtants; and by Charles II. with a mayor, 12 aldermen, and 24 aſſiſtants. It has been a long time famous for the woollen manufacture, and is one of the largeſt and moſt flouriſhing towns in the county, yet had but one church till the reign of Charles I. By the late inland navigation, it has communication with the rivers Merſey, Dee, Ribble, Ouſe, Trent, Darwent, Severn, Humber, Thames, Avon, &c. which navigation, including its windings, extends above 500 miles in the counties of Lincoln, Nottingham, Lancaſter, Weſtmoreland, Cheſter, Stafford, Warwick, Leiceſter, Oxford, Worceſter, &c. Here is a long ſtreet full of ſhops, and a hall for the ſale of cloth, built in 1758. The merchants of this place, York, and Hull, ſhip them off at the latter, for Holland, Hamburgh, and the north. After ringing of the market-bell at ſix or ſeven in the morning, the chapmen come and match their patterns, when they treat for the cloth with a whiſper, becauſe the clothiers ſtandings are ſo near each other; and perhaps 20,000l. worth of cloth is ſold in an hour's time. At half an hour after eight the bell rings again, when the clothiers make room for the linen-drapers, hardware-men, ſhoemakers, fruiterers, &c. At the ſame time the ſhambles are well ſtored with all ſorts of fiſh and fleſh; and 500 horſe loads of apples have been counted here in a day. There is a magnificent hall, where they alſo ſell great quantities of white cloth; and here is a noble guildhall, with a fine marble ſtatue of queen Anne, erected about the year 1714. Its river being navigable by boats, they ſend other goods, beſides their cloth, to Wakefield, York, and Hull, and furniſh York with coals. There is a houſe called *Red-hall*, becauſe it was the firſt brick-building in the town, and king Charles I. had an apartment in it, which is ever ſince called the *king's chamber*. There is another place called *Tower-hill*, on which there was once a tower; beſides which, there was a caſtle which king Stephen beſieged in his march to Scotland. Here was alſo a park, where are now incloſures. There is a workhouſe here of free-ſtone, where poor children are taught to mix wool, and perform other eaſy branches of that manufacture, and a part of it has been uſed many years as an hoſpital for the reception of the aged poor. Here are three alms-houſes, and two charity-ſchools of blue-coat boys to the number of 100. In the ceiling of St. Peter's, its only parochial church, the delivery of the law to Moſes is finely painted in freſco by Parmentier. It is a venerable free-ſtone pile built in the cathedral faſhion, and ſeems to have been the patch-work of ſeveral ages. The increaſe of building in Leeds in the year 1786, was nearly 400 houſes. There is a Preſbyterian meeting-houſe here, erected in 1691, called the *new chapel*, which is the ſtateſieſt, if not the oldeſt, of that denomination in the north of England; and in the town and its ſuburbs are ſeveral other meeting-houſes, as is always obſervable in towns of great trade and manufacture. It is noted for ſome medicinal ſprings; one of which, called *St. Peter's*, is an extreme cold one, and has been very beneficial in rheumatiſms, rickets, &c. Here is an hoſpital for relief of the poor, who had been honeſt and induſtrious, endowed with 50l. a year, beſides 10l. a year for a maſter to read prayers and inſtruct them; alſo a free ſchool. Its markets are Tueſdays and Saturdays, and the market-laws are more ſtrictly obſerved here than any

where. It has two fairs in the year. Leeds, though a large town, ſends no members to parliament.

LEEK, in botany. See ALLIUM.

LEEK, a town of Staffordſhire in England, 155 miles from London. It lies among the barren moorlands, has a manufacture of buttons, a market on Wedneſday, and 7 fairs in the year. In the church-yard, at the ſouth-eaſt corner of the chancel, are the remains of a Daniſh croſs, now upright, and ten feet high from the ground, beneath which are three ſteps. In Blue-hills in the neighbourhood are coal-mines; and a ſalt ſtream comes from thence, which tinges the ſtones and earth through which it runs with a ruſty colour, and, with the infuſion of galls, turns as black as ink. Here are rocks of a moſt ſurpriſing height, without any turf or mould upon them.

LEER, in glaſs-making, a ſort of third furnace, intended to anneal and cool by proper degrees the veſſels when made. This properly comprehends two parts, the tower and leer. The tower is that part which lies directly above the melting furnace, with a partition between them of a foot thick, in the midſt whereof there is a round hole, placed exactly over the furnace, through which the flame and heat paſs into the tower: on the floor of this tower the veſſels are ſet to anneal. There are two openings by which the veſſels are put into this tower; and after ſtanding there ſome time they are put into iron pans, which by degrees are drawn out all along that part of this furnace which is properly called the *leer*, which is five or ſix yards long, that the veſſels may cool by degrees. This leer is continued to its tower and arched all along, and is about four feet wide, and high within. The glaſſes are cool by that time they are come to the mouth of this, which enters into a room where the glaſſes are placed when taken out.

LEES, the groſſeſt and moſt ponderous parts of liquors, which, being ſeparated by fermentation, fall to the bottom. The word comes from the French *lie*; and that either from *limus* "mud," or from *Lyeus* one of the ſurnames of Bacchus; or, according to Du Cange, from *lia*, a corrupt Latin word ſignifying the ſame.—The vinegar-makers make a great trade of the lees of wine dried and made into cakes, after having ſqueezed out the remains of the liquor in preſſes.

LEET, or COURT LEET *(leta viſus franci plegii)*, is a court of record, ordained for puniſhing offences againſt the crown; and is ſaid to be the moſt ancient court of the land. It inquires of all offences under high treaſon; but thoſe who are to be puniſhed with loſs of life or member, are only inquirable and preſentable here, and to be certified over to the juſtices of aſſiſe, (Stat. 1. Edw. III.). And this court is called the view of frank pledge, becauſe the king is to be there certified by the view of the ſteward, how many people are within every leet, and have an account of their good manners and government; and every perſon of the age of 12 years, who hath remained there for a year and a day, may be ſworn to be faithful to the king, and the people are to be kept in peace, &c. A leet is incident to a hundred; as a court baron to a manor: for by grant of a hundred, a leet paſſeth; and a hundred cannot be without a leet.—The uſual method of puniſhment in the court-leet, is by fine and amercement; the former aſſeſſed by the ſteward, and the latter by the jury.

LEEUW (WILLIAM de), an eminent engraver of the laſt century. He was a native of Flanders, and the diſciple of Southman, whoſe manner of engraving, or rather etching, he imitated. His prints generally appear harſh at firſt ſight; but grow into favour upon examination, and ſeveral of them have great effect; particularly his Daniel in the lion's den, a large plate lengthwiſe, from Rubens. The firſt impreſſions of this plate are before the name of Dankertz was added, and are now extremely rare and dear.

LEEWARD *Ship*, a veſſel that falls much to leeward of her courſe when ſailing cloſe-hauled, and conſequently loſes much ground.

To LEEWARD, towards that part of the horizon which lies under the lee, or whither the wind bloweth. Thus, "We ſaw a fleet *under the lee*," and, "We ſaw a fleet *to leeward*," are ſynonymous expreſſions.

LEGATE, a cardinal or biſhop, whom the pope ſends as his ambaſſador to ſovereign princes. See AMBASSADOR. There are three kinds of legates, viz. legates *a latere*, legates *de latere*, and legates by office, or *legati nati*: of theſe the moſt conſiderable are the legates *a latere*, the next are the legates *de latere*. See the article LATERE. Legates by office are thoſe who have not any particular legation given them; but who, by virtue of their dignity and rank in the church, become legates: ſuch are the archbiſhop of Rheims and Arles: but the authority of theſe legates is much inferior to that of the legates *a latere*. The power of a legate is ſometimes given without the title. Some of the nuncios are inveſted with it. It was one of the eccleſiaſtical privileges of England from the Norman conqueſt, that no foreign legate ſhould be obtruded upon the Engliſh, unleſs the king ſhould deſire it upon ſome extraordinary emergency, as when a caſe was too difficult for the Engliſh prelates to determine. The term *legate* comes from *legatus*, which Varro derives from *legere*, "to chooſe;" and others from *legare*, *delegare*, "to ſend, delegate."

Court of the LEGATE, was a court obtained by Cardinal Wolſey of Pope Leo X. in the ninth year of Henry VIII. wherein he, as legate of the pope, had power to prove wills, and diſpenſe with offences againſt the ſpiritual laws, &c. It was but of ſhort continuance.

LEGATEE, in law, the perſon to whom a legacy is bequeathed.

LEGATIO LIBERA, was a privilege frequently obtained of the ſtate, by ſenators of Rome, for going into any province or country, upon their own private buſineſs, in the quality of *legati* or envoys from the ſenate, that the dignity of this nominal office might ſecure them a good reception, and have an influence on the management of their concerns. The cities and towns through which they paſſed were obliged to defray their expences.—This was called *libera legatio*, becauſe they might lay aſide the office as ſoon as they pleaſed, and were not encumbered with any actual truſt.

LEGATUS, a military officer amongſt the Romans, who commanded as deputy of the commander in chief. The *legati*, at their firſt inſtitution, were not ſo much to command as to adviſe. They were generally choſen by the conſuls, with the approbation of the ſenate. As to the number of the *legati*, we have no certain information, though we may upon good grounds aſſign one to every legion. In the abſence of conſul or proconſul, they had the honour to uſe the *faſces*. Under the emperors there were two ſorts of *legati*, *conſulares*, and *prætorii*. The firſt commanded whole armies, as the emperors lieutenant-generals; and the other had the command of particular legions. The *legati* under the proconſuls in the provinces, ſerved for judging inferior cauſes, and management of ſmaller concerns, remitting things of great moment to the governor or preſident himſelf. This was the original office of the *legati*, as was hinted above; though, as we have ſeen, they were afterwards admitted to command in the army.

LEGEND, any idle or ridiculous ſtory told by the Romaniſts concerning their ſaints, and other perſons, in order to ſupport the credit of their religion. The legend was originally a book uſed in the old Romiſh churches, containing the leſſons to be read at divine ſervice; hence the lives of the ſaints and martyrs came to be called *legends*, becauſe chapters were read out of them at matins, and at the refectories of religious houſes. Among theſe the golden legend, which is a collection of the

lives of the ſaints, was received in the church with great applauſe, which it maintained for 200 years; though it is ſo full of ridiculous and romantic ſtories, that the Romaniſts themſelves are now aſhamed of it.

LEGEND is alſo uſed by authors to ſignify the words or letters engraven about the margins, &c. of coins. Thus the legend of a French crown is, SIT NOMEN DOMINI BENEDICTVM; that of a moidore, IN HOC SIGNO VINCES: on thoſe of the laſt emperors of Conſtantinople, we find IESVS CHRISTVS BASILEVS BASILEON, IHS XPS NIKA, IESVS CHRISTVS VINCIT.

LEGEND is alſo applied to the inſcription of medals, which ſerves to explain the figures or devices repreſented on them. In ſtrictneſs, the legend differs from the inſcription; this laſt properly ſignifying words placed on the reverſe of a medal, in lieu of figures.

It ſeems as if the ancients had intended their medals ſhould ſerve both as images and as emblems; the former for the common people, and the other for perſons of taſte and parts; the images to repreſent the faces of princes; emblems their virtues and great actions; ſo that the legend is to be looked on as the ſoul of the medal, and the figures as the body.

Every medal has properly two legends; that on the front, and that on the reverſe. The firſt generally ſerves only to diſtinguiſh the perſon by his name, titles, offices, &c. the latter is intended to expreſs his noble and virtuous ſentiments, his good deeds, and the advantages the public has reaped by him. This, however, does not hold univerſally; for ſometimes we find the titles ſhared between both ſides, and ſometimes alſo the legend.

In the medals of cities and provinces, as the head is uſually the genius of the place, or at leaſt ſome deity adored there, the legend is the name of the city, province, or deity, or of both together; and the reverſe is ſome ſymbol of the city, &c. frequently without a legend, ſometimes with that of one of its magiſtrates.

Legends generally commemorate the virtues of princes, their honour and conſecrations, ſignal events, public monuments, deities, vows, privileges, &c. which are either in Latin or Greek, or a mixture of both, and are intended to eternize their names, and the benefits done by them to the empire.

LEGERDEMAIN.

THE term LEGERDEMAIN is given to certain deceptive performances, which either depend altogether on manual dexterity and addreſs, or derive but a ſmall degree of aid from philoſophical principles. Of theſe we ſhall preſent our readers with a ſelection of the beſt that have been either explained in books or publicly exhibited.

SECT. I. *Performances with* CUPS *and* BALLS.

THE following method of exerciſing this ſimple and ingenious amuſement is that practiſed by one Mr. Kopp a German, whoſe performances are deſervedly preferred to thoſe of former artiſts. In this, however, as in all the other branches belonging to the art of legerdemain, it is not ſufficient that a perſon has the requiſite dexterity, or ſleight of hand; it is neceſſary alſo to take off the attention of the ſpectators by ſome entertaining diſcourſe; which not only prevents diſcovery, but adds greatly to the amuſement of the company; for which reaſon, ſuch diſcourſe is inſerted in this article.

To play his part properly, the performer on cups and balls ought to provide himſelf with a bag about 12 inches long, and from eight to ten in depth. The inſide muſt be furniſhed with a number of pockets for holding the ſeveral articles neceſſary in the amuſement; and this bag the performer muſt hang before him.

The materials neceſſary for the performer are, 1. Three white poliſhed tin-cups, repreſented by A, B, and C (pl. 4. fig. 1.) in the ſhape of a truncated cone with a double ledge D towards the baſe. This ledge, which is about half an inch in breadth, ſerves to raiſe the cups eaſily by, admitting alſo the hand to paſs a ſmall cork ball (ſee fig. 5.) The upper part E of the cup ought to be hollowed in the form of a ſphere, ſufficient to contain the balls without their appearing above the upper edge of the cups. 2. It is alſo neceſſary to have a ſmall rod, called *Jacob's ſtaff*; which is uſually made of ebony, and neatly tipt with ivory at both ends. This is frequently uſed for ſtriking on the cups; and being held in the hand where the balls are alſo kept, it gives the operator an opportunity of keeping that hand generally ſhut, or of varying its poſition, in order to avoid being diſcovered. The balls are made of cork, blackened by ſlight burning on the outſide.

The dexterity in performing this operation conſiſts in artfully ſecreting a ball in the right hand, and making it to appear or diſappear in the ſame hand. The ſecreting it between the fingers is called *conjuring the ball*, at which time the ſpectators are to ſuppoſe that it is kept in the other hand, or that it was paſſed under a cup; but if it is made to re-appear when held ſecretly in the hand, they muſt believe that it came out of the place laſt touched by the fingers.

Conjuring the ball is performed by putting it between the place of the thumb A and the finger B (fig. 2.), conveying it with the thumb, by rolling it upon the fingers the length of the line B C, moving the middle finger D to a diſtance, and placing the ball at the junction of the fingers C (fig. 3.); but in this part of the operation it is neceſſary to hold the ball rather tight, leſt it ſhould fall down and diſcover the ſecret. In order to make it appear, we muſt bring back the ball the ſame way from C to D; and every time that it is conjured, or made to diſappear, as well as when it is made to re-appear, the palm of the hand ſhould be turned from the ſide of the table on which the operator is playing.

While this part of the trick is performing, the operator muſt let the ſpectators know that the ball has been paſſed under a cup, or into another hand; and in the firſt caſe he makes a motion with the hand (as repreſented fig. 4.) indicating that he had thrown it through the cup; at which time alſo he conjures it, approaching the two fingers of the right hand towards the left, which laſt he holds open, and makes a motion as if the ball had been placed there, ſhutting the left hand inſtantly. It is alſo to be ſuppoſed, at every time when a ball ſeems to be placed below a cup, that it has been held in the left hand; and when he raiſes the cup with the right hand as in fig. 5. the left hand muſt be opened, and he reſts the ball at that inſtant upon the hollow of the other, ſliding it along the fingers.

At the time the ball is to be put ſecretly under the cup, it ſhould lie between the two fingers of the right hand (fig. 5.) With this hand he raiſes the cup; and placing it on the table, lets go the ball, which, according to its poſition in fig. 6. ſhould be found near the edge of the cup when taken into the hand. If he would put the ball ſecretly between the two cups, it muſt be let go by jerking it towards the bottom of the cup which he holds, and places it very quickly on that in which the

ball is to be found. When the ball is in this ſituation, if the operator ſhould want it to diſappear, he muſt raiſe the two cups with his right hand, and draw out haſtily that under which the ball is placed; at the ſame inſtant lowering with his left hand the other cup, under which he places it.

In ſpeaking of the tricks which follow, terms are made uſe of which explain whether what is ſaid be feigned or true; of which terms explanations are given, and numbers adapted to the explanations of the different operations which follow.

I. *To put the ball under the cup:* Really done, with the fingers of the right or left hand.

II. *To put the ball under the cup, or in the hand.*—A feigned conjuration; pretending to ſhut it up in the left hand, which is afterwards opened, in order to have it ſuppoſed that the ball is under the cup or elſewhere. See fig. 3.

III. *To paſs the ball under the cup.*—The ball ſuppoſed to be conjured is to be really introduced.

IV. *To paſs the ball between the cups,* is likewiſe real.

V. *To make the ball which is between the cups diſappear.*—This is likewiſe real; and performed, as has already been deſcribed, by drawing back with much precipitation and dexterity the cup on which it is placed, and lowering upon the table that which is above, and under which the ball muſt of conſequence be found.

VI. *To take the ball.* Real.—It is taken between two fingers of the right hand, and ſhown before conjuration.

VII. *To take away the ball from under the cup.* This is done by taking it away in the ſight of the ſpectators.

VIII. *To draw the ball.* Feigned; or by pretending to draw it from the end of the rod, from the cup or any other place, by bringing into the fingers the ball which was ſecreted.

IX. *To throw the ball through the cup,* is to conjure it in pretending to throw it.

X. *To raiſe up the cups.* This is really done in three ways; viz. either with the right hand, the rod, or the left hand. The firſt is when the ball is to be ſecretly inſerted in returning the cup to its place. In the ſecond, the rod is to be put on the tops of the cups to turn them over again, ſo that the balls may be ſhown which were to be paſſed into them. The third is when the operator intends to ſhow that no balls are in the cups, or that there are ſome.

XI. *To cover a cup.* This is really done, by taking with the right hand that which is to be put over another, and introducing at the ſame time a ball between the two.

XII. *To recover a cup.* It is done by taking with the left hand the cup to be put over or above, without introducing any thing into it.

The Performances.

1. *To put a ball under each cup, and take it out again.* Having placed on the table the three cups and little rod, as ſhown in fig. 1. the performer muſt begin his manœuvres, by endeavouring to amuſe the ſpectators with ſome kind of entertaining diſcourſe. Nothing can be more *a-propos* than the origin of the little rod and cups; and he muſt be very aſſiduous in this ſort of diſcourſe to take off the eyes of the ſpectators as much as poſſible. The following may be a ſpecimen of the manner in which he ought to addreſs his audience: "There are many perſons who meddle with the play of the cups and balls, and yet know nothing about them. This is by no means extraordinary: even I who now play before you, pretend to know but little. Nay, ſome time ago, I was ſuch a novice as to think of playing before a numerous aſſembly with glaſs cups, in which you may gueſs I did not meet with great applauſe. I do not indeed practiſe this method but before ſuch as are actually blind; neither do I play with china cups, leſt, through awkwardneſs in feigning to break their handles, I ſhould do ſo in reality. Theſe are the cups which anſwer my purpoſe. They are made of ſuch metal as the alchymiſts attributed to Jupiter and Mars, or, to ſpeak more properly and intelligibly, they are made of tin. Behold and examine theſe cups (*ſhowing the cups to the company, and putting them on the table:*) All my ſcience, and it is in that in which it is admirable, conſiſts in deceiving the eyes, and paſſing the balls into the cups without your perceiving how it is done. I adviſe you therefore to pay no attention to my words, but to examine well my hands (*ſhowing his hands*). If there is in this company any perſon who has the misfortune to uſe ſpectacles, he may retire; but the moſt clear-ſighted will ſee nothing there.

"Here is the little Jacob's rod (*ſhowing the rod with the left hand*); that is to ſay, the magazine from which I take all my balls (*taking ſecretly with the other hand a ball from his bag, which he hides between his fingers*). There is not one in England ſo well furniſhed. Obſerve, that the more I take from it the more remain: I draw from it (VIII.) this ball, (*ſhowing it, and placing it upon the table,* (I.) Obſerve that there is nothing under the cups (*ſhowing the inſide of the cups*), and that I have no other ball in my hands (*ſhowing his hands*). I take (VI.) this ball: I put it (II.) under this firſt cup. I draw (VIII.) a ſecond ball from my little rod, and I put it under this ſecond cup (*actually done*). It is proper here to tell you, that the generality of thoſe who play the cups only feign to put the balls there; but I do not deceive you, and I actually put them there. (*He raiſes the cup* B, *and, taking the ball which he has put under it into his right hand fingers, ſhews it to the company.*) I return it (II.) under the ſame cup. I take (VIII.) this third, and put it (II.) in the ſame way under this laſt cup. You are about to ſay that this is not very extraordinary, and that you could do it as well yourſelves. I agree with you; but the difficulty conſiſts in taking out theſe balls again through the cups (*ſtriking the firſt cup with the rod*). I take (VIII.) this firſt ball (*ſhowing it*): I put it (II.) into my hand, and ſend it to Conſtantinople, (*he opens the left hand*). I take (VIII.) this, (*ſtriking with the rod on the ſecond cup*). I put it (II.) into my hand, and I ſend it to the Eaſt Indies, (*opening his left hand*). I take (VIII.) the laſt, and I put it (I.) on the table: Obſerve that there are no more under any of theſe cups, (*turning down the cups with the rod*).

2. *With the ſingle ball remaining on the table, to paſs a ball through each of the cups, and to take it off from the ſame.* "I return the cups to their places, and take (VI.) this ball, and I put it under this firſt cup. I take it back again (VIII.): Obſerve that it is not there now, (*raiſing* (X.) *the cup with the left hand*). I put it (II.) under this other cup: I take it out again (VIII.) in the ſame manner, (*raiſing* (X.) *the cup*). I put it (II.) under the laſt cup, and take it out again, (VIII.) (*raiſing the laſt cup with the left hand, and placing the ball on the table.*)

3. *With the ſingle ball remaining on the table, to take away a ball through two or three cups.*—In this performance the three cups are diſtinguiſhed by A, B, C, as in fig. 1.

"I never have any ball ſecreted in my hands, as the greateſt part of them who play the cups and balls have (*ſhowing his hands*). I take (VI.) this ball, and I put it (II.) under this cup B. I cover it (XII.) with this cup C, and I take again (VIII.) this ball through the two cups (*ſhows the ball in placing it on the table, returns afterwards the cup* C *to its place, and raiſes* (X.) *the cup* B *to ſhow that there is nothing there.*) I take again (VI.) this ſame ball. I put it (II.) under the ſame cup B: I cover it (XII.) with the two other cups C and A; and I take out (VIII.) this ball through the three cups (*ſhowing it and placing it on the table.*)

4. *With the ſingle ball remaining on the table, to paſs the ſame ball from cup to cup.*—" I now beg of you to pay every poſſible attention, and you will very diſtinctly ſee this ball paſs from one cup into the other (*putting the cups at a greater diſtance from each other*). I take (VI.) this ball, and I put it (II.) under the cup C: there is nothing under this cup B (*raiſing it, introducing the ball, and taking the rod in his hand*). I command that which I have put under the cup C to paſs under that B. You ſee it (*moving the end of the rod from one cup to the other, as if he followed the ball*): obſerve that it is paſſed (*raiſing the cup with his left hand, and taking the ball with his right, ſhows it to the company*). I return it (II.) under this cup B; there is nothing under this A (*raiſing the cup with his right hand, and introducing the ball there*). I am going to paſs it under this laſt cup A. Look well; come near; (*making as if in ſeeing it he would ſhow with the end of the rod the path that it took*). You did not ſee it paſs? I am not much ſurpriſed: I did not ſee it myſelf: however, here it is under the cup (*raiſing the cup* A, *and placing it on the table*).

5. *With the ſame ball remaining on the table. The cups being covered, to paſs a ball from one into the other, without raiſing them up.*—" I was very right in telling you, that the moſt clear-ſighted would not ſee very much; but, for your comfort, here is a trick in which you will ſee nothing at all. I take this ball, and put it (II.) under this cup B. I cover it (XI.) with the two other cups (*taking one in each hand, and introducing the ball upon the cup* B): pay attention, that there is abſolutely nothing in my hands (*ſhowing them*). I command this ball to mount up upon the firſt cup (*taking up the two cups, and putting them in their places, he ſhows that it has mounted*). I return (II.) this ball under the ſame cup B. I cover it as before (*covers it in taking a cup in each hand, and introducing a ball between the ſecond and third cup*). I take (*the only ball with which he plays being under the third cup, he cannot ſhow it, but acts as if he had taken it out, and put it into the fingers of his left hand, which he holds in the air, in conducting the hand from one ſide to the other*). I take the ball, which is under theſe three cups; and I throw it through the firſt cup (*feigning to throw it*): obſerve that I have not conjured the ball, having nothing in my hands (*ſhowing them*); it is paſſed, however (*raiſing the firſt cup with the left hand, putting the ball upon the table and the cups in their places*).

6. *With the ſingle ball remaining on the table, to paſs a ball through the table and two cups.*—" You are undoubtedly ſurpriſed, that, having but a ſingle ball, I have been able, after having ſhown it to you, to paſs it under this cup without raiſing it; but let not that aſtoniſh you: I have ſecrets much more wonderful. I convey, for example, the ſteeple of one village into another: I have ſympathetic quadrants, with which a converſation may be held at 200 leagues diſtance: I have a flying chariot which can conduct me to Rome in three days. I will ſhow all theſe curioſities as ſoon as my machines are entirely completed; that is to ſay, in a few centuries: but to amuſe you till the arrival of all theſe prodigies, I now continue the entertainment of the cups and balls. I put (II.) this ball under the cup A. I take it away again (VIII.) (*ſhowing it, and feigning to put it into his left-hand fingers*). I cover (XI.) this cup with the two others B and C (*introducing the ball between thoſe two cups, uſing always the right hand, and feigning ſtill to hold it in his left*), and I paſs this ſame ball through the table and the two cups (*putting the left hand under the table*). There it is paſſed (*raiſing the firſt cup*).

7. *With the ſame ball. A ball having been put under a cup, to take it away again, and to paſs it between two others.*—" Here is again a very pretty trick: I take this ball, and I put it (II.) under this cup A. Obſerve, that there is nothing under the others (*ſhowing them and introducing the ball under the cup* C), nor in my hands: I take this ball, which is under the cup A (*feigning to take it out, and raiſing the bottom of the cup ſo that the ſpectators may not attend to his fingers*). I cover this cup C with the two others A and B, and I throw it (IX.) through theſe two cups (*raiſing them, and ſhowing that the ball is paſſed there*).

8. *With this ſingle ball and a ſhilling; to paſs a ball from one hand into the other*—" I take this ball; I put it (II.) into this hand, and I put into the other the ſhilling. In which hand do you think the ball is? or in which do you think the ſhilling may be?" (*Whatever anſwer the ſpectator makes, the performer ſhows him that he is miſtaken, and that the whole is in the right hand; and this truth ſerves as a pretence to take a ball from the bag in putting the ſhilling back into it.*)

The performer may, however, without breaking the connection of theſe operations, diſpenſe with this trick, and feign to drop the ball he plays with; which affords him a pretence for taking another.

9. *With the ball remaining on the table, and that which is ſecretly taken out of the bag; to paſs under a cup the two balls put under the others.*—The operator goes on with his diſcourſe: " In order to give you ſtill farther amuſement, I take this ball and cut it in two (*taking it in his left hand, and holding the rod with his right; feigning to cut it, he puts afterwards the rod on the table, and brings back to his fingers ends the ball which he took out of the bag*). Nothing is ſo commodious as to be able in this manner to multiply the balls. When I am in want of money, I cut them again and again, until I may have had five or ſix buſhels (*placing the two balls on the table*). Obſerve that there is nothing under this cup A. I put there (II.) this firſt ball: there is nothing more under the two other cups (*introducing the ball under the cup* B). I take this ſecond ball, and I put it (II.) under the cup C: there is now a ball under theſe two cups A and C. I take away (VIII.) from this cup C this ball, and I throw it (IX.) through the middle cup B: obſerve that it is paſſed (*raiſing the cup* B, *and introducing there the ſecond ball*). I command this, which is under the other cup A, to paſs under the ſame cup B (*raiſing this cup and ſhowing that they are both there, and placing them upon the table*).

10. *With the two balls which are upon the table. Two balls having been put under the ſame cup, to paſs them under two others.*—" When I was at college, the tutor told me, it was neceſſary to know how to do my exerciſe in two ways. I have juſt now paſſed theſe two balls into the middle cup; I am now to make them go out; the one is not more difficult for me than the other. I take therefore theſe two balls, and place them under this cup B (*putting one ball under the cup, and conjuring the other*); obſerve that there is nothing under the cup A, nor under the other C (*introducing into this laſt the ball that he conjured*): I command one of theſe balls, which are under the middle cup, to paſs under the one or the other of theſe two cups A and C. Behold it already gone (*raiſing the cup* B *to ſhow that there is no more than a ſingle ball; and taking, with the right hand, the ball which is underneath, he ſhows it, and puts it* (II.) *under the ſame cup* B). Let us ſee into which cup it has paſſed (*raiſing immediately the cup* A, *and introducing the ball that he took from the cup* B): here it is under this cup C (*raiſing the cup*); I command the other ball to paſs under this cup A (*he raiſes it, and ſhows that it paſſed there*)." This trick is frequently done with three balls, but it appears much more extraordinary with two.

11. *With theſe two balls, a third which he ſhows, and a fourth ſecreted in his hands; to paſs three balls under the ſame cup.*—" All this is but a trifle; I am going to ſhow you another trick with three balls (*taking out of the bag a third ball, and placing it on the table, ſecreting at the ſame time a fourth in*

his hand). Obſerve that there is nothing under any of theſe cups *(raiſing them, and introducing them under the cup* C). I take this firſt ball, and throw it (IX.) through this cup C. Obſerve that it is paſſed *(raiſing* (X.) *the cup with the right hand)*; I take this ſecond ball, and throw it (XI.) through the ſame cup. There it is paſſed *(raiſing* (X.) *again the cup)*; I take the third, and I make it paſs the ſame *(raiſing* (X.) *the cup, and ſhowing that theſe are paſſed under all the three).*

12. *With the three balls remaining under the cup, and that held ſecretly in the hand; to paſs two balls from one cup into another, at the choice of a perſon, without touching any of the cups.* "Here is another in which I have never been able to comprehend any thing; but it will aſtoniſh you much *(raiſing the cup* C, *and taking away the three balls from their places, he puts them under each cup, and in raiſing the cup* C *introduces there the fourth ball which he held ſecretly in his hand).* I take this ball (*that which is under the cup* B), and I put it (II.) under the ſame cup. I take this *(the ball from the cup* A), and I place it (I.) under the ſame cup *(putting there alſo that which was ſecreted in his hand).* I take this laſt, and I throw it (IX.) through the cup C; and to ſhow that I do not deceive you, behold it paſſed (*raiſing* (X.) *the cup that has been fixed upon, which ſuppoſe to be* C, *and ſhowing that there are two).* I take again theſe two balls, and put them under the cup C *(putting really but one):* obſerve that there is no more under this cup B *(introducing there the ball that he had juſt taken away, and ſhowing that he had no other in his hand)*; I command one of theſe balls, which are under this cup C, to go and join that which is under this A. Obſerve that it is paſſed. There! *(raiſing the cup* C, *and returning the two balls under the ſame cup, and raiſing* C, *in order to ſhow that there is but a ſingle one; and he places it again under the ſame cup: he does not raiſe the cup* B, *under which a ball remains).*

13. *With the three balls that were placed upon cups, and that which remains hidden under the middle cup; to paſs under the ſame cup the balls put under the others.*—"I take this ball *(that which is upon the cup* C), and I put it (II.) under the ſame cup C; and I order it to paſs into this cup B: there it is paſſed *(in raiſing this cup he introduces a third ball).* I take this third ball, and put it (II.) under this cup C; and I command it to paſs into the cup B along the table, and in the ſight of the ſpectators *(taking the rod in his left hand, feigning to ſhow the way that it paſſed between the two cups).* You did not ſee it then? Here it is *(He draws it* (VIII.) *from the end of the rod, which appears to ſhow it).* Go quickly *(throwing it* (IX.) *through the cup* B; *and ſhowing that they are all three there, and that there is nothing under the two others; placing afterwards three of the balls on the table, and ſecreting the fourth in his hand).*

14. *With the three balls remaining upon the table, and that which is held ſecretly in his hand.—Multiplication of the balls.* For this trick there muſt be a tin vaſe (ſee fig. 8), at the bottom of which there muſt be contrived a falſe bottom A, which will fall down at pleaſure; that is to ſay, in reverſing it upon the table, by means of a ſmall trigger placed at the baſe of one of the handles B, introducing previouſly between the falſe and true bottoms a dozen of balls. The operator goes on with his diſcourſe.

"If any of the company believe in witches, I would give my advice that they ſhould believe in them no longer; as what I am about to do is much more ſurpriſing than the feats of any witch.—I put (I.) theſe three balls under the three cups you ſee on the table: I take away (VII.) this firſt ball (*that which is under the cup* C), and I put it (II.) into this vaſe. I take this, and I alſo put it (II.) into the vaſe. I take away (VII.) this third *(that which is under the cup* A), and I throw it (II.) the ſame way." *(Every time that he raiſes one of the cups to take away the ball, he introduces that which always remains ſecreted in his right hand; and this he repeats, conſtantly taking out one ball and putting in another, till he has introduced all the twelve balls; after which he reſumes his diſcourſe.)* "You imagine, perhaps, that I always make uſe of the ſame balls; but, to prove the contrary, here they are *(inverting the vaſe ſo as to turn them all out):* In this trick, if the vaſe be well made, the inſide may be ſhown, and it may even be previouſly inverted; in which caſe, it will not be ſuppoſed that any balls have been put into it.

15. *With the three balls remaining under each of the cups, and that which is hidden in his hand; to paſs one ball under each of the three cups.*—"I put all theſe balls into my pocket. I take (VI.) this *(the one ſecreted in his hand)*, and I make it paſs through the table under this firſt cup C *(conjuring it).* I take another from my bag *(ſhowing the ſame ball).* I make it paſs in the ſame manner through this B *(conjures it again).* I take a third *(ſhowing ſtill the ſame)*, and I make it paſs under this laſt cup A *(conjuring it).* Here are all the three paſſed *(turning over the cups, and in taking them up again introduces the ball that he has in his hand under the cup* B, *and puts the three balls upon the three cups).*

16. *With the three balls put upon each cup, and that which was introduced under the middle cup; to draw two balls through the ſame cup.*—"There will be wanted now only two balls." Here the operator takes that which is under the cup C, and puts it (II.) into his bag. He takes in the fingers of his right hand the ball which is on the cup B, ſhowing it; and with the other covers the cup B, with that paſſing (IV.) there the ball which he feigned to put into his bag. He then takes the ball which is under the cup A with the right hand; and ſhowing a ball in each hand, tells the company that he put them (II.) under the cup A; though he actually puts but one, which he holds in his left. He then draws one of theſe balls through the ſame cup A, ſhowing it, and placing it upon the cup C. He then raiſes the cup A, and takes the ball which is under it with his right hand, adding, "There remains but one more." While pronouncing theſe words, he puts it (II.) under the cup. "I take (adds he) the other ball," *(raiſing the cup, and ſhowing that it is there no longer)*; then, taking one of the two balls which ſeemed to remain alone, he puts it (II.) into his bag, ſaying, "I return this into my bag."

17. *With a ball which is hidden under the middle cup, another hidden under that which covers it, that which remains in the hand; and a fourth which is upon the table; to paſs the ſame ball ſucceſſively through the three cups.*—The preceding trick was only on purpoſe to prepare the ſpectators for this; as they now imagine that the performer played only with one ball. He may now addreſs them in the following manner:

"I am now going to make a very pretty trick with this ſingle ball. I forgot to ſhow it to you at the beginning: I cover (XI.) theſe cups *(putting the cup* A *upon* C *and* B). I take (VI.) this ball, and I throw it (IX.) through the firſt cup;" *(raiſing* (X.) *the cup* A. *with the right hand).* He then ſhows that it is paſſed between C and A; and, putting it in its place, he introduces there that which he has in his hand. "I take (ſays he) (VI.) this ſame ball, and I throw it through the other cup C;" and while he ſays ſo, he raiſes (X.) the cup C, ſhowing that it has paſſed, introducing there that which he has in his hand, and putting it in the place of the former. "I take again (continues he) (VI.) this ſame ball, and I throw it (IX.) through that laſt cup B," *(raiſing* (IX.) *the cup* B.) During which time he takes away the ball from under it with his left hand, then places it on the table, and returns the cup to its place, introducing there the ball which he has in his left hand.

18. *With the three balls which are under the cups, that which is on the table, and two which he takes from the bag; to paſs*

under a cup the balls put under the two others without raiſing theſe laſt.—The performer may proceed in his diſcourſe in the following manner:

"Let us now return to the order of the entertainment which I have interrupted, and continue to play with three balls." He now takes two balls from his bag, by which means he in fact plays with ſix balls, though he pretends to play only with three. Theſe two balls, together with that which remains on the table, he puts on the top of each cup. "I take (ſays he) (VI.) this ball *(that which is on the cup* C). I throw it (IX.) through that cup; there it is paſſed." He now raiſes (X.) the cup, ſhows it; and thus has an opportunity of introducing the ball which he has in his hand. "I take (VI.) this *(the ball which is under the cup* B), and throw it (IX.) through the cup B." At this he raiſes the cup with his left hand, ſhowing that it has paſſed, and covering it again. "I take again (VIII.) this ball from the ſame cup, and throw it (IX.) through that C; obſerve that it is paſſed." Then, raiſing up (X.) the cup C, ſhowing that there are then two there, he introduces two others which he had in his hand. "I take (ſays he) (IV.) this ball *(that which is under the cup* A), and I throw it (IX.) through the ſame cup A. There! it is paſſed," *(raiſing the cup* C); after which he ſhows the three balls, and introduces there that which was in his hand, putting the three balls upon the table.

19. *With the three balls which remain under the cups, and the three others which remain upon the table; to paſs ſeparately the three balls through each cup.*—In this manœuvre the performer puts again the three balls which are upon the table upon the top of each cup. He takes that which is on the cup C, and throws it (IX.) through the ſame cup; and while he announces this to the company, he raiſes (X.) the cup; taking away (VIII.) the ball, ſhowing that it has paſſed, introducing there that which was in his hand, and putting the ſame ball upon the ſame cup. He then takes that which is upon the cup B, and throws it (IX.) through the ſame cup; ſhows that it is paſſed, takes it away (VII.), and introduces the ball that was in his hand under this cup, putting it in like manner on the cup. Then he takes the ball which is on the cup A, and throws it (IX.) through the ſame cup A. As he announces its paſſage he raiſes the cup, taking away (VII.) and ſhowing the ball; introducing in the ſame manner that which was in his hand; putting this firſt at the top of the cup A, and then ſhows that it is not in his hand, and that he has but three balls.

20. *With the three balls remaining upon the table, and thoſe which are under each cup. Having put the balls into the bag, to make them return under the cups*—"I take theſe three balls, and I return them into my bag *(keeping one in his hand)*. Behold to what all is reduced that I had to ſhow you for your amuſement! I did know ſome more very pretty tricks, but I have forgot them. *(Pretending to muſe for a moment)* Ah! I ſtill remember two or three very pleaſing ones. Come, my little balls! return under the cups *(turning over the cups)*. See how nimble they are, and obedient at the ſame time!" *(covering them again with the cups.)*

21. *With the three balls which are under the cups, and that in his hand; to paſs the balls through the two cups.*—Here the operator begins with taking away (VII.) the ball which is under the cup C; he covers it with the cup B; and paſſes (III.) the other ball which he has in his right hand between the two cups. He then takes (VI.) the ball which he had in his left hand, and throws it (IX.) between the two cups B and C. In announcing its paſſage he raiſes the cup (X.), ſhows that it is paſſed, and introduces the ball in his hand. He then takes the ball under the cup B, and throws it (IX.) through the two cups C and B. Announcing to the company its paſſage, he raiſes (X.) the cup, and ſhows that there are two balls, introducing (III.) at the ſame time the third. He then takes the laſt ball, viz. that which is under the cup A, covers again with the left hand the two cups B and C, and throws (IX.) the third ball through theſe two cups. He then announces their paſſage, raiſes the two cups, and ſhows the three balls, covering again the cup C with the two others.

22. *With the three balls which are upon the cup* C, *and the one in his hand; to take out the three through two cups.*—"I take (ſays the performer) (VIII.) the firſt ball, and put it (II.) into my bag. I take (VIII.) in the ſame manner the ſecond, and I put it alſo into my bag. I take (VIII.) the third, and I put it into my bag *(putting in really that which he had in his hand)*. While he deſires the ſpectators to obſerve that there are no more in the cups, he raiſes the cup A with the left hand, and, putting it in its place, raiſes with the right hand the cup C. In ſupporting it with the cup B, he puts it down quickly, and a little on the ſide of B, and at the ſame time places C on the table, under which will be found the three balls, which had not time to ſeparate.

23. *With the three balls remaining under the middle cup, and three others taken out of the bag; to paſs, in one action, three balls through a cup.*—This trick is begun by the performer taking three balls from his bag, and putting them on the top of the cup B, which he covers with the cup A. Ordering them to diſappear and to paſs under the cup C, he takes away very ſuddenly with the left hand the cup B, as is done in the preceding trick, leaving in the middle of the play the cup C under which the balls are found. Taking them then away, and replacing them on the ſame cup, he makes them return again in the ſame manner under the cup C. At laſt he takes the three balls, and, putting them in his bag, pretends to paſs them through the table under the cup where the others were. He then returns two or three of theſe laſt balls into his bag, and takes two white balls, which he puts upon the table.

24. *With the black ball remaining on the table, two other white balls, and a black one which he holds ſecretly in his hand; to paſs three balls from one cup into another.* [*N. B.* To make the balls white, they are rubbed with a little chalk inſtead of being blackened with the candle.]

"Let us now (ſays the operator) have a trick to prove that I do not conjure the balls. There is nothing under this cup C *(introducing the black ball that was in his hand)*. There is no great thing under this B. I place there theſe three balls *(the three which are upon the table, of which he conjures the white one)*. There is nothing more under this third cup A *(introducing there the white ball)*. I order one of theſe two white balls which are under the cup B, to paſs under this A." With theſe words he raiſes the cup B; and taking the white ball in the fingers of his left hand, and the black one in thoſe of the right, he ſhows them, ſaying, "Obſerve that there is but one white one. I put again theſe two balls under the cup B." While ſpeaking thus he puts the white one under the cup, and conjures the other, while feigning to put it in with that of the left hand. He then announces its paſſage; and while he does ſo, raiſes the cup A, and introduces the black ball. Commanding then the black ball to paſs under the cup A, he raiſes the cup B, takes in his right-hand fingers the ball which is there, and ſhows it. "I put it again (ſays he) (II.) under this cup *(conjuring it)*; and I ſhow you that it is paſſed under this A *(introducing there the white ball)*. I order at laſt the white ball, which is under this cup B, to paſs into this A." While telling the company that it is paſſed, he raiſes the cup A, and puts the three balls upon each cup, the black one upon the middle.

25. *With the three balls put at the top of the cups, and that which has been inſerted under one of them in the preceding trick; to change the colour of the balls.* The operator goes on with his diſcourſe: "If there is any one here who knows how to play the cups and balls, he will do well to obſerve, that it is not

poſſible to do this trick by the common method, and with three balls only. However, I have no more *(ſhowing his hands)*. I take this white ball *(that which is upon the cup* C), and I throw it (IX.) through this cup *(the ſame under which he left a black ball in the preceding trick)*. I take this black ball *(with the left-hand fingers)*; there is nothing under this cup B *(introducing there the white ball)*. I throw it (IX.) through this cup B *(taking again the ball in his right-hand fingers)*. I take this other white ball *(with his left-hand fingers)*. There is nothing under this cup A *(introducing the black ball)*: I throw it (IX.) through the cup A *(taking it again into his right-hand fingers to conjure it)*. Obſerve that they have all changed their colour," *(covering each of them with their cups.)*

26. *With the three balls which are left under the cups, two white balls, and a black one that he took trick by trick from his bag; to change the ſizes of the balls.*— In performing this trick the operator takes away the white ball which is under the cup C with his left-hand fingers, and, raiſing the cup with his right, introduces there a white ball which he took out of his bag. The white ball which he introduces is kept in his hand with the fourth and little finger; and he raiſes the cup in the ſame manner as when he introduces the balls. In turning over the cup afterwards, he advances his hand to introduce this ball. Theſe balls ſhould be filled with horſe-hair or paper, ſo that they may be very light, and make no noiſe. The operator then tells his company, that he makes the ball paſs through the table under the ſame cup; and while he ſpeaks thus, he takes the ball again in his right hand, and while putting his hand under the table, he takes a black ball out of the bag. He then takes away the ball from the cup B, introducing the black one in its ſtead. He then tells the ſpectators, that he makes it repaſs through the table; and, while he tells them ſo, he takes a white ball; then, while taking away that which is under the cup A, he introduces that ball, making it repaſs in the ſame manner through the table, and at laſt ſhows them to the company, and covers them with their cups.

27. *With the three balls which are under the cups, two other black balls, and a white one that was taken trick by trick from his bag; to paſs the balls from one cup into another.*—"Obſerve well (ſays the operator), that there are two white balls under theſe two cups A and C, and a black one under this *(raiſing the cups)*. I cover again theſe three balls (*covering each of them with a cup*). I make to paſs out through the table the white ball which is under the cup C." Here he takes a white ball from his bag; and in order not to fail, the black and white balls ſhould be in ſeparate pockets. Having taken out the ball, he puts the firſt into his bag, telling the company that there is now nothing under the cup C; and while he ſays ſo, he raiſes it, holding the ball with his little finger, proceeding in his diſcourſe as follows: "I take away this ball (*that which is under the cup* A), and I paſs it through the table under the cup C," (*taking a black ball from his bag.*) While the paſſage of this ball is announced, he raiſes the cup C to take it away and ſhow it; and introducing there this black ball, "I put again (ſays he) this other white ball into my bag, and I command the black one which is under the cup B to paſs under this. It is no longer under this cup:" and while he ſays ſo, he raiſes the cup B, in ſupporting with his little finger the ball which remains there. Announcing its paſſage, he raiſes the cup C and ſhows the ball; taking it afterwards into the left-hand, throws it into the air, returning it into his right hand, and feigning to throw it into the air a ſecond time, he lets it fall into his bag: caſting his eyes upwards and downwards as if he ſaw it fall upon the cup B; he raiſes this cup, and ſhows it to the ſpectators, as the former, paſſed through the cup.

Sect. II. *Performances with the* Cards.

Previous to the performance with cards, it will be neceſſary to explain the method of making the paſs; that is, bringing a certain number of cards from the bottom of the pack to the top; as many of theſe performances depend on that manœuvre.

1. Hold the pack of cards in your right hand, ſo that the palm of your hand may be under the cards: place the thumb of that hand on one ſide of the pack, the firſt, ſecond, and third fingers on the other ſide, and your little finger between thoſe cards that are to be brought to the top and the reſt of the pack. Then place your left hand over the cards, in ſuch a manner that the thumb may be at C (fig. 20, 21, pl. 3.) the fore-finger at A, and the other fingers at B.

The hands and the two parts of the cards being thus diſpoſed, you draw off the lower cards confined by the little finger and the other parts of the right hand, and place them, with an imperceptible motion, on the top of the pack.

It is quite neceſſary, before you attempt any of the experiments that depend on making the paſs, that you can perform it ſo dexterouſly that the eye cannot diſtinguiſh the motion of your hand: otherwiſe, inſtead of deceiving others, you will expoſe yourſelf. It is alſo proper that the cards make no noiſe, as that will occaſion ſuſpicion. This dexterity is not to be attained without ſome practice.

There is a method of preparing a pack of cards, by inſerting one or more that are a ſmall matter longer or wider than the reſt; which preparation will be neceſſary in ſeveral of the following experiments.

2. Have a pack in which there is a long card; open the pack at that part where the long card is, and preſent the pack to a perſon in ſuch a manner that he will naturally draw that card. He is then to put it into any part of the pack, and ſhuffle the cards. You take the pack, and offer the ſame card in like manner to a ſecond or third perſon; obſerving, however, that they do not ſtand near enough to ſee the card each other draws. You then draw ſeveral cards yourſelf, among which is the long card, and aſk each of the parties if his card be among thoſe cards, and he will naturally ſay Yes, as they have all drawn the ſame card. You then ſhuffle all the cards together, and cutting them at the long card, you hold it before the firſt perſon, ſo that the others may not ſee it, and tell him that is his card. You then put it again in the pack, and ſhuffling them a ſecond time, you cut again at the ſame card, and hold it in like manner to the ſecond perſon, and ſo of the reſt*.

If the firſt perſon ſhould not draw the long card, each of the parties muſt draw different cards; when, cutting the pack at the long card, you put thoſe they have drawn over it, and ſeeming to ſhuffle the cards indiſcriminately, you cut them again at the long card, and ſhow one of them his card. You then ſhuffle and cut again, in the ſame manner, and ſhow another perſon his card, and ſo on: remembering, that the card drawn by the laſt perſon is the firſt next the long card; and ſo of the others.

This experiment may be performed without the long card, in the following manner: Let a perſon draw any card whatever, and replace it in the pack:-you then make the paſs,

* There is frequently exhibited another experiment, ſimilar to this, which is by making a perſon draw the long card; then giving him the pack, you tell him to place his card where he pleaſes and ſhuffle them, and you will then name his card or cut the pack where it is. You may alſo tell him to put the pack in his pocket, and you will draw the card; which you may eaſily do by the touch.

and bring that card to the top of the pack, and ſhuffle them without loſing ſight of that card. You then offer that card to a ſecond perſon, that he may draw it, and put it in the middle of the pack. You make the paſs and ſhuffle the cards in the ſame manner, and offer the card to a third perſon, and ſo again to a fourth or fifth, as is more fully explained further on.

3. You let a perſon draw any four cards from the pack, and tell him to think on one of them. When he returns you the four cards, you dexterouſly place two of them under the pack and two on the top. Under thoſe at the bottom you place four cards of any ſort; and then, taking eight or ten from the bottom cards, you ſpread them on the table, and aſk the perſon if the card he fixed on be among them. If he ſay No, you are ſure it is one of the two cards on the top. You then paſs thoſe two cards to the bottom, and drawing off the loweſt of them, you aſk him if that is not his card. If he again ſay No, you take that card up, and bid him draw his card from the bottom of the pack.

If the perſon ſay his card is among thoſe you firſt drew from the bottom, you muſt dexterouſly take up the four cards that you put under them, and, placing thoſe on the top, let the other two be the bottom cards of the pack, which you are to draw in the manner before deſcribed.

4. After a card has been drawn, you place it under the long card, and by ſhuffling them dexterouſly you bring it to the top of the pack. Then lay, or throw, the pack on the ground, obſerving where the top card lies. A handkerchief is then bound over your eyes, in ſuch a manner however that you can ſee the ground, which may be eaſily done. A ſword is then put into your hand, with which you touch ſeveral of the cards, ſeemingly in great doubt, but never loſing ſight of the top card, in which at laſt you fix the point of the ſword, and preſent it to him who drew it. Two or three cards may be diſcovered in the ſame manner; that is, by placing them under the long card, and then bringing them to the top of the pack.

5. You muſt have in the pack two cards of the ſame ſort, ſuppoſe the king of ſpades. One of theſe is to be placed next the bottom card, which may be the ſeven of hearts, or any other card. The other is to be placed at top. You then ſhuffle the cards, without diſplacing thoſe three cards, and ſhow a perſon that the bottom card is the ſeven of hearts. Then drawing that card privately aſide with your finger, which you have wetted for that purpoſe, you take the king of ſpades from the bottom, which the perſon ſuppoſes to be the ſeven of hearts, and lay it on the table, telling him to cover it with his hand. You then ſhuffle the cards again, without diſplacing the firſt and laſt card, and paſſing the other king of ſpades at the top to the bottom, you ſhow it to another perſon. You then draw that privately away; and taking the bottom card, which will then be the ſeven of hearts, you lay that on the table, and tell the ſecond perſon, who believes it to be the king of ſpades, to cover it with his hand.

You then command the ſeven of hearts, which is ſuppoſed to be under the hand of the firſt perſon, to change into the king of ſpades; and the king of ſpades, which is ſuppoſed to be under the hand of the ſecond perſon, to change into the ſeven of hearts; and when the two parties take their hands off, and turn up the cards, they will ſee, to their no ſmall aſtoniſhment, after having ſo careſully obſerved the bottom cards, that your commands are punctually obeyed.

6. Take a card, the ſame as your long card, and rolling it up very cloſe, put it in an egg, by making a hole as ſmall as poſſible, and which you are to fill up carefully with white wax. You then offer the long card to be drawn; and when it is replaced in the pack you ſhuffle the cards ſeveral times, giving the egg to the perſon who drew the card, and, while he is breaking it, you privately withdraw the long card, that it may appear, upon examining the cards, to have gone from the pack into the egg. This experiment may be rendered more ſurpriſing by having ſeveral eggs, in each of which is placed a card of the ſame ſort, and then giving the perſon the liberty to chooſe which egg he thinks fit.

This deception may be ſtill further diverſified, by having, as moſt public performers have, a confederate, who is previouſly to know the egg in which the card is placed; for you may then break the other eggs, and ſhow that the only one that contains a card is that in which you directed it to be.

7. Divide a piquet pack of cards into two parts by a long card. Let the firſt part contain a quint to a king in clubs and ſpades, the four eights, the ten of diamonds, and ten of hearts; and let the other part contain the two quart majors in hearts and diamonds, the four ſevens, and the four nines: or, indeed, the cards may be divided in any other manner that is eaſy to be remembered.

Then ſhuffle the cards, but obſerve not to diſplace any of thoſe cards of the laſt part which are under the long card. You then cut at that card, and leave the pack in two parts. Next, preſent the firſt of thoſe parts to a perſon, and tell him to draw two or three cards, and place the remainder on the table. You preſent the ſecond parcel in like manner to another. Then having dexterouſly placed the cards drawn by the firſt perſon in the ſecond parcel, and thoſe drawn by the ſecond perſon in the firſt parcel, you ſhuffle the cards, obſerving to diſplace none but the upper cards. Then ſpreading the cards on the table, you name thoſe that each perſon drew; which you will very eaſily do, by obſerving the cards that are changed in each parcel.

8. On the ace of ſpades fix, with ſoap, a heart, and on the ace of hearts a ſpade, in ſuch a manner that they will eaſily ſlip off. Show theſe two aces to the company; then taking the ace of ſpades, you deſire a perſon to put his foot upon it, and, as you place it on the ground, draw away the ſpade. In like manner you place the ſeeming ace of hearts under the foot of another perſon. You then command the two cards to change their places; and that they obey your command, the two perſons, on taking up their cards, will have ocular demonſtration. A deception ſimilar to this is ſometimes practiſed with one card, ſuppoſe the ace of ſpades, over which a heart is placed ſlightly. After ſhowing a perſon the card, you let him hold one end of it, and you hold the other, and while you amuſe him with diſcourſe, you ſlide off the heart. Then laying the card on the table, you bid him cover it with his hand. You then knock under the table, and command the heart to turn into the ace of ſpades. By deceptions like theſe, people of little experience and much conceit are frequently deprived of their money, and rendered ridiculous.

9. You muſt be prepared with two cards, like thoſe repreſented by fig. 22. and with a common ace and a five of diamonds. The five of diamonds and the two prepared cards are to be diſpoſed as in fig. 23. and holding them in your hand, you ſay, "A certain Frenchman left 15,000 livres, which are repreſented by theſe three cards, to his three ſons. The two youngeſt agreed to leave their 5,000, each of them, in the hands of the elder, that he might improve it." While you are telling this ſtory, you lay the five on the table, and put the ace in its place, and at the ſame time artfully change the poſition of the other two cards, that the three cards may appear as in fig. 24. You then reſume your diſcourſe: "The eldeſt brother, inſtead of improving the money, loſt it all by gaming, except 3,000 livres, as you here ſee." You then lay the ace on the table, and, taking up the five, continue your ſtory: "The eldeſt, ſorry for having loſt the money,

went to the Eaſt Indies with theſe 3,000, and brought back 15,000." You then ſhow the cards in the ſame poſition as at firſt, in fig. 22. To render this deception agreeable, it muſt be performed with dexterity, and ſhould not be repeated, but the cards immediately put in the pocket; and you ſhould have five common cards in your pocket, ready to ſhow, if any one ſhould deſire to ſee them.

10. Take a parcel of cards, ſuppoſe 40, among which inſert two long cards: let the firſt be, for example, the 15th, and the other the 26th, from the top. Seem to ſhuffle the cards, and then cutting them at the firſt long card, poiſe thoſe you have cut off in your hand, and ſay, "There ſhould be here 15 cards." Cut them again at the ſecond long card, and ſay, "There are here only 11 cards." Then poiſing the remainder, you ſay, "Here are 14 cards."

11. *Several different cards being ſhown to different perſons, that each of them may fix on one of thoſe cards; to name that on which each perſon has fixed.*—There muſt be as many different cards ſhown to each perſon as there are perſons to chooſe: therefore, ſuppoſe there are three perſons, then to each of them you muſt ſhow three cards; and telling the firſt perſon to retain one in his memory, you lay thoſe three cards down, and ſhow three others to the ſecond perſon, and ſo to the third. You then take up the firſt perſon's cards, and lay them down one by one, ſeparately, with their faces upward. You next place the ſecond perſon's card over the firſt, and in like manner the third perſon's card over the ſecond's; ſo that in each parcel there will be one card belonging to each perſon. You then aſk each of them in which parcel his card is; and when you know that, you immediately know which card it is; for the firſt perſon's card will always be the firſt, the ſecond perſon's the ſecond, and the third perſon's the third, in that parcel where they each ſay his card is.

This experiment may be performed with a ſingle perſon, by letting him fix on three, four, or more cards. In this caſe you muſt ſhow him as many parcels as he is to chooſe cards, and every parcel muſt conſiſt of that number, out of which he muſt fix on one; and you then proceed as before, he telling you the parcel that contains each of his cards.

12. Make a ring large enough to go on the ſecond or third finger (fig. 15.), in which let there be ſet a large tranſparent ſtone, to the bottom of which muſt be fixed a ſmall piece of black ſilk, that may be either drawn aſide or expanded by turning the ſtone round. Under the ſilk is to be the figure of a ſmall card.

Then make a perſon draw the ſame ſort of card as that at the bottom of the ring, and tell him to burn it in the candle. Having firſt ſhown him the ring, you take part of the burnt card, and reducing it to powder, you rub the ſtone with it, and at the ſame time turn it artfully about, ſo that the ſmall card at bottom may come in view.

13. *To change one card into another.*—Provide a mahogany tea caddy about four or five inches deep, and long enough to admit a common ſized playing card (ſee fig. 9. pl. 4.) This caddy muſt be furniſhed with a moving falſe bottom B, moveable upon hinges on the inſide edge of the front A. This bottom may be made of braſs, tin, or lead; and the falſe bottom muſt be ſo exactly fitted, that it cannot, from a ſlight view, be diſtinguiſhed from the other. The inſide of both caddy and falſe bottom ought to be lined with black or other dark-coloured cloth or velvet, ſo that it may not make any noiſe in falling down. It would be proper that the falſe bottom ſhould riſe with a ſpring towards the front; and it muſt be kept tight with a braſs ſpring-catch (*a*, fig. 10.) ſcrewed to the left ſide of the box near the top, and which is hid by the cloth covering. The end of this ſpring projects a little into the front. It is driven back, to let go the falſe bottom, by means of a ſmall bent wire *bb* let into the front of the caddy; and this pin is moved by the bolt *c*, which, when the box is locked, ſhoots out againſt it, by reaſon of the ſpring being driven in; by which means the bottom ſprings down, and covers the card placed in the box.

Before you attempt to ſhow any trick with this caddy, a card muſt be placed in the inſide between the front A and the falſe bottom B, ſpringing up the bottom afterwards againſt the front; after which it is ready for uſe, and ſhown openly to the company, without any danger of a diſcovery.

Two perſons may now be deſired to draw two different cards from a pack, one of which muſt be the ſame with the one concealed in the caddy. Taking this card from the perſon who drew it, you put it in the pack, pretend to ſhuffle it, but keep the card either uppermoſt or undermoſt, ſo that you can eaſily find it afterwards. Deſiring then the other perſon to come forward and put his card very attentively into the caddy, you in the mean time ſecretly convey away from the pack the card drawn by the other; then, giving him the key, you deſire the caddy to be locked up. After ſome pretended conjurations, deſire him to unlock it again and take out the card; which he will find not to be his, but that drawn by his neighbour: his card being apparently vaniſhed from the caddy, as the other is from the pack.

14. Provide two pieces of paſteboard A and B (fig. 11.) of equal dimenſions, $3\frac{1}{2}$ inches long and three broad. Place theſe beſide one another, as ſhown in the figure. Take then a very ſmooth ſilk ribbon, and put a band of it from C to E towards the edge of the paſteboard A, and another from D to F in ſuch a manner as to come beyond the paſteboard, and to admit of being folded over at the two ends. This muſt be glued on the back of the board A at the places C and D, and at the back of the board B at the places E and F. Place two other bands in a ſimilar manner on the paſteboard B, turning them over on the back of the ſame board at the places I and L, and at the back of A at the places G and H. Theſe two bands ſhould fall in the inſide of the paſteboard, according to the breadth of the ribbons. The two paſteboards being now placed the one upon the other, will form a kind of port-folio, one of the ſides of which will always be hinged when the other is opened. Four ſmall bands of the ſame ribbon are to be put at the four extremities of the ſides MNQR of the two pieces of paſteboard; obſerving that they paſs below the bands already placed. Glue their ends in the ſame manner as their ends at the back of the boards, ornamenting alſo the two ſides O and P of the paſteboard B with pieces of the ſame ribbon; but theſe ſix laſt bands are of no uſe in the performance.

Two pieces of paper folded like the cover of a letter muſt now be provided, large enough to cover the two ribbons GI and HL, as well as the ſpace contained within them. Glue one of theſe upon the two ribbons, and apply the other below this; ſo that the uppermoſt of theſe two wrappers may fall exactly over the other, incloſing and hiding the two ribbons entirely. A ſecond port-folio ſimilarly conſtructed is now to be provided, and both of them covered with coloured paper from the ſides where the ribbons are glued and folded.—The deceptions with theſe port-folios are as follows.

1. *Two cards, choſen at random, having been ſhut up, in two ſeparate places; to make them paſs reciprocally from the one into the other.*—The port-folios being conſtructed in the manner above deſcribed; if you open one of them either on the one ſide or on the other, one of the paper wrappers will always be viſible; and thus it will naturally be ſuppoſed that there is no more but one. Having then ſecretly incloſed a card in each of the wrappers of the port-folios, procure a pack of cards that has but two ſorts, and cauſe two perſons fairly to draw two cards

ſimilar to the firſt. Preſent then a port-folio, open, to the firſt perſon who drew a card ſimilar to that which was placed in the ſecond, deſiring him to place it in the wrapper which he finds vacant. Take back then the port-folio; and, in placing it on the table, artfully turn it over: having placed likewiſe in the vacant wrapper of the ſecond port-folio the card drawn by the ſecond perſon; and putting it in the ſame way upon the table, command the cards reciprocally to paſs from the one port-folio into the other; and open them ſo that each of the perſons may take out the card which the other inſerted.

2. *A card being ſhut up in the port-folio; to make it return into the pack.*—To perform this, procure a pack which has two cards of the ſame kind. One of theſe is to be openly drawn, and the perſon who has done ſo muſt be told to ſhut it up under the wrapper of one of the port-folios; and inform him that you will make it return into the pack. Give him the port-folio to blow upon; and on opening it, preſent him with the empty wrapper, to ſhow him that his card is not there; after which, preſenting him with the pack, he will find there the other card, which he will naturally imagine to be the one he put into the wrapper.

3. *To make an anſwer appear to a queſtion ſecretly written.*—Tranſcribe on different cards a certain number of queſtions, and on others the ſame queſtions with their anſwers; taking care to have the hand-writing as much alike as poſſible, ſo that no difference can eaſily be perceived. The ſame caution muſt be obſerved with regard to the cards themſelves; which, for that reaſon, ought to be plain ones. Having written with a pencil at the bottom of the firſt queſtions their correſponding anſwers, ſhut up one of them ſecretly in the port-folio; and preſenting them to any perſon, let him draw as by chance that which is ſimilar to the one thus ſhut up. Make him then place in the other wrapper the queſtion which he had drawn; and telling him that you are about to write an anſwer even through the port-folio, take a glaſs, and pretend to read in it the anſwer to the queſtion. Open it afterwards, ſo that he may take out the other card himſelf, and he will imagine it to be the one he ſelected.

In performing this trick, it will be proper to have a port-folio of the ſame kind with the two deſcribed, which opens only at one ſide, and which conſequently has but one wrapper. This muſt be ſhown to ſuch as ſeem to be too inquiſitive, and will be of uſe to prevent them from entertaining any idea that the folio opens upon both ſides. The former muſt therefore be immediately put into the pocket, in order to give an opportunity of drawing out the other in caſe the port-folio ſhould be aſked for.

15. Provide a mirror, either round, as A (fig. 18. pl. 3.) or oval, the frame of which muſt be at leaſt as wide as a card. The glaſs in the middle muſt be made to move in the two grooves CD and EF, and ſo much of the quickſilver muſt be ſcraped off as is equal to the ſize of a common card. You will obſerve that the glaſs muſt likewiſe be wider than the diſtance between the frame by at leaſt the width of a card.

Then paſte over the part where the quickſilver is rubbed off a piece of paſteboard, on which is a card that muſt exactly fit the ſpace, which muſt at firſt be placed behind the frame.

This mirror muſt be placed againſt a partition, through which are to go two ſtrings, by which an aſſiſtant in the adjoining room can eaſily move the glaſs in the grooves, and conſequently make the card appear or diſappear at pleaſure *.

Matters being thus prepared, you contrive to make a perſon draw the ſame ſort of card with that fixed to the mirror, and place it in the middle of the pack: you then make the paſs, and bring it to the bottom; you then direct the perſon to look for his card in the mirror, when the confederate behind the partition is to draw it ſlowly forward, and it will appear as if placed between the glaſs and the quickſilver. While the glaſs is drawing forward, you ſlide off the card from the bottom of the pack, and convey it away.

The card fixed to the mirror may eaſily be changed each time the experiment is performed. This experiment may alſo be made with a print that has a glaſs before it and a frame of ſufficient width, by making a ſlit in the frame through which the card is to paſs; but the effect will not be ſo ſtriking as in the mirror.

16. Place a vaſe of wood or paſteboard AB (fig. 19.) on a bracket L, fixed to the partition M. Let the inſide of this vaſe be divided into five parts, *c*, *d*, *e*, *f*, *g*; and let the diviſions *c* and *d* be wide enough to admit a pack of cards, and thoſe of *e*, *f*, *g*, one card only.

Fix a thread of ſilk at the point H, the other end of which paſſing down the diviſion *d*, and over the pully I, runs along the bracket L, and goes out behind the partition M.

Take three cards from a piquet pack, and place one of them in each of the diviſions *e*, *f*, *g*, making the ſilk thread or line go under each of them. In the diviſion *c*, put the pack of cards from which you have taken the three cards that are in the other diviſions.

Then take another pack of cards, at the top of which are to be three cards of the ſame ſort with thoſe in the three ſmall diviſions; and, making the paſs, bring them to the middle of the pack, and let them be drawn by three different perſons. Then give them all the cards to ſhuffle; after which place the pack in the diviſion *d*, and tell the parties they ſhall ſee the three cards they drew come, at their command, ſeparately out of the vaſe.

An aſſiſtant behind the partition then drawing the line with a gentle and equal motion, the three cards will gradually riſe out of the vaſe. Then take the cards out of the diviſion *c*, and ſhow that thoſe three cards are gone from the pack.

The vaſe muſt be placed ſo high that the inſide cannot be ſeen by the company. You may perform this experiment alſo without an aſſiſtant, by fixing a weight to the end of the ſilk line, which is to be placed on a ſupport, and let down at pleaſure by means of a ſpring in the partition.

17. Let a ſmall perſpective glaſs be made, that is wide enough, at the end where the object-glaſs is placed, to hold a table ſimilar to the following.

1.131	10..132	19.133
2.231	11..232	20.233
3.331	12..332	21.333
4.121	13..122	22.123
5 221	14..222	23.223
6.321	15..322	24.323
7.111	16..112	25.113
8.211	17. 212	26.213
9.311	18..312	27.313

Take a pack of cards that conſiſts of 27 only, and giving

* This experiment may be performed without an aſſiſtant, if a table be placed againſt a partition, and the ſtring from the glaſs be made to paſs through a leg of it, and communicate with a ſmall trigger, which you may eaſily puſh down with your foot; and at the ſame time wiping the glaſs with your handkerchief, as if to make the card appear the more conſpicuous. It may alſo be diverſified, by having the figure of a head, ſuppoſe that of ſome abſent friend, in the place of the card.

them to a perſon, deſire him to fix on any one, then ſhuffle them, and give the pack to you. Place the 27 cards in three heaps, by laying down one alternately on each heap; but before you lay each card down, ſhow it to the perſon, without ſeeing it yourſelf; and when the three heaps are finiſhed, aſk him at what number, from 1 to 27, he will have his card appear, and in which heap it then is? Then look at the heap through the glaſs, and if the firſt of the three numbers which ſtands againſt that number it is to appear at be 1, put that heap at top; if the number be 2, put it in the middle; and if it be 3, put it at bottom. Then divide the cards into three heaps, in the ſame manner, a ſecond and third time, and his card will then be at the number he choſe.

For example: Suppoſe he deſire that his card ſhall be the 20th from the top, and the firſt time of making the heaps he ſay it is in the third heap: you then look at the table in the perſpective, holding it at the ſame time over that heap, and you ſee that the firſt figure is 2; you therefore put that figure in the middle of the pack. The ſecond and third times you in like manner put the heap in which he ſays it is, at the bottom, the number each time being 3. Then looking at the pack with your glaſs, as if to diſcover which the card was, you lay the cards down one by one, and the 20th card will be that he fixed on.

You may ſhow the perſon his card in the ſame manner, without aſking him at what number it ſhall appear, by fixing on any number yourſelf.

The foregoing experiments with the cards will be found ſufficient to explain moſt others of a ſimilar nature that have been or may be made; the number of which is very great. To perform thoſe we have deſcribed requires no great practice; the two principal points are, the making the paſs in a dexterous manner, and a certain addreſs by which you influence a perſon to draw the card you preſent. Thoſe that are performed by the long card are in general the moſt eaſy, but they are confined to a pack of cards that is ready prepared; whereas thoſe which depend on making the paſs, may be performed with any pack that is offered.

Sect. III. *Experiments with Sympathetic Inks.*

[See *the article Sympathetic* Ink.]

Experiments with Class I.

1. Make a book of 70 or 80 leaves; and in the cover at the end of it let there be a caſe, which opens next the binding that it be not perceived. At the top of each right hand page write any queſtion you pleaſe; and at the beginning of the book let there be a table of all thoſe queſtions, with the number of the page where each is contained. Then write with common ink, on ſeparate papers, each about half the ſize of the pages in the book, the ſame queſtions that are in the book, and under each of them write, with the ink made of the impregnation of ſaturn, or the diſſolution of biſmuth, the anſwer.

Soak a double paper in the viviſying liquor made of quicklime and orpiment, or the phlogiſton of the liver of ſulphur, and place it, juſt before you make the experiment, in the caſe that is in the cover of the book.

Then deliver ſome of the papers on which the queſtions are wrote to the company; and, after they have choſen ſuch as they would have anſwered, they put them in thoſe leaves where the ſame queſtions are contained, and, ſhutting the book for a few minutes, the ſulphureous ſpirit with which the paper in the cover of the book is imbibed, will penetrate the leaves, and make the anſwers viſible, which will be of a brown colour, and more or leſs deep in proportion to the time the book has been cloſed.

2. Make a box about four inches long, and three wide, as ABCD (fig. 17.) and quite ſhallow. Let it ſhut with hinges and faſten with a hook; and let it have two bottoms, the loweſt of wood, that draws out by a groove, and the uppermoſt of paſteboard. Between theſe two bottoms is to be placed a paper dipped in the vivifying liquor mentioned in the laſt experiment. Let there be alſo a board of the ſame ſize with the inſide of the box, which being placed in it may preſs a paper againſt the paſteboard bottom.

Then take ſeveral pieces of paper, of the ſame ſize with the inſide of the box, and draw on them the figures of men and women, in different attitudes and employments, as walking, riding, reading, writing, &c. Theſe figures muſt be drawn with a new pen, or pencil, dipped in the impregnation of ſaturn.

Being thus provided, and having privately placed the paper dipped in the vivifying liquor between the two bottoms, you tell a perſon you will ſhow him what an abſent friend of his is doing at the preſent hour. You then give him the paper adapted to the employment you intend, and tell him to write his friend's name at the bottom, that you may not change the paper. Then placing that paper next the paſteboard bottom, and putting the piece of wood over it, you ſhut the box. After amuſing him with diſcourſe for three or four minutes, you take out the paper, when he will ſee his friend in the employment you have aſſigned him.

3. Let a workman make a hand of wood, as in fig. 16. fixed at the end next the elbow to the piece E, the ends of which go through the ſcrews CD and EF. The fore and middle fingers, and the thumb, are to be moveable at their joints. There muſt go a wire through the arm, that is fixed at one end to the fore-finger, and at the other to the piece E, round which it is to move: under the two joints of the two fingers are alſo placed two ſmall ſprings, which are to raiſe it up.

To the fore-finger and thumb fix two ſmall rings, through which a pen may be put, ſo as not to impede their motion. Under the arm at the point I, place a ſmall braſs roller, which ſerves to ſuſtain the arm.

The pedeſtal on which this hand is placed muſt be at leaſt a foot long, if the hand be of the natural ſize, and about eight inches wide. This pedeſtal muſt be hollow, and at the part ST there muſt be an opening about three inches long and two inches wide; the whole pedeſtal may be covered with a thin ſtuff, by which the hole will be concealed. There is to be a valve, or ſort of trap-door, on the inſide of the pedeſtal, which is to faſten againſt the opening.

Over the hand and pedeſtal place a glaſs frame, as in the figure: cover the hand with fine leather of fleſh colour, and decorate the arm with a ruffle and cuff, which will entirely conceal the machinery.

Then take a number of cards, and write on them different queſtions; and on the ſame number of papers write, with the impregnation of lead, the anſwers. Give the cards to any one, and let him chooſe a queſtion; and you place the paper with the anſwer under the pen in the hand, letting him firſt ſee there is no writing on it *. Now the pedeſtal being placed againſt a partition, the end F is to go through it. Therefore an aſſiſtant, upon a ſignal given, turns a handle fixed to F; and, as the piece E turns round, the wires that move the fingers and thumb are alternately lengthened and ſhortened, by

* The paper dipped in the viviſying liquor is to be previouſly placed againſt the opening in the table, and ſupported by the trap-door.

which their joints are kept in continual motion; and the ſcrew at the ſame time turning gently from F towards G, gives the whole arm a motion which very much reſembles that of nature *.

The hand and pen ſerve here merely to aſſiſt the illuſion; but if a bit of ſponge, dipped in the viviſying liquor, be placed at the end of the pen, as it goes over the writing on the paper, it will make it become gradually viſible, and in this caſe the trap-door and dipped paper may be omitted †.

Deception with Class II.

4. Take ſeveral pieces of paper, of a ſize that you can put in any book that will go into your pocket, and write at the top of each of them a queſtion, with common ink, and under it write the anſwer with the ſolution of gold or ſilver. Give any of theſe papers, cloſely wrapt up, to a perſon, and tell him to place it againſt the wall of his chamber, and keeping the door locked he will next day find the anſwer wrote on it.

As the gold ink will ſometimes give a yellow caſt to the paper, you may previouſly give a ſlight tincture of that kind to the papers you uſe for this purpoſe.

Deception with Class III.

5. On different papers draw the figures of ſeveral leaves or flowers with one of the colourleſs juices mentioned: then take one of the correſponding leaves or flowers, and laying it on an iron plate, over a chafing-diſh of hot coals, let it burn to aſhes. Put theſe aſhes into a ſieve, in which there is ſome very fine ſteel-filings, and ſift them over the paper on which the flower is drawn, when they will adhere to the glutinous liquor, and form an exact repreſentation of the figure of the leaf or flower.

Deceptions with Class IV.

6. Make a little triangular box, each ſide of which is to be about five inches, and let its inſide be divided into three parts. The firſt part A (fig. 7.), which makes the bottom of the box, is to be covered by the ſecond part B, in form of a caſe, and let the top C exactly cover the part B, as is expreſſed in the figure and the profiles.

Upon the bottom of the box let there be a plate of copper, about one-twentieth of an inch thick, on which let there be a number of hieroglyphic characters contiguous to each other, and cut in different ſorts of metal.

On the top of the cover place a knob O, that goes through it, and to which the copper triangle Q is to be fixed occaſionally, in ſuch manner as it may go into the caſe B. There muſt be a ſpace of one quarter of an inch between the triangle Q and the bottom of the caſe B; into which another plate of copper, of that thickneſs, may be placed.

The outſide of this taliſman may be decorated with uncommon figures or characters, to give it the appearance of greater myſtery.

On ſeveral pieces of paper, of the ſame ſize with the inſide of the taliſman, write different queſtions in common ink, and write the anſwers in thoſe different ſorts of ſympathetic ink that appear when heated, obſerving that each word of the anſwer is to be wrote in a different ink.

Having properly heated the triangle, and placed it under the cover, you introduce the taliſman, and tell any one of the company to chooſe one of the papers on which the queſtions are wrote, and place it in the taliſman, and he will immediately have an anſwer wrote on that paper, the words of which will be of different colours, according to the different metals of which the taliſman is compoſed. The paper being placed in the taliſman, and the cover placed over it, the heat of the triangle will make the anſwer viſible in a few moments. This experiment may be repeated if the triangle be made ſufficiently hot; and two papers may be placed in the taliſman at the ſame time.

This deception, when well executed, occaſions a ſurpriſe that cannot be conceived by a mere deſcription.

7. Make a wooden pedeſtal AB (fig. 5.), about ten inches long, eight wide, and one deep: and at one end erect a box C, about ten inches high, eight broad, and two and a half deep.

The top of the pedeſtal muſt ſlide in a groove, on which inſcribe a dial M, of ſix inches diameter, and which is to be divided into nineteen equal parts, in twelve of which write the names of the months, and mark the reſpective ſigns of the zodiac; and in the ſeven other diviſions, which muſt be next the end B, write the days of the week, and mark the figures of the planets. Next the inner circle NO, make an opening into the box, of about one tenth of an inch. On the centre of the dial place an index that turns freely on its centre.

Within the pedeſtal place a pulley P, about four inches diameter, which is to turn on an axis that is directly under the centre of the dial; and on the upper part of that axis fix a bent index R, which comes out at the opening made by the inner circle ‡, and paſſes over thoſe ſeven diviſions only on which are wrote the days of the week.

Within the box C, let there be two rollers S and T, as in the figure: let that of S contain a ſpring; and at the end of T let there be a pulley V, of three quarters of an inch diameter, round which goes a ſtring or thread that paſſes under the ſmall pulley X, and is faſtened to that of P: ſo that when the laſt pulley makes about one-third of a turn, that of V may make three or four turns.

There muſt alſo be a ſcroll of paper, about two feet long, and each end of which muſt be paſted to one of the rollers. In the front of the box, between the two rollers, make an aperture D, about four inches long, and one inch and a half wide: to this opening let there be a little flap or ſlider, by which it may be cloſed at pleaſure.

The apparatus being thus diſpoſed, place the index R ſucceſſively againſt each of the diviſions marked with one of the planets; and as the paper is gradually wound up the roller, mark, againſt that part which is at the aperture D, the name of one of the following ſibyls:—The Helleſpontian, Cumean, Artemiſian, Phrygian, Albunean, Perſian, Libyan, ſibyl.

On each of the ſeven cards write a different queſtion, and draw one of the ſeven planets. Next, take a memorandum-book that contains ſeven leaves, and on each of them write the name of one of the foregoing ſibyls; in each of the leaves place ſeveral pieces of paper, and on each of them write, with the ſympathetic ink that does not appear till the paper is heated, different anſwers to the ſame queſtion.

Then give a perſon the ſeven cards on which the queſtions are wrote, and tell him to chooſe one of them privately, and

* This might be performed without an aſſiſtant, by means of a trigger placed in the leg of the table, and communicating with the handles, which the operator might thruſt down with his foot. Where expence is not regarded, there may be a complete figure of a man in wood, or plaſter of Paris, ſeated by the table.

† You may alſo have a glaſs ink-ſtand, with ſome of the viviſying liquor, into which the pen may be dipped, and it will then appear to write with common ink. The ſpectators ſhould not be permitted to come very near this machine, which may be applied to ſeveral other purpoſes.

‡ If the axis be made to paſs through the top of the pedeſtal, this opening will not be neceſſary.

conceal the reſt, ſo that it cannot poſſibly be known which of them he has choſen.

Next, tell him to place the index that points to the month againſt that in which he was born *, and to place the index of the planets againſt that which is on the card he has choſen, and which is to preſide over the anſwer: you tell him to do this privately, that no one may ſee him, and after that to cover the dial with his handkerchief. Then let him open the door that is before the aperture in the box, and tell you the name of the ſibyl there viſible.

You then open the memorandum book, and taking out the papers that are in the leaf where the name of the ſibyl juſt mentioned is wrote, you deſire him to chooſe any one of them he thinks proper. The taliſman uſed in the laſt experiment being properly heated, is then to be introduced, when you direct the perſon to put the blank paper into it; and taking it out a few moments after, he will find the anſwer to his queſtion.

To make this operation appear the more extraordinary, it will be proper to have a ſmall preſs or cupboard, at the back of which there is a door that opens into an adjoining room, by which means an aſſiſtant having prepared the taliſman, may place it in the cupboard the moment before it is wanted. This contrivance will be uſeful on many other occaſions.

8. PROVIDE an urn of wood or metal about ſix inches high, and two and a half diameter in the wideſt part, and of ſuch figure in other reſpects as you think proper (ſee fig. 9.) Let there be a cylinder of copper C, (fig. 10.) of about one-eighth of an inch diameter, which is to fill a hole AB made in the urn. The top of this cylinder is to be in the top of the urn, ſo that it may be eaſily taken out. To this urn there muſt be a cover D, which fits it exactly.

On a ſmall ſquare piece of paper draw the figure of a flower or leaf, with that ſort of ſympathetic ink whoſe colour moſt reſembles it. You then preſent ſeveral ſorts of flowers or leaves to a perſon, and deſire him to chooſe any one of them. Then put that flower on a chafingdiſh of hot coals; and, taking the paper on which it is ſecretly drawn, you give it to the perſon to examine, and then put it in the urn, having previouſly heated the cylinder.† Then taking ſome of the aſhes of the burnt flower, you ſtrew them over the paper; after which you take it out, and ſhow the company the figure of that flower. While the flower is burning, you may ſprinkle ſome powder over it, ſuppoſe that of ſaltpetre; and by that, mixed with the aſhes of the flower, the company may imagine the effect is produced.

The preſs or cupboard mentioned in the preceding experiment will be here very convenient for heating the cylinder, and placing it in the urn. A ſimilar deception may be perſormed by putting the paper in a copper veſſel, that may be placed on an iron plate over the chafingdiſh in which the flower is burnt. But this method has not ſo myſterious an appearance as the other, and in ſome perſons may cauſe a ſuſpicion that the effect is produced by heat.

9. To perform this experiment, you muſt obſerve, that there are ſeveral letters which may be changed into others, without any appearance of the alteration; as, the *a* into *d*, the *c* into *a*, *e*, *d*, *g*, *o*, or *q*; the *i* into *b*, *d*, or *l*; the *l* into *t*, the *o* into *a*, *d*, *g*, or *q*, the *v* into *y*, &c.

Take a parcel of cards, ſuppoſe 20, and on one of them write, with the ink of the fourth claſs, the word *law*‡, and on the other, with the ſame ink, the words *old woman*; then holding them to the fire, they will both become viſible. Now you will obſerve, that by altering the *a* in the word *law* into *d*, and adding *a* before the *l*, and *oman* after the *w*, it becomes *old woman*. Therefore, you make thoſe alterations with the inviſible ink, and let it remain ſo. On the reſt of the cards you write any words you think fit.

Preſent the cards in ſuch a manner to two perſons, that one of them ſhall draw the word *law*, and the other the words *old woman*. You then tell the perſon who drew the word *law*, that it ſhall diſappear, and the words on the other card ſhall be wrote in its place; and that you may not change the cards, deſire each of the parties to write his name on his card. Then putting the cards together, and holding them before the fire, as if to dry the names juſt wrote, the word *law* will preſently change into *old woman*.

This experiment may be varied, by fixing on a word that may be changed into three other words, and making four perſons draw the cards on which thoſe words are wrote; and it may be further diverſified by chooſing three ſuch words, as that the firſt can be changed into the ſecond, and the ſecond into the third. You then tell him who drew the firſt word, that it ſhall be changed into that drawn by the ſecond perſon; and him you tell, that his word ſhall be changed into that of the third perſon.

10. WRITE on ſeveral ſlips of paper different queſtions, and ſuch as may be anſwered by the name of ſome perſon; for example, Who is the merrieſt man in the company? Anſwer, Mr. ——. To whom will Miſs —— be married? Anſwer, To Mr. ——. Theſe queſtions are to be wrote in the ſympathetic ink of this claſs, and expoſed to the fire, and the anſwers wrote in the ſame ink, and left inviſible. The papers are to be folded in form of letters, and in ſuch manner, that the part where the name is wrote ſhall be directly under the ſeal, and the heat of the wax will make it viſible. Then give the letter to the perſon who requires the anſwer, and he will find it plainly wrote.

A deception ſimilar to this may be made with a number of blank cards, on each of which an ace of ſpades is drawn with the inviſible ink; then let a perſon chooſe any one of them, and incloſe it in a letter-caſe, prepared in ſuch manner that the figure of the ace ſhall be directly under the ſeal, and on opening the letter it will be immediately viſible.

DECEPTIONS with CLASS V.

11. HAVE a box that is divided into three parts, after the ſame manner as the taliſman in the 21ſt experiment, except that, inſtead of being triangular, it muſt be of a long ſquare. (See fig. 14.) Divide its top B into two equal parts D and E, as in fig. 13. and to the part D adjuſt a plate of copper L, about one quarter of an inch thick, and under both the plate L and the opening E place a cloth. The upper part C muſt have a button, by which it may be fixed on the cover B, ſo as to appear of one piece with it.

At the bottom of the box place a piece of cloth, or other ſtuff, on which you may ſtamp certain myſterious characters, and obſerve that the bottom of the cover muſt reſt upon this cloth.

Then provide a ſlip of paper GH (fig. 12) of the ſame ſize with the bottom of the box; and at each end of it write, with the green ſympathetic ink, the name of a different card, and make ſome private mark, by which you can tell at which end each name is wrote.

Take a parcel of cards, and offer thoſe two of them whoſe names are wrote on the paper to the two perſons, that they may draw them. You tell the parties to keep their cards to

* Theſe months and the index are of no other uſe than to give the experiment an air of greater myſtery.

† There are ſome ſorts of ſympathetic inks that require much more heat than others.

‡ Theſe letters ſhould not be joined.

themſelves, and you propoſe to make the names of thoſe cards appear upon a ſlip of paper, which you put into the box. You then aſk which name of the two cards ſhall appear firſt. The copper plate being previouſly heated and placed in the cover, you put it over that end of the paper on which is the name required, and it will preſently appear. Then taking the paper out, and ſhowing the name wrote, you put it in again, turning the other end to the ſide of the box where the plate is, and it will in like manner become viſible.

The firſt name may be made to diſappear at the ſame time that the ſecond appears, if the cloth, at the end oppoſite to that where the plate is, be made damp.

12. TAKE a print that repreſents winter, and trace over the proper parts of the trees, plants, and ground, with the green ſympathetic ink; obſerving to make ſome parts deeper than others, according to their diſtance. When thoſe parts are dry, paint the other objects with their natural colours. Then put the print in a frame with a glaſs, and cover the back of it with a paper that is paſted over its border only.

When this print is expoſed to the heat of a moderate fire, or to the warm rays of the ſun, all the graſs and foliage will turn to a pleaſing green; and if a yellow tint be given to ſome parts of the print, before the ſympathetic ink be drawn over, this green will be of different ſhades; and the ſcene that a minute before repreſented winter, will now be changed to ſpring.—When this print is placed in the cold, winter will again appear, and will again be driven away by the warm rays of the ſun. This alternate change of ſeaſons may be repeated as often as you pleaſe; remembering, however, as was before obſerved, not to make the print at any time too hot, for then a faded autumn will for ever remain.

DECEPTIONS with CLASS VII.

13. PROVIDE a number of artificial flowers, ſuch as roſes, jonquils, pinks, or any other you find convenient. Theſe flowers muſt be made of white thread or ſilk, and their leaves of parchment. Dip the roſes in the red ſympathetic ink, the jonquils in the yellow, the pinks in the violet, and their leaves in a ſolution of ſalt of tartar. When they are all dry, form them into ſmall bouquets, which will all appear white, and may be uſed in this experiment, either the day they are dipped, or ſeveral days after.

You take one of theſe bouquets, and after ſhowing the company that every part of it is white, you dip it in an infuſion of any of the blue flowers mentioned under the article *Colour-Making*, and, drawing it preſently out, all the flowers and leaves will appear in their natural colours*.

14. WRITE on a paper, with the violet liquor, as many letters or words as you pleaſe; and aſk any perſon whether he will have that writing turn to yellow, green, or red.

Have a ſponge with three ſides that you can readily diſtinguiſh, and dip each of its ſides in one of the three ſympathetic inks. Draw the ſide of the ſponge that correſponds to the colour the perſon has choſe, over the writing once only, and it will directly change to the colour required†.

SECT. III. *Miſcellaneous Performances.*

15. *A perſon having an even number of counters in one hand, and an odd number in the other, to tell in which hand the odd or even number is.* LET the perſon multiply the number in his right-hand by an odd number, and the number in his left-hand by an even number, and tell you if the ſum of the products added together be odd or even. If it be even, the even number is in the right hand; but if it be odd, the even number is in the left hand.

Example.

1. Number in the right hand	18	In the left	7
Multipliers	3		2
	54		14
	14		
Their ſum	68		
2. Number in the right hand	7	In the left	18
Multipliers	3		2
	21		36
	36		
Their ſum	57		

16. *To tell, by the dial of a watch, at what hour any perſon intends to riſe.* LET the perſon ſet the hand of the dial to any hour he pleaſes, and tell you what hour that is; and to the number of that hour you add, in your mind, 12. Then tell him to count privately the number of that amount upon the dial, beginning with the next hour to that on which he purpoſes to riſe, and counting backwards, firſt reckoning the number of the hour at which he has placed the hand. An example will make this plain.

Suppoſe the hour at which he intends to riſe be 8, and that he has placed the hand at 5. You add 12 to 5, and tell him to count 17 on the dial, firſt reckoning 5, the hour at which the index ſtands, and counting backwards from the hour at which he intends to riſe; and the number 17 will neceſſarily end at 8, which ſhows that to be the hour he choſe.

That the hour at which the counting ends muſt be that on which he purpoſed to riſe, will be evident on a little reflection; for if he had begun at that hour and counted 12, he would neceſſarily have come to it again; and calling the number 17, by adding 5 to it, only ſerves to diſguiſe the matter, but can make no ſort of difference in the counting.

17. IF the number 11 be multiplied by any one of the nine digits, the two figures of the product will always be ſimilar. As follows:

11	11	11	11	11	11	11	11	11
1	2	3	4	5	6	7	8	9
11	22	33	44	55	66	77	88	99

Place a parcel of counters on a table, and propoſe to any one to add, alternately, a certain number of thoſe counters, till they amount to 100, but never to add more than 10 at a time. You tell him, moreover, that, if you ſtake firſt, he ſhall never make the even century, but you will. In order to which, you muſt firſt ſtake 1, and remembering the order of the above ſeries, 11, 22, 33, &c. you conſtantly add, to what he ſtakes, as many as will make one more than the numbers of that ſeries, that is, as will make 12, 23, 34, &c. till you come to 89, after which the other party cannot make the century himſelf, nor prevent you from making it.

If the other party has no knowledge of numbers, you may ſtake any other number firſt, under 10, provided you take care to ſecure ſome one of the laſt terms, as 56, 67, 78, &c.

This deception may be performed with other numbers; and in order to ſucceed, you muſt divide the number to be attained

* The liquor ſhould be put in a ſort of jar with a narrow neck, that it may not be ſeen by the company; and you ſhould draw the flowers gently out, that the liquor may drop if thin, and they may have time to acquire their colours.

† The ſponge ſhould be well cleaned immediately after the experiment.

by a number that has one digit more than what you can ſtake each time, and the remainder will be the number you muſt firſt ſtake. Obſerve, that, to be ſure of ſucceſs, there muſt be always a remainder. Suppoſe, for example, the number to be attained is 52, making uſe of a pack of cards inſtead of counters, and that you are never to add more than 6; then divide 52 by the next number above 6, that is, by 7, and the remainder, which is 3, will be the number you muſt ſtake firſt; and whatever the other ſtakes, you muſt add as much to it as will make it equal to the number by which you divided, that is, 7. Therefore, if his firſt ſtake be 1, you muſt ſtake 6, &c. ſo that your ſecond ſtake will make the heap 10, your third ſtake will make it 17, and ſo on, till you come to 45, when, as he cannot ſtake more than 6, you muſt make the number 52.

In this, as in the former caſe, if the other perſon has no knowledge of numbers, you may ſtake any number firſt under 7; or you may let him ſtake firſt, only taking care to ſecure either of the numbers 10, 17, 24, 31, &c. after which he cannot make 52, if you conſtantly add as many to his ſtake as will make it 7.

18. *A perſon privately fixing on any number, to tell him that number.* After the perſon has fixed on a number, bid him double it, and add 4 to that ſum, then multiply the whole by 5; to the product let him add 12, and multiply the amount by 10. From the ſum of the whole let him deduct 320, and tell you the remainder; from which if you cut off the two laſt figures, the number that remains will be that fixed on.

Example.

Let the number choſen be	7
Which doubled is	14
And 4 added to it, makes	18
Which multiplied by 5, gives	90
To which 12 being added, it is	102
That multiplied by 10, makes	1020
From which deducting 320, the remainder is	700
And by ſtriking off the two cyphers, it becomes the original number	7

19. *Three dice being thrown on a table, to tell the number of each of them, and the order in which they ſtand.* Let the perſon who has thrown the dice double the number of that next his left hand, and add 5 to that ſum; then multiply the amount by 5, and to the product add the number of the middle die; then let the whole be multiplied by 10, and to that product add the number of the third die. From the total let there be ſubtracted 250, and the figures of the number that remains will anſwer to the points of the three dice as they ſtand on the table.

Example. Suppoſe the points of the three dice thrown on the table to be 4, 6, and 2,

Then the double of the firſt die will be	8
To which add	5
	13
	5
That ſum multiplied by 5 will be	65
To which add the number of the middle die	6
	71
And multiply the ſum by	10
	710
To that product add the number of the third die	2
From the total	712
Subtract	250
And the three remaining figures	264

will anſwer to the numbers on the dice, and ſhow the order in which they ſtand.

20. *Some perſon in company having put a ring privately on one of his fingers; to name the perſon, the hand, the finger, and the joint on which it is placed.* Let a third perſon double the number of the order in which he ſtands who has the ring, and add 5 to that number; then multiply that ſum by 5, and to the product add 10. Let him next add 1 to the laſt number if the ring be on the right hand, and 2 if on the left, and multiply the whole by 10: to this product he muſt add the number of the finger (counting the thumb as the firſt finger), and multiply the whole again by 10. Let him then add the number of the joint; and, laſtly, to the whole join 35.

He is then to tell you the amount of the whole, from which you are to ſubtract 3535, and the remainder will conſiſt of four figures, the firſt of which will expreſs the rank in which the perſon ſtands, the ſecond the hand (the number 1 ſignifying the right hand, and 2 the left), the third number the finger, and the fourth the joint.

Example. Suppoſe the perſon who ſtands the third in order has put the ring upon the ſecond joint of the thumb of his left hand; then

The double of the rank of the third perſon is	6
To which add	5
	11
Multiply the ſum by	5
	55
To which add	10
And the number of the left hand	2
	67
Which being multiplied by	10
	670
To which add the number of the thumb	1
	671
And multiply again by	10
	6710
Then add the number of the joint	2
And laſtly the number	35
	6747
From which deducting	3535
The remainder is	3212

Of which, as we have ſaid, the 3 denotes the third perſon, the 2 the left hand, the 1 the thumb, and the laſt 2 the ſecond joint.

21. Cover the outſide of a ſmall memorandum-book with black paper, and in one of its inſide covers make a flap, to open ſecretly, and obſerve there muſt be nothing over the flap but the black paper that covers the book.

Mix ſoot with black or brown ſoap, with which rub the ſide of the black paper next the flap; then wipe it quite clean, ſo that a white paper preſſed againſt it will not receive any mark.

Provide a black-lead pencil that will not mark without preſſing hard on the paper. Have likewiſe a ſmall box, about the ſize of the memorandum-book, and that opens on both ſides, but on one of them by a private method. Give a perſon the pencil, and a ſlip of thin paper, on which he is to write what he thinks proper: you preſent him the memorandum-book at the ſame time, that he may not write on the bare board. You tell him to keep what he writes to himſelf, and direct him to burn it on an iron plate laid on a chafingdiſh of coals, and give

you the aſhes. You then go into another room to fetch your magic box above deſcribed, and take with you the memorandum-book.

Having previouſly placed a paper under the flap in the cover of the book, when he preſſes hard with the pencil, to write on the paper, every ſtroke, by means of the ſtuff rubbed on the black paper, will appear on that under the flap. You therefore take it out, and put it into one ſide of the box.

You then return to the other room, and taking a ſlip of blank paper, you put it into the other ſide of the box, ſtrewing the aſhes of the burnt paper over it. Then ſhaking the box for a few moments, and at the ſame time turning it dexterouſly over, you open the other ſide, and ſhow the perſon the paper you firſt put in, the writing on which he will readily acknowledge to be his.

22. Take two guineas and two ſhillings, and grind part of them away, on one ſide only, ſo that they may be but of half the common thickneſs; and obſerve that they muſt be quite thin at the edge; then rivet a guinea and a ſhilling together. Lay one of theſe double pieces, with the ſhilling upwards, on the palm of your hand, at the bottom of your three firſt fingers; and lay the other piece, with the guinea upward, in like manner, in the other hand. Let the company take notice in which hand is the guinea, and in which the ſhilling. Then as you ſhut your hands, you naturally turn the pieces over; and when you open them again, the ſhilling and the guinea will appear to have changed their places.

23. Provide a round tin-box, of the ſize of a large ſnuff-box; and in this place eight other boxes, which will go eaſily into each other, and let the leaſt of them be of a ſize to hold a guinea. Each of theſe boxes ſhould ſhut with a hinge: and to the leaſt of them there muſt be a ſmall lock, that is faſtened with a ſpring, but cannot be opened without a key: and obſerve that all theſe boxes muſt ſhut ſo freely, that they may be all cloſed at once. Place theſe boxes in each other, with their tops open (ſee fig. 12.), in the drawer of the table on which you make your experiments; or, if you pleaſe, in your pocket, in ſuch a manner that they cannot be diſplaced.

Then aſk a perſon to lend you a new guinea, and deſire him to mark it, that it may not be changed. You take this piece in one hand, and in the other you have another of the ſame appearance; and putting your hand in the drawer you ſlip the piece that is marked into the leaſt box, and, ſhutting them all at once, you take them out. Then ſhowing the piece you have in your hand, and which the company ſuppoſe to be the ſame that was marked, you pretend to make it paſs through the box, and dexterouſly convey it away.

You then preſent the box, for the ſpectators do not yet know there are more than one, to any perſon in company; who, when he opens it, finds another, and another, till he comes to the laſt; but that he cannot open without the key, (ſee fig. 13.) which you then give him; and retiring to a diſtant part of the room, you tell him to take out the guinea himſelf, and ſee if it be that he marked.

This deception may be made more ſurpriſing, by putting the key into the ſnuff-box of one of the company; which you may do by aſking him for a pinch of his ſnuff, and at the ſame time conceal the key, which muſt be very ſmall, among the ſnuff: and when the perſon who is to open the box aſks for the key, you tell him that one of the company has it in his ſnuff-box. This part of the deception may likewiſe be performed by means of a confederate.

24. ABCD, pl. 4. fig. 15. repreſents a ſmall wooden box ſeven or eight inches long, two and an half broad, and half an inch deep; the bottom of which, by means of two croſs-pieces, is divided into three equal parts. EFGH repreſents the lid, which is faſtened to the bottom by a hinge, and has in front a ſmall plate ſhaped like a lock, and two ſmall eyes for hooks which ſerve to faſten it when it is ſhut. ILM are three ſmall flexible ſprings, flat, and about $\frac{3}{4}$ inch long. NOP are three wooden tablets of the ſame ſize, upon which are marked the figures 3, 4, and 5. The tablets are of different thickneſſes, and the difference is ſo ſmall as not to be perceived by the eye. The outſide of the box is covered with ſhagreen or morocco leather, and on the inſide with ſilk taffety; theſe coverings being indiſpenſibly neceſſary to hide the three ſmall ſprings above-mentioned. Fig. 14. ſhows the two hinges E and F bent cloſe to the top of the lid ABCD; the piece of braſs G, ſimilar to a lock, being alſo curved to the lid. A ſmall braſs ſtud is riveted upon the end of each of theſe ſprings inſerted into the lid, and paſſes through the curved part of each of the hinges and the lock; ſo that on the outſide they appear as the heads of ſmall pins which faſten them upon the lid. Theſe ſmall ſtuds will be elevated more or leſs according to the thickneſſes of the tablets, that may be ſhut up in each of the partitions in which they may be found placed; ſo that the tablet N elevates them more than the tablet O, and the latter leſs than P; though theſe elevations are but barely ſenſible to the ſight or touch, and that by a perſon accuſtomed to look at or handle them. Thus it may be eaſily known in whatever order the tablets are placed, however carefully ſhut up; and conſequently the numbers named as incloſed.

Give now the box to any indifferent perſon, leave him at liberty to form with the tablets any number he pleaſes, deſiring him to return the box well ſhut up; then taking the box, and determining by the touch, or rather by the eye, what order the tablets are in, it will be very ſurpriſing to hear you declare the number without ſeeing it. *N. B.* It will ſtill be equally poſſible to diſcover the number, though the tablets ſhould be returned with the bottom upwards, or even though one ſhould be withdrawn in order to defeat your deſign; particularly if care has been taken to make the ſtuds remain even with the plates when a number is omitted.

25. *To diſcover any particular counter which has been ſecretly placed within a box that turns upon it.*—This table, which is made of wood, is repreſented by A, fig. 16. It is of an hexagonal ſhape, and about three or four inches diameter. For the ſake of neatneſs in appearance, a proportionably ſized pillar with a foot is fixed to it. Round a centre there turns a ſmall round box B of about $\frac{3}{4}$ inch diameter in the inſide, the lid of which takes off at B. At the bottom of this box, near the circumference in the inſide, is fixed a braſs pin to fit a hole made in a flat ivory counter ſhown at *b*, fig. 17. The pin and counter are repreſented in fig. 18. which is a flat view of fig. 16. with the lid of the box B taken off. Oppoſite to the pin *b*, in the ſame figure, D repreſents a fine dot deſigned as a ſecret mark on the outſide of the box, which ſerves always as a guide to the number of the counter privately placed in the inſide of the box, as is afterwards particularly explained. Upon one of the corners of the table is an ivory mark C, fig. 16. and 18. which ſerves to place the ſpot *a* upon the counters in its proper poſition. See fig. 17. There are 12 counters fitted to the box B, marked 10, 20, &c. as far as 120, on the middle of each. On each of theſe counters is the hole *b*, fig. 17. and 18. which goes over the pin in the bottom of the box; and on one ſide of this hole a red or black ſpot is placed in the following manner: When No. 10 is put into the box, the ſpot muſt be ſo far to the left hand of the hole, that when it is brought to the mark C, fig. 18. the hole *b* will be oppoſite to the ſide marked 1. When No. 20 is put in, the ſpot being brought to the mark C will carry the hole to the corner marked 2. When No. 30 is put in, and the ſpot brought oppoſite to C, the hole will be brought againſt the ſide marked 3, as is ſhown in the figure, and ſo on for the reſt. Therefore, as oppoſite to the braſs pin, or hole in the counter on the outſide of the box B, there is a ſecret mark

D already mentioned, this muſt ſerve as an index to the number contained in the box, according as it is oppoſite to a ſide or corner of the table.

Give now the table with the box and the 12 counters to any perſon, and deſire him to put one of the counters ſecretly into the box, keeping the reſt to himſelf; and after having placed the hole over the pin in the box, to place particularly, by turning the box round, the ſpot *a* againſt the mark C on the table. Let him then cover the box, give you the table, and keep the counters to himſelf. Obſerve then privately what ſide or corner the ſecret outſide mark D ſtands againſt, reckon the tens accordingly, and tell him the number.

26. *To draw out of the well with a bucket any one of four liquors which have been previouſly mixed and put into it.*—Provide two tin cylinders of ſeven or eight inches height; the diameter of the largeſt, repreſented by AB fig. 19. to be four inches, and that of the leaſt, CD, two inches. Place the ſmall one within the larger, and connect them together by ſoldering to them four tin partitions, making the equal ſpaces *e*, *f*, *g*, *h*. Turn a piece of wood three inches thick, hollow withinſide, and lined with tin, of which a ſection is given, fig. 20. Into this the exterior cylinder ſhould be cloſely fitted at *a* and *b*. Another circle of wood (of which a ſection is given fig. 21.), hollowed at *a*, *b*, and *c*, is alſo to be procured, and which may cover exactly the ſpace between the two cylinders; and laſtly, let the whole be conſtructed in ſuch a manner, that when theſe three ſeparate pieces are placed together, they may repreſent a well, as in fig. 22. The two braſs or wooden pillars AA, with the axis and handle C, ſerve to let down and draw up a ſmall glaſs bucket B, an inch and an half in diameter. Make alſo four tin reſervoirs of the ſame height with the cylinder, and ſo ſhaped as to fill the four ſpaces *e*, *f*, *g*, *h*, (fig. 19.) which muſt be well cloſed at their extremities B and C. On the top of each make a ſmall hole about the tenth part of an inch diameter, and ſolder at the baſe C a ſmall tube D, the end of which ſhould be bent towards the inſide of the well when the reſervoir is placed in it. Solder on the top of each reſervoir a ſmall ſpring lever and prop ABDE, fig. 23. This ſpring will ſerve always to preſs the end of the lever D down upon the hole at the top of the reſervoir B; and in order to cover it more perfectly, a ſmall piece of leather is to be glued on to the end of the lever D. Laſtly, a ſmall peg or ſtud C is placed at the end of each of the levers, and which muſt be cloſe to the under part of the wooden circle which covers the reſervoirs. To conceal theſe ſtuds, and at the ſame time to be able to preſs upon them with the fingers, circular apertures, as ſhown in fig. 21. muſt be made in the piece of wood, the top covered with a piece of vellum, and the whole neatly painted with oil colour.

If now you plunge one of theſe reſervoirs perpendicularly into any liquor, in preſſing on the ſtud, ſo as to uncover the hole at the top, it will be filled with the liquor in proportion to the depth to which it is immerged; and as long as the lever continues to preſs upon the hole by means of the ſpring, the liquor cannot run out for want of air, though it will do ſo the moment the ſtud is preſſed upon and the air admitted. If the reſervoir is properly placed, then the liquor will flow out of it into the glaſs bucket when let down to a proper depth.

Fill now the four reſervoirs with the four different liquors; putting them in their places, and covering them with the circular top. Take a quantity of the ſame liquors, mix them well together, and pour the whole into the well; after which you may draw out any one which the company deſires, by letting down the bucket, and preſſing ſecretly upon the ſtud belonging to the reſervoir which contains it, and which will thus diſcharge the liquor it contains.

27. Provide a ſmall tin mortar, that is double, as A (fig. 8. pl. 3.) whoſe bottom B turns round on an axis, by means of a ſpring which communicates with the piece C. There muſt be a hollow ſpace under the falſe bottom. To the under ſide of the bottom faſten, by a thread of fine ſilk, a flower, with its ſtalk and leaves.

Then take a flower that exactly reſembles the other, and plucking it from the ſtalk, and all the leaves from each other, put them into the mortar, and pound them with a ſmall peſtle; after which you ſhow the mortar to the company, that they may ſee the parts are all bruiſed.

Then taking the mortar up in your hands, you hold it over the flame of a lamp or candle, by whoſe warmth the flower is ſuppoſed to be reſtored; and at the ſame time preſſing the piece at C, the bottom will turn round, the bruiſed parts deſcend into the ſpace under the bottom, and the whole flower will be at top; you then put your hand into the mortar, and eaſily breaking the ſilk thread, which may be very ſhort as well as fine, you take the flower out and preſent it to the company.

There is an experiment ſimilar to this, in which a live bird is concealed at the bottom of the mortar, and one that is dead is pounded in it, after which, by the motion of the bottom, the live bird is ſet at liberty. But ſurely the pounding a bird in a mortar, though it be dead, muſt produce, in perſons of any delicacy, more diſguſt than entertainment.

28. Procure a tin box ABCD (fig. 1.) about eight inches high, four wide, and two deep, and let it be fixed on the wooden ſtand E. On two of the inſides let there be a groove FG; and in the front an opening I, three inches wide and one high.

At the back of the box let there be a little tin door, that opens outward, by which two wax-candles M may be put in. Let the top of the box have a cover of the ſame metal, in which there are ſeveral holes, and which may be taken off at pleaſure.

Provide a double glaſs OP (fig. 2.) conſtructed in the ſame manner as that in the laſt experiment. On one of its ſides you are to paſte a black paper, the length of which is to be divided into three parts, and the breadth into fifteen; in every two of theſe fifteen diviſions you cut out letters, which will make in the whole three anſwers to three queſtions that may be propoſed. On the other ſide of the glaſs paſte a very thin paper, and to the top faſten a ſmall cord, by which they may be made to riſe or deſcend in the groove FG.

Then take a ſlip of paſteboard RS (fig. 3.), one inch and a half wide and three inches long, which is to be divided into fifteen equal parts ſimilar to thoſe of the paper OP, and cut out ſpaces, as in the figure, ſo that this paper, ſliding horizontally before OP, will either cover or conceal the letters cut in that.

This paſteboard is to ſlide between two braſs wires, and is to be faſtened to one ſide of the box, by a ſtring that communicates with a ſmall braſs ſpring; and to the other ſide, by a ſtring faſtened to the box by a ſmall piece of wax, ſo ſituated that the ſtring may be eaſily ſet at liberty by the heat of the candles placed in the box.

Take a parcel of cards, and write on them different queſtions, three of which are to correſpond with the anſwers on the glaſs. Shuffle theſe cards, and let a perſon draw any one of the three queſtions. Then by raiſing the glaſs you bring the anſwer againſt the hole in the front of the box. You next place the candles in the box, the heat of which will melt the wax that holds the paper RS, which being then drawn by the ſpring, the anſwer will be viſible; and in proportion as the compoſition between the glaſſes becomes diluted by the increaſe of the heat, the letters will become more ſtrongly illuminated.

The letters cut in the paper may be made to anſwer ſeveral different queſtions, as has been explained in other experiments; and the whole parcel of cards may conſiſt of queſtions that may be anſwered by one or other of the three diviſions in the paper.

29. Make a tin box ABCD (fig. 4.), with a cover M, that takes off. Let this box be ſupported by the pedeſtal FGHI, of

the ſame metal, and on which there is a little door L. In the front of this box is to be a glaſs O.

In a groove, at a ſmall diſtance from O, place a double glaſs of the ſame ſort with that in the laſt experiment. Between the front and back glaſſes place a ſmall upright tin tube ſupported by the croſs-piece R. Let there be alſo a ſmall chafingdiſh placed in the pedeſtal FGHI. The box is to be open behind. You privately place a flower* in the tin tube R; and preſenting one that reſembles it to any perſon †, deſire him to burn it on the coals in the chafingdiſh.

You then ſtrew ſome powder over the coals, which may be ſuppoſed to aid the aſhes in producing the flower; and then put the chafingdiſh in the pedeſtal, under the box. As the heat by degrees melts the compoſition between the glaſſes, the flower will gradually appear; but when the chafingdiſh is taken away, and the power of the aſhes is ſuppoſed to be removed, the flower ſoon diſappears.

For entertaining experiments, illuſions, &c. of a philoſophical nature, ſee the articles ACOUSTICS, CATOPTRICS, CHROMATICS, DIOPTRICS, ELECTRICITY, HYDROSTATICS, MAGNETISM, PYROTECHNICS, &c.

LEG

LEGER LINE, in muſic, one added to the ſtaff of five lines, when the aſcending or deſcending notes run very high or low: there are ſometimes many of theſe lines both above and below the ſtaff, to the number of four or five.

LEGHORN, anciently called *Liburnus Portus*, but by the modern Italians *Livorno*, a handſome town of Italy, in the duchy of Tuſcany, and a free port, about 30 miles ſouth-weſt from Florence, in the territory of Piſa. The only defect of the harbour is its being too ſhallow for large ſhips. Coſmo I. had this town in exchange for Sarzana, from the Genoeſe; and it is the only ſea-port in the duchy. It was then but a mean unhealthy place; but it is now very handſome and well-built, with broad, ſtraight, parallel ſtreets. It is alſo well fortified; but wants good water, which muſt be brought from Piſa, 14 miles diſtant. It is about two miles in circuit, and the general form of it is ſquare. Part of it has the convenience of canals; one of which is five miles in length, and, joining the Arno, merchandiſe and paſſengers are thus conveyed to Piſa. The port, conſiſting of two havens, one for the duke's galleys, the other for merchant ſhips, is ſurrounded with a double mole, above a mile and a half in length, and defended, together with the town, by a good citadel and 12 forts. Roman Catholics, Jews, Greeks, Armenians, Mahometans, and even the Engliſh factory, are indulged in the public exerciſe of their religion; but other Proteſtants muſt be ſatisfied with the private. The trade carried on here is very great, and moſt of it paſſes through the hands of the Jews. Though only two piaſtres, or ſcudi, are paid for every bale, great or ſmall, imported or exported, yet the duties on all proviſions and commodities brought from the continent to the town are very heavy. The number of the inhabitants is ſaid to be about 45,000; and one third of theſe are Jews, who live in a particular quarter, but without any mark of diſtinction, and have a fine ſynagogue. They have engroſſed the coral manufactory, have a conſiderable trade, and poſſeſs the chief riches of the place. The garriſon conſiſts of 2,000 men. The walks on the ramparts are very agreeable. There is good anchorage in the road; but ſhips riding there are much expoſed to the weather and the Barbary corſairs. The number of Engliſh families in Leghorn is about 36; they are much favoured by the government, and carry on a good trade. The power of the Inquiſition is limited to eccleſiaſtical matters and Roman Catholics. There are a great many Turkiſh ſlaves here, brought in by the duke's galleys, who are often ſent out on a cruize againſt the corſairs of Barbary. The lighthouſe ſtands on a rock in the ſea; near which is the

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Lazaretto, where quarantine is performed. Another ſource from which the duke draws a great revenue, is the monopoly of brandy, tobacco, and ſalt; but that, with the heavy duties, makes proviſions dear. The Turks who are not ſlaves live in a particular quarter, near that of the Jews. The common proſtitutes have alſo a particular place aſſigned them, out of which they muſt not be ſeen, without leave from the commiſſary. The number of the rowers in the galleys, whether Turkiſh ſlaves, criminals, or volunteers, is about 2,000. In the area before the darſena or inner harbour is a fine ſtatue of duke Ferdinand, with four Turkiſh ſlaves, in bronze, chained to the pedeſtal. The ducal palace is one of the fineſt ſtructures in the town, and the ordinary reſidence of the governor. Leghorn is the ſee of a biſhop, and has a noble cathedral; but the other churches are not remarkable. E. lon. 11. 0. N. lat. 43. 30.

LEGIO VII. GEMINA, (anc. geog,) a town or ſtation of that legion in the Aſtures. Now *Leon*, capital of the province of that name in Spain. W. lon. 6. 5. lat. 43.—Another LEGIO, a town of Galilee; from which Jerome determines the diſtances of the places in Galilee; not a bare encampment, though the name might originally be owing to that circumſtance. It lay 15 miles to the weſt of Nazareth, between mount Tabor and the Mediterranean. Now thought to be *Legune*.

LEGION, in Roman antiquity, a body of foot, which conſiſted of different numbers at different periods of time. The word comes from the Latin *legere*, to chooſe; becauſe, when the legions were raiſed, they made choice of ſuch of their youth as were moſt proper to bear arms.

In the time of Romulus, the legion conſiſted of 3000 foot and 300 horſe; though, after the reception of the Sabines, it was augmented to 4000. In the war with Hannibal it was raiſed to 5000; after this it ſunk to 4000 or 4500; this was the number in the time of Polybius. The number of legions kept in pay together differed according to times and occaſions. During the conſular ſtate, four legions were fitted up every year, and divided betwixt the two conſuls; yet we meet with the number of 16 or 18, as the ſituation of affairs required. Auguſtus maintained a ſtanding army of 23 or 25 legions; but this number in after times is ſeldom found. The different legions borrowed their names from the order in which they were raiſed; hence we read of *legio prima, ſecunda, tertia*: but as there might be many *primæ, ſecundæ, tertiæ*, &c. they were ſurnamed from the emperors, as *Auguſta, Claudiana, Galbiana, Flavia, Ulpia, Trajana, Antoniana*, &c. or from

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* This flower muſt not be placed ſo near as to make it in the leaſt degree viſible.

† You may preſent ſeveral flowers, and let the perſon chooſe any one of them. In this caſe, while he is burning the flower, you fetch the box from another apartment, and at the ſame time put in a correſponding flower, which will make the experiment ſtill more ſurpriſing.

the provinces which had been conquered by their means, as *Parthica*, *Scythica*, *Gallica*, *Arabica*, &c. or from the deities under whose protection the commanders had particularly placed themselves, as *Minervia*, *Apollinaris*, &c. or from the region where they were quartered, as *Cretensis*, *Cyrenaica*, *Britannica*, &c. or from particular accidents, as *adjutrix*, *martia*, *fulminatrix*, *rapax*, *victrix*.

Each legion was divided into 10 cohorts, each cohort into 10 companies, and each company into two centuries. The chief commander of the legion was called *legatus*, i. e. lieutenant.

The standards borne by the legions were various: at first, the standard was a wolf, in honour of Romulus's nurse; afterwards an hog, which animal was usually sacrificed at the conclusion of a treaty, to indicate that war is undertaken with a view to peace: sometimes a minotaur, to remind the general of his duty of secrecy, of which the labyrinth was an emblem, and consequently the minotaur; a horse was also borne, also a boar; and Marius, we are told, was the first who changed all these for the eagle.

LEGISLATOR, a lawgiver, or person who establishes the polity and laws of a state. Such was Moses, among the Jews; Lycurgus, among the Lacedemonians, &c. See Mosaic *Law*.

The first laws among the Athenians seem to have been those of Theseus; for what we can find earlier than this period is involved in fable. After Theseus came Draco the Archon, whose laws were said, for their severity, to have been written with blood: by his laws every offence was punished with death; so that stealing an apple, and betraying their country, were treated as equal crimes. These laws were afterwards repealed by Solon, except such as related to murder. By way of distinction, Draco's laws were called Θεσμοι, and Solon's Νομοι. The laws of Solon were in a great measure suspended during the usurpation of Pisistratus; but, after the expulsion of his family, were revived with some additions by Clisthenes. After this, the form of government was again changed, first by the four hundred, and afterwards by the thirty tyrants; but these storms being over, the ancient laws were again restored in the archonship of Euclides, and others established at the instance of Diocles, Aristophon, and, last of all, of Demetrius the Phalerian. This is a short sketch of the history of the Athenian legislation, before that state submitted to the Roman yoke. But many laws were enacted by the suffrages of the people on particular exigencies: the decrees of the senate continued to have the force of laws no longer than a year. If a new law was to be proposed to the assembly, it was necessary to write it upon a white tablet, and fix it up some days before the meeting, lest their judgment should be caught by surprise. The laws were carefully revised every year; and if any of them, from a change of circumstances, were found unsuitable or prejudicial, they were repealed: this was called επιχειροτονια των νομων, because the suffrages were given by holding up of hands. The first laws among the Grecians were unwritten and composed in verse, that the common people might with more ease commit them to memory. Solon penned his laws upon wooden tablets, called Αξονες; and some authors, with great probability, assert, that they were written in the manner called Βουστροφηδον, from left to right, and from right again to left, in the same manner as oxen walk the furrows in plowing, thus,

ΕΚΔΙΟΣ ΑΡ
.ΑΘΣΕΜΩΧ

It was against the law for any person to erase a decree, and certain persons called Γραμματεις were appointed to prevent any corruption; whose business it was also to transcribe the old and enter the new ones.

At Rome, the people were in a great measure their own legislators; though Solon may be said, in some sense, to have been their legislator, as the decemviri, who were created for the making of laws, borrowed a great number from those of Solon. See Lex.

With us, the legislative power is lodged in the king, lords, and commons, assembled in parliament. See Law and Parliament.

LEGITIMATION, an act whereby illegitimate children are rendered legitimate. See Bastard.

LEGUMEN, or Pod, in botany; a species of seed-vessel which has two valves or external openings inclosing a number of seeds that are fastened along one suture only. In this last circumstance the seed-vessel in question differs from that termed by botanists *siliqua*, in which the enclosed seeds are fastened alternately to both the sutures or joinings of the pod. The seed-vessel of all the pea-bloom or butterfly-shaped flowers, the *diadelphia* of Linnæus, is of this pod kind. Such, for instance, is the seed-vessel of the pea, vetch, lupine, and broom.

LEGUMINOUS, an appellation given to all plants whose fruit is a legumen.

LEIBNITZ (Godfrey William-de), an eminent mathematician and philosopher, was born at Leipsic in Saxony in 1646. At the age of 15 years he applied himself to the mathematics at Leipsic and Jena; and in 1663 maintained a thesis *de Principiis Individuationis*. The year following he was admitted master of arts. He read with great attention the Greek philosophers; and endeavoured to reconcile Plato with Aristotle, as he afterwards did Aristotle with Des Cartes. But the study of the law was his principal view; in which faculty he was admitted bachelor in 1665. The year following he would have taken the degree of doctor; but was refused it on pretence that he was too young, though in reality because he had raised himself several enemies by rejecting the principles of Aristotle and the schoolmen. Upon this he went to Altorf, where he maintained a thesis *de Casibus Perplexis*, with such applause, that he had the degree of doctor conferred on him. He might have settled to great advantage in Paris; but as it would have been necessary to have embraced the Roman Catholic religion, he refused all offers. In 1673, he went to England; where he became acquainted with Mr. Oldenburg, secretary of the royal society, and Mr. John Collins, fellow of that society. In 1676 he returned to England, and thence went into Holland, in order to proceed to Hanover, where he proposed to settle. Upon his arrival there, he applied himself to enrich the duke's library with the best books of all kinds. The duke dying in 1679, his successor Ernest Augustus, then bishop of Osnaburgh, showed our author the same favour as his predecessor had done, and ordered him to write the history of the house of Brunswick. He undertook it, and travelled over Germany and Italy to collect materials. The elector of Brandenburgh, afterwards king of Prussia, founded an academy at Berlin by his advice; and he was appointed perpetual president, though his affairs would not permit him to reside constantly at Berlin. He projected an academy of the same kind at Dresden; and this design would have been executed, if it had not been prevented by the confusions in Poland. He was engaged likewise in a scheme for an universal language. His writings had long before made him famous over all Europe. Beside the office of privy counsellor of justice, which the elector of Hanover had given him, the emperor appointed him in 1711 aulic counsellor; and the czar made him privy-counsellor of justice, with a pension of 1000 ducats. He undertook at the same time the establishment of an academy of science at Vienna; but

the plague prevented the execution of it. However, the emperor, as a mark of his favour, ſettled a penſion on him of 2000 florins, and promiſed him another of 4000 if he would come and reſide at Vienna. He would have complied with this offer, but he was prevented by death in 1716. His memory was ſo ſtrong, that in order to fix any thing in it, he had no more to do but to write it once; and he could even in his old age repeat Virgil exactly. He profeſſed the Lutheran religion, but never went to ſermon; and upon his death-bed, his coachman, who was his favourite ſervant, deſiring him to ſend for a miniſter, he refuſed, ſaying, *he had no need of one.* Mr. Locke and Mr. Molyneux plainly ſeem to think that he was not ſo great a man as he had the reputation of being. Foreigners did for ſome time aſcribe to him the honour of an invention, of which he received the firſt hints from Sir Iſaac Newton's letters, who had diſcovered the method of fluxions in 1664 and 1665. But it would be tedious to give the reader a detail of the diſpute concerning the right to that invention.

LEIBNITZIAN philoſophy, or the philoſophy of Leibnitz, is a ſyſtem of philoſophy formed and publiſhed by its author in the laſt century, partly in emendation of the Carteſian, and partly in oppoſition to the Newtonian. The baſis of Mr. Leibnitz's philoſophy was that of Des Cartes; for he retained the Carteſian ſubtile matter, with the univerſal plenitude and vortices; and repreſented the univerſe as a machine that ſhould proceed for ever by the laws of mechaniſm, in the moſt perfect ſtate, by an abſolute inviolable neceſſity, though in ſome things he differs from Des Cartes. After Sir Iſaac Newton's philoſophy was publiſhed in 1687, he printed an eſſay on the celeſtial motions, Act. Erud. 1689, where he admits of the circulation of the ether with Des Cartes, and of gravity with Sir Iſaac Newton; though he has not reconciled theſe principles, nor ſhown how gravity aroſe from the impulſe of this ether, nor how to account for the planetary revolutions, and the laws of the planetary motions in their reſpective orbits. That which he calls the *harmonical circulation*, is the angular velocity of any one planet, which decreaſes from the perihelium to the aphelium in the ſame proportion as its diſtance from the ſun increaſes: but this law does not apply to the motions of the different planets compared together; becauſe the velocities of the planets, at their mean diſtances, decreaſe in the ſame proportion as the ſquare roots of the numbers expreſſing thoſe diſtances. Beſides, his ſyſtem is defective, as it does not reconcile the circulation of the ether with the free motions of the comets in all directions, or with the obliquity of the planes of the planetary orbits; nor reſolve other objections to which the hypotheſis of the plenum and vortices is liable. Soon after the period juſt mentioned, the diſpute commenced concerning the invention of the method of fluxions, which led Mr. Leibnitz to take a very decided part in oppoſition to the philoſophy of Sir Iſaac Newton. From the wiſdom and goodneſs of the Deity, and his principle of a ſufficient reaſon, he concluded that the univerſe was a perfect work, or the beſt that could poſſibly have been made; and that other things, which were incommodious and evil, were permitted as neceſſary conſequences of what was beſt: the material ſyſtem, conſidered as a perfect machine, can never fall into diſorder, or require to be ſet right; and to ſuppoſe that God interpoſes in it, is to leſſen the ſkill of the author, and the perfection of his work. He expreſsly charges an impious tendency on the philoſophy of Sir Iſaac Newton, becauſe he aſſerts, that the fabric of the univerſe and courſe of nature could not continue for ever in its preſent ſtate, but would require, in proceſs of time, to be re-eſtabliſhed or renewed by the hand of its Former. The perfection of the univerſe, by reaſon of which it is capable of continuing for ever by mechanical laws in its preſent ſtate, led Mr. Leibnitz to diſtinguiſh between the quantity of motion and the force of bodies; and, whilſt he owns, in oppoſition to Des Cartes, that the former varies, to maintain that the quantity of force is for ever the ſame in the univerſe, and to meaſure the forces of bodies by the ſquares of their velocities.

This ſyſtem alſo requires the utter excluſion of atoms, or of any perfectly hard and inflexible bodies. The advocates of it allege, that, according to the law of continuity, as they call a law of nature invented for the ſake of the theory, all changes in nature are produced by inſenſible and infinitely ſmall degrees; ſo that no body can, in any caſe, paſs from motion to reſt, or from reſt to motion, without paſſing through all poſſible intermediate degrees of motion: whence they conclude, that atoms, or perfectly hard bodies, are impoſſible; becauſe, if two of them ſhould meet with equal motions, in contrary directions, they would neceſſarily ſtop at once, in violation of the law of continuity.

Mr. Leibnitz propoſes two principles as the foundation of all our knowledge; the firſt, that it is impoſſible for a thing to be and not to be at the ſame time, which, he ſays, is the foundation of ſpeculative truth: the other is, that nothing is without a ſufficient reaſon why it ſhould be ſo rather than otherwiſe; and by this principle, according to him, we make a tranſition from abſtracted truths to natural philoſophy. Hence he concludes, that the mind is naturally determined, in its volitions and elections, by the greateſt apparent good; and that it is impoſſible to make a choice between things perfectly like, which he calls *indiſcernibles*: from whence he infers, that two things perfectly alike could not have been produced even by the Deity: and he rejects a vacuum, partly becauſe the parts of it muſt be ſuppoſed perfectly like to each other. For the ſame reaſon he alſo rejects atoms, and all ſimilar particles of matter, to each of which, though diviſible, *in infinitum* he aſcribes a *monad* (Act. Lipſiæ 1698, p. 435.) or active kind of principle, endued, as he ſays, with perception and appetite. The eſſence of ſubſtance he places in action or activity, or, as he expreſſes it, in ſomething that is between acting and the faculty of acting. He aſſirms abſolute reſt to be impoſſible; and holds motion, or a ſort of *niſus*, to be eſſential to all material ſubſtances. Each monad he deſcribes as repreſentative of the whole univerſe from its point of ſight; and after all, in one of his letters he tells us, that matter is not a ſubſtance, but a *ſubſtantiatum*, or *phenoméne bien fondé*. He frequently urges the compariſon between the effects of oppoſite motives on the mind, and of weights placed in the ſcales of a balance, or of powers acting upon the ſame body with contrary directions. His learned antagoniſt Dr. Clarke denies that there is a ſimilitude between a balance moved by weights, and a mind acting upon the view of certain motives; becauſe the one is entirely paſſive, and the other not only is acted upon, but acts alſo. The mind, he owns, is purely paſſive in receiving the impreſſion of the motive, which is only a perception, and is not to be confounded with the power of acting after, or in conſequence of, that perception. The difference between a man and a machine does not conſiſt only in ſenſation and intelligence, but in this power of acting alſo. The balance, for want of this power, cannot move at all when the weights are equal; but a free agent, he ſays, when there appear two perfectly alike reaſonable ways of acting, has ſtill within itſelf a power of chooſing, and it may have ſtrong and very good reaſons not to forbear.

The tranſlator of Moſheim's Eccleſiaſtical Hiſtory obſerves, that the progreſs of Arminianiſm has declined in Germany and ſeveral parts of Switzerland, in conſequence of the influence of the Leibnitzian and Wolfian philoſophy. Leibnitz and Wolf, by attacking that liberty of indifference which is ſuppoſed to imply the power of acting not only without but

againſt motives, ſtruck, he ſays, at the very foundation of the Arminian ſyſtem. He adds, that the greateſt poſſible perfection of the univerſe, conſidered as the ultimate end of creating goodneſs, removes from the doctrine of predeſtination thoſe arbitrary procedures and narrow views with which the Calviniſts are ſuppoſed to have loaded it, and gives it a new, a more pleaſing, and a more philoſophical aſpect. As the Leibnitzians laid down this great end as the ſupreme object of God's univerſal dominion, and the hope to which all his diſpenſations are directed; ſo they concluded, that if this end was propoſed, it muſt be accompliſhed. Hence the doctrine of neceſſity, to fulfil the purpoſes of a predeſtination founded in wiſdom and goodneſs; a neceſſity phyſical and mechanical, in the motions of material and inanimate things, but a neceſſity moral and ſpiritual in the voluntary determinations of intelligent beings, in conſequence of propellent motives, which produce their effects with certainty, though theſe effects be contingent, and by no means the offſpring of an abſolute and eſſentially immutable fatality. Theſe principles, ſays the ſame writer, are evidently applicable to the main doctrines of Calviniſm; by them predeſtination is confirmed, though modified with reſpect to its reaſons and its end; by them irreſiſtible grace (irreſiſtible in a moral ſenſe) is maintained upon the hypotheſis of propellent motives and a moral neceſſity: the perſeverance of the ſaints is alſo explicable upon the ſame ſyſtem, by a ſeries of moral cauſes producing a ſeries of moral effects.

LEICESTER, the capital of a county of the ſame name in England, upon the river Leire, now called *Soare*. From its ſituation on the foſſe-way, and the many coins and antiquities diſcovered here, it ſeems probable that it was a place of ſome note in the time of the Romans. In the time of the Saxons it was a biſhop's ſee, and afterwards ſo repaired and fortified by Edelflida, that it became, according to Matthew Paris, a moſt wealthy place, having 32 pariſh churches; but in Henry the Second's reign it was in a manner quite ruined, for joining in rebellion againſt him with Robert earl of Leiceſter. In the reign of Edward III. however, it began to recover by the favour of his ſon Henry Plantagenet, duke and earl of Lancaſter, who founded and endowed a collegiate church and hoſpital here. It is a borough and corporation, governed by a mayor, recorder, ſteward, bailiff, 24 aldermen, 48 common-council men, a ſolicitor, a town clerk, and two chamberlains. It had its firſt charter from king John. The freemen are exempt from paying toll in all the fairs and markets of England. It has three hoſpitals, that mentioned above, built by Henry Plantagenet duke of Lancaſter, and capable of ſupporting 100 aged people decently; another erected and endowed in the reign of Henry VIII. for 12 poor lazars; and another for ſix poor widows. The caſtle was a prodigious large building, where the duke of Lancaſter kept his court. The hall and kitchen ſtill remain entire, of which the former is very ſpacious and lofty; and in the tower over one of the gate-ways is kept the magazine for the county militia. There was a famous monaſtery here, antiently called, from its ſituation in the meadows, *St. Mary de Pratis* or *Prez*. In theſe meadows is now the courſe for the horſe-race. It is ſaid that Richard III. who was killed at the battle of Boſworth, lies interred in St. Margaret's church. The chief buſineſs of Leiceſter is the ſtocking-trade, which hath produced in general to the amount of 60,000 l. a year. In a parliament held here in the reign of Henry V. the firſt law for the burning of heretics was made, levelled againſt the followers of Wickliffe, who was rector of Lutterworth in this county, and where his pulpit is ſaid ſtill to remain. The town ſuffered greatly in the civil wars, by two ſieges upon the back of one another. It has given the title of *earl* to ſeveral noble families. The preſent earl was created in 1784, and is the marquis of Townſhend's ſon. Its market on Saturday is one of the greateſt in England for proviſions, eſpecially for corn and cattle; and it has four fairs in the year.

LEICESTERSHIRE, an inland county of England, in form almoſt circular. It has Nottinghamſhire and Derbyſhire to the north; Rutlandſhire and Lincolnſhire on the eaſt; Warwickſhire on the weſt, from which it is parted by the Roman military way called *Watling-ſtreet*; and by Northamptonſhire on the ſouth; and is about 170 miles in circumference. As it lies at a great diſtance from the ſea, and is free from bogs and marſhes, the air is ſweet and wholeſome. It is a champaign country in general, and abundantly fertile in corn and graſs, being watered by ſeveral rivers, as the Soure, or Sare, which paſſes through the middle of it, and abounds in excellent ſalmon and other fiſh; the Wreke, Trent, Eye, Senſe, Auker, and Aven. Theſe rivers being moſtly navigable greatly facilitate the trade of the county. In ſome parts there is a great ſcarcity of fuel, both wood and coal; but in the more hilly parts there is plenty of both, together with great flocks of ſheep. Beſides wheat, barley, oats, and peaſe, it produces the beſt beans in England. They grow ſo tall and luxuriant in ſome places, particularly about Barton in the Beans, that they look, towards the harveſt-time, like a foreſt; and the inhabitants eat them not only when they are green, as in other places, but all the year round; for which reaſon their neighbours nickname them *be n-bellics*. They have plenty of very good wool, of which they not only make great quantities of ſtockings, but ſend a great quantity unmanufactured into other parts of England. They make great profit of their corn and pulſe; and likewiſe breed great numbers of coach and dray horſes, moſt of the gentlemen being graziers; and it is not uncommon to rent graſs farms from 500 l. to 2000 l. a-year. It is in the midland circuit, and dioceſe of Lincoln; and ſends four members to Parliament, two for Leiceſter, and two for the county.

LEIGH (Sir EDWARD), a very learned Engliſhman, was born at Shawell in Leiceſterſhire, and educated at Magdalen Hall, Oxford. He was a member of the long parliament, and one of the members of the houſe of commons who were appointed to ſit in the aſſembly of divines. He was afterwards colonel of a regiment for the parliament; but in 1648 was numbered among the preſbyterians who were turned out, and in December he was impriſoned. From this period to the Reſtoration he employed himſelf in writing a conſiderable number of learned and valuable books, which ſhowed profound learning, a knowledge of the languages, and much critical ſagacity; and of which a liſt is given by Anthony Wood. Sir Edward died at his houſe called Ruſhall Hall, in Staffordſhire, June 2, 1671, and was buried in the chancel of Ruſhall church.

LEIGHLIN, a town of Ireland, ſituated in the county of Carlow, and province of Leinſter; about 43 miles from Dublin, near the river Barrow. It is a borough, and returns two members to parliament; patronage in the biſhop of the dioceſe, this being a biſhopric united to Ferns. At the eaſt end of the church of Old-Leighlin is a famous well covered with great aſh-trees, and dedicated to St. Laſarian. This place was formerly a city, though now a very mean village, and the cathedral has been kept in good repair. It was a *ſole* biſhopric, founded in 632, and joined to Ferns in 1600. It is reported, that Gurmundus a Daniſh prince was buried in this church. The laſt biſhop of Leighlin before its union with Ferns was the Right Rev. Robert Grave, who coming by ſea to be inſtalled, ſuffered ſhipwreck in the harbour of Dublin, and periſhed in the waves. This cathedral was burnt to the ground, it is ſaid, by lightning; and rebuilt A. D. 1232, then dedicated to St. Laſarian or Lazarinus, before mentioned: ſince

the fees were joined, it is made uſe of as a pariſh-church. Leighlin-bridge is ſituated about two miles from this village; it was deſtroyed by the Iriſh in 1577. Here are the remains of a caſtle and of an old abbey. This is a poſt town, and has fairs in May, September, and October.

LEINSTER, the eaſtern province of Ireland, bounded by Ulſter on the north; St. George's, or the Iriſh Channel, on the eaſt and ſouth; and by the provinces of Connaught and Munſter on the weſt. The capital city of this province, and of the kingdom, is Dublin. It contains 12 counties, viz. Carlow, Dublin, Kildare, Kilkenny, King's county, Longford, Louth, Meath, Queen's county, Weſt-meath, Wexford, and Wicklow. It is the moſt level and beſt cultivated province in the kingdom; containing 2,642,958 Iriſh plantation acres, 858 pariſhes, 99 baronies, and 53 boroughs; it is about 124 miles long and 74 broad, and extends from 51° 45′ to 55° 45′ north latitude. Dermod king of Leinſter marrying his daughter Eva to Strongbow earl of Pembroke, on his deceaſe made him his univerſal heir; whereby the Earl inherited the province of Leinſter, and was afterwards enfeoffed of it by Henry II. He died in 1176, and left an only daughter Iſabel, eſpouſed to William Marſhal earl of Pembroke; by her he had five ſons, who ſucceeded to his great eſtates in Leinſter. This province gives title of duke to the ancient and noble family of Fitzgerald. In the early ages, this diſtrict was almoſt one continued foreſt, and was principally the ſeat of the Kinſelaghs.

LEIPSIC, a large, ſtrong, and populous town of Miſnia in Germany, with a caſtle and a famous univerſity. It is neat, and regularly built, and the ſtreets are lighted in the night; it carries on a great trade, and has a right to ſtop and ſell the merchandizes deſigned to paſs through it, and the country for 75 miles round has the ſame privilege. There are three great fairs every year; at the beginning of the year, Eaſter and Michaelmas, which laſt 15 days each. There are ſix handſome colleges belonging to the univerſity, beſides the private colleges. The town-houſe makes an indifferent appearance, but the exchange is a fine ſtructure. The town was taken by the king of Pruſſia in the late war, but given up by the peace in 1763. It is ſeated in a plain between the rivers Saale and Muld, near the confluence of the Playſſe, the Elſter, and the Barde. E. long 12. 55. N. lat. 51. 19

LEITH, (anciently called *Inverleith*), the port of Edinburgh, is ſeated on the banks of the Forth, about two miles from the capital. It is built on both ſides of the harbour; by which it is divided into two parts, called *North* and *South Leith*. The communication between theſe was by a ſtone bridge of three arches, founded by Robert Ballentyne abbot of Holyrood houſe in 1493, but lately pulled down. The harbour is formed by the conflux of the rivulet called the *Water of Leith* with the Frith of Forth. The depth of the water, at neap-tides, is about nine feet; but in high ſpring tides it is about 16 feet. In the beginning of the preſent century, the town-council of Edinburgh improved the harbour at an enormous expence, by extending a ſtone-pier a conſiderable way into the ſea. In 1777 they erected an additional ſtone quay towards its weſt ſide. Upwards of 100 ſhips could then lie conveniently in this port: but it can now admit of a much greater number, in conſequence of having lately undergone great improvements. The road of Leith affords good anchorage for ſhips of the greateſt ſize.

The harbour was granted to the community of Edinburgh by king Robert in 1329; but the banks of the harbour belonged to Logan of Reſtalrig, a turbulent and ambitious baron, from whom the citizens were under the neceſſity of purchaſing the bank or waſte piece of ground between the houſes and the rivulet above mentioned, for the purpoſes of wharfs, as well as for erecting ſhops and granaries, neither of which they could do before. As the ſituation of Leith, however, is much more convenient for trade than that of Edinburgh, which is two miles diſtant from the harbour, the inhabitants of the latter place have fallen upon various methods of reſtraining the trade of Leith.

On the breaking out of the diſturbances at the Reformation, the queen-regent cauſed the whole town to be fortified, that the French troops might have a more ready inlet into the kingdom; and it was accordingly ſurrounded with a wall, having eight baſtions. In the time of Charles I. a fortification was erected at Leith by the Covenanters. Cromwell built a ſtrong fort at the place ſtill called the *Citadel* in North-Leith; but it was pulled down on the Reſtoration of Charles II. by order of government. A gate with porteculliſes is the preſent remains of that fortification.—A palace alſo appears to have formerly ſtood here, ſituated at the north-eaſt boundaries of the former town, on the ſpot where the preſent weigh-houſe ſtands. It was deſtroyed by the Engliſh in the time of Henry VIII. The remains of this building, called the *king's work*, with a garden, and a piece of waſte land that ſurrounded it, was erected into a barony by James VI. and beſtowed upon Bernard Lindſay of Lochill, groom of the chamber to that prince. He is ſaid to have fully repaired, and appropriated it to the recreations of the court; but it ſoon fell from its dignity, and became ſubſervient to much more ignoble purpoſes. The tennis-court was converted into a weigh-houſe; and the ſtreet which bounds it ſtill bears the name of the founder, from whom it is called *Bernard's Nook*.

As Leith lay within the pariſh of Reſtalrig, the church of Reſtalrig was of conſequence the place of worſhip for the inhabitants of Leith; but in 1650 the Aſſembly ordered that church to be pulled down as a monument of idolatry, ſo that Leith wanted a pariſh-church for upwards of 50 years. During that period they reſorted for worſhip to a large and beautiful chapel already built, and dedicated to St. Mary, which is now called *South Leith church*; and in 1709 this chapel was by authority of parliament declared to be the pariſh church of the diſtrict; ſo that Reſtalrig is now in the pariſh of South-Leith, as the latter was formerly in that of Reſtalrig. In 1772, a Chapel of Eaſe was erected by the inhabitants, as the pariſh-church was inſufficient to contain the number of hearers. There are alſo an epiſcopal and ſeveral diſſenting congregations in Leith. North-Leith is a pariſh by itſelf, and the church is ſituated at what was the north end of the old bridge.

Though a very great trade is carried on between Leith and many foreign ports, yet the articles of export and import fluctuate ſo much, that it would be uſeleſs to enter into any details either as to ſpecies or quantity. The coaſting trade is at preſent the principal branch that employs the ſhipping at Leith, including thoſe which belong to other ports on the Forth, which are ſaid to make about one fourth of the tonnage of the Leith veſſels. The ſhips employed in the London trade are in general of a large ſize, and furniſhed with tolerable accommodations for paſſengers. They make at an average four voyages up and down in the year. The largeſt ſhips in this port, however, are thoſe employed in the Greenland fiſhery.

The manufactures of Leith are ropes, ſail-cloth, cordage; glaſs bottles; ſoft ſoap and candles. Beſides theſe, there are manufactories for making cards with which wool is combed, carpets, &c. and ſeveral iron-forges.

The inhabitants of Leith were divided into four claſſes; and theſe erected into corporations by the queen dowager, Mary of Lorraine. Theſe were mariners, maltmen, trades, and traffickers. The firſt of theſe conſiſted of ſhipmaſters and ſailors; the ſecond, of malt-makers and brewers, the third of coopers, bakers, ſmiths, wrights, &c.; and the fourth, of merchants and ſhop-keepers. Of theſe corporations the mariners are the

moſt conſiderable. Oppoſite to South-Leith church there is a large houſe belonging to them, called the *Trinity-hoſpital*, becauſe originally conſecrated to the Holy Trinity. In this houſe ſome of their poor uſed formerly to be maintained, but now they are all out-penſioners. Adjoining to the ſchool-houſe there is another hoſpital, called *King James's Hoſpital*; and bears upon its front the cypher and arms of that prince. Here ſome poor women belonging to the other corporations are maintained.

Leith is ſuppoſed to contain about thirteen thouſand inhabitants. The government of the town is veſted in a magiſtrate ſent from Edinburgh, having admiral's power; and in two reſiding bailies elected by the town-council.

LEITRIM, a county of Ireland, ſituated in the province of Connaught, is bounded on the north by the bay of Donnegal and part of Fermanagh, on the ſouth and weſt by Sligo and Roſcommon, and on the eaſt by Fermanagh and Cavan. It is a fruitful county, and, though mountainous, produces great herds of black cattle, but has few places of note. It contains 206,830 Iriſh plantation acres, 21 pariſhes, 5 baronies, and 2 boroughs, and ſends ſix members to parliament. It is about 42 miles long, and 17 broad.

LEITRIM, the ſhire town of the county of that name, is pleaſantly ſituated on the banks of the river Shannon, about 80 miles from Dublin, and appears to have been formerly a place of ſome note. St Mac Leigus, ſon of Cernac, was biſhop here: and his feſtival is obſerved on the 8th of February. It has ſix fairs in the year.

LEIXLIP, a poſt and fair town of Ireland, pleaſantly ſituated in the county of Kildare and province of Leinſter, about 8 miles from Dublin. Near it are the ruins of the church and caſtle of Confy. The caſtle of Leixlip is beautifully ſeated on the banks of the river Liffey; it is a fine edifice, with large and pleaſant gardens, at one ſide of which is a fine waterfall, called the *Salmon leap*, there being plenty of that ſpecies of fiſh hereabouts. A mile from this is Caſtletown, the magnificent ſeat of Mr. Conolly. There are three fairs here in the year.

LELAND (JOHN) the great Engliſh antiquary, was born in London about the year 1507. Having loſt his parents when a child, he had the good fortune to find a friend and patron in one Mr. Thomas Miles, who placed him in St. Paul's ſchool, of which the grammarian Lilye was maſter. From that ſchool he was ſent to Chriſt's College, Cambridge; whence, after ſome years reſidence, he removed to All Souls, Oxford. From Oxford he went to Paris, chiefly with a deſign to ſtudy the Greek language, which at that time was but little underſtood in this kingdom. On his return to England he took orders, and was ſoon appointed chaplain to king Henry VIII. who alſo gave him the rectory of Poppeling, in the marſhes of Calais, appointed him his librarian, and in 1533 granted to him, by commiſſion under the great ſeal, the office of king's antiquary; an office never borne by any other perſon before or ſince. By this commiſſion he was empowered to ſearch for ancient writings in all the libraries of colleges, abbeys, priories, &c. in his majeſty's dominions. We are told by his laſt biographer, that he renounced popery ſoon after his return to England; but he quotes no authority. Be this as it may, in 1536 he obtained a diſpenſation to keep a curate at Poppeling, and ſet out on his journey in ſearch of antiquities. In this employment he ſpent ſix years, during which time he viſited every part of England where monuments of antiquity were to be expected. After his return, in the year 1542, he was preſented by the king to the rich rectory of Haſeley in Oxfordſhire, and in the following year he gave him a prebend of King's College, now Chriſt's Church, in Oxford, beſides that of Eaſt and Weſt Knowle, in the cathedral of Saliſbury. Being thus amply provided for, he retired to a houſe of his own in the pariſh of St. Michael le Querne in London, where he ſpent ſix years more in digeſting the materials which he had collected. King Henry VIII. died in 1547; and, in a ſhort time after, poor Leland loſt his ſenſes. He was at firſt ſeized with a deep melancholy, which was ſucceeded by a total deprivation of his reaſon. In this dreadful ſtate he continued till the beginning of the year 1552, when he was happily releaſed by death. He was buried in the church of St Michael le Querne, which was deſtroyed by the fire in 1666. Mr. Leland is remembered as a man of great learning, an univerſal linguiſt, an excellent Latin poet, and a moſt indefatigable and ſkilful antiquary. On his death king Edward VI. gave all his papers to Sir John Cheeke, his tutor and Latin ſecretary of ſtate. The king dying, and Sir John being obliged to leave the kingdom, he gave four folio volumes of Leland's collections to Humphrey Pureſoy, Eſq. which, in 1612, were by his ſon given to William Burton, author of the Hiſtory of Leiceſterſhire. This gentleman alſo became poſſeſſed of the Itinerary, in 8 vols. folio, which, in 1632, he depoſited in the Bodleian library. Many other of Leland's manuſcripts, after the death of Sir John Cheeke, fell into the hands of lord Paget, Sir William Cecil, and others, which at laſt fortunately came into the poſſeſſion of Sir John Cotton. Theſe manuſcripts were of great uſe to all our ſubſequent antiquarians, particularly Cambden, Sir William Dugdale, Stowe, Lambard, Dr. Batteley, Ant. Wood, &c. His Itinerary throughout moſt parts of England and Wales, was publiſhed by Mr. Hearne, 9 vols. 8vo. in 1710-11; as was alſo his *Collectanea de rebus Britannicis*, 6 vols. 8vo, in 1715.

LELAND (John), well known by his writings in defence of Chriſtianity, was born at Wigan in Lancaſhire in 1691, of eminently pious and virtuous parents. They took the earlieſt care to ſeaſon his mind with proper inſtructions; but, in his ſixth year, the ſmall pox deprived him of his underſtanding and memory, and expunged all his former ideas. He continued in this deplorable ſtate near a twelvemonth, when his faculties ſeemed to ſpring up anew; and though he did not retain the leaſt traces of any impreſſions made on him before the diſtemper, yet he now diſcovered a quick apprehenſion and ſtrong memory. In a few years after his parents ſettled in Dublin, which ſituation gave him an eaſy introduction to learning and the ſciences. When he was properly qualified by years and ſtudy, he was called to be paſtor to a congregation of Proteſtant diſſenters in that city. He was an able and acceptable preacher, but his labours were not confined to the pulpit. The many attacks made on Chriſtianity, and by ſome writers of no contemptible abilities, engaged him to conſider the ſubject with the exacteſt care, and the moſt faithful examination. Upon the moſt deliberate inquiry, the truth and divine original, as well as the excellence and importance of Chriſtianity, appearing to him with great luſtre, he publiſhed anſwers to ſeveral authors who ſucceſſively appeared in that cauſe. He was indeed a maſter in this controverſy; and his hiſtory of it, ſtyled "A View of the Deiſtical Writers that have appeared in England in the laſt and preſent Century, &c." is very greatly and deſervedly eſteemed. In the decline of life he publiſhed another laborious work, entitled, "The Advantage and Neceſſity of the Chriſtian Revelation, ſhown from the State of Religion in the ancient Heathen World, eſpecially with reſpect to the Knowledge and Worſhip of the One true God; a Rule of moral Duty, and a State of future Rewards and Puniſhments; to which is prefixed, a long and preliminary Diſcourſe on Natural and Revealed Religion." 2 vols. 4to. This noble and extenſive ſubject, the ſeveral parts of which have been ſlightly and occaſionally handled by other writers, Leland has treated at large with the greateſt care, accuracy and candour. And, in his "View of the Deiſtical Writers," his cool and diſpaſſionate manner of treating their arguments, and his ſolid confutation of them,

have contributed more to depreſs the cauſe of atheiſm and infidelity, than the angry zeal of warm diſputants. But not only his learning and abilities, but alſo his amiable temper, great modeſty, and exemplary life, recommended his memory to general eſteem and affection. He died in 1766.

LELEGEIS, the ancient name of Miletus, from the Leleges, the firſt inhabitants of it.

LELEGES, anciently a people of Aſia, of Greek original; the name denoting "a collection of people:" they firſt occupied the iſlands; then paſſing over to the continent, they ſettled partly in Myſia on the Sinus Adramyttenus, and partly in that part of Ionia next Caria. There were Leleges alſo of Laconia. Theſe went to the Trojan war with Altes their king. Achilles plundered their country, and obliged them to retire to the neighbourhood of Halicarnaſſus, where they fixed their habitation.—The inhabitants of Laconia and of Megara alſo bore this name for ſome time, from Lelex, one of their kings.

LELEX, an Egyptian who came with a colony to Megara, where he reigned about 200 years before the Trojan war. His ſubjects were called from him *Leleges*.—Alſo the name of a Greek who was the firſt king of Laconia in Peloponneſus. His ſubjects were alſo called *Leleges*, and the country where he reigned *Lelegia*.

LELY (Sir Peter), an excellent painter, born in Weſtphalia in the year 1617. He was placed as a diſciple with Peter Grebber at Haerlem; and in 1641 was induced, by the encouragement Charles I. gave to the fine arts, to come to England. He became ſtate painter to Charles II. who knighted him; and being as complete a gentleman as a painter, that king took pleaſure in converſing with him. He practiſed portrait-painting, and ſucceeded ſo well that he was preferred before all his cotemporaries. Hence he became perpetually involved in buſineſs; ſo that he was thereby prevented from going into Italy to finiſh the courſe of his ſtudies, which in his younger days he was very deſirous of: however, he made himſelf amends, by getting the beſt drawings, prints, and paintings, of the moſt celebrated Italian maſters. Among theſe were the better part of the Arundel Collection, which he had from that family, many whereof were ſold after his death at prodigious rates, bearing upon them his uſual mark of P. L.—The advantage he reaped from this collection, the beſt choſen of any one of his time, appears from that admirable ſtyle which he acquired by daily converſing with the works of thoſe great maſters. In his correct draught and beautiful colouring, but more eſpecially in the graceful airs of his heads, and the pleaſing variety of his poſtures, together with the gentle and looſe management of the draperies, he excelled moſt of his predeceſſors. Yet the critics remark, that he preſerved in almoſt all his female faces a drowſy ſweetneſs of the eyes peculiar to himſelf; for which he is reckoned a manneriſt. The hands of his portraits are remarkably fine and elegantly turned; and he frequently added landſcapes in the back-grounds of his pictures, in a ſtyle peculiar to himſelf, and better ſuited to his ſubject than moſt men could do. He excelled likewiſe in crayon painting. He was familiar with, and much reſpected by, perſons of the greateſt eminence in the kingdom. He became enamoured of a beautiful Engliſh lady, to whom he was ſome time after married; and he purchaſed an eſtate at Kew, in the county of Surrey, to which he often retired in the latter part of his life. He died of an apoplexy in 1680 at London, and was buried at Covent-garden church, where a marble monument was erected to his memory, with his buſt, carved by Mr. Gibbons, and a Latin epitaph, written, as is ſaid, by Mr. Flatman.

LEMBERG, a town of Poland, capital of Red Ruſſia, ſeated in the palatinate of Lemburg, on the river Pelteu. It is pretty well fortified, and defended by two citadels, one of which is ſeated on an eminence without the town. The ſquare, the churches, and the public buildings, are magnificent, and it is a large and rich trading place. It has a Roman catholic archbiſhop, and an Armenian as well as a Ruſſian biſhop; but the Proteſtants are not tolerated. This city was reduced to the laſt extremity by the rebel Coſſacs and Tartars, and was forced to redeem itſelf with a large ſum of money. In 1672 it was beſieged in vain by the Turks; but in 1704 was taken by ſtorm by Charles XII. of Sweden. E. long. 24. 46. N. lat. 49. 51.

LEMERY (Nicholas), a celebrated chemiſt, born at Rouen in Normandy in 1645. After having made the tour of France, he in 1672 commenced an acquaintance with M. Martyn, apothecary to Monſieur the Prince, and performed ſeveral courſes of chemiſtry in the laboratory of this chemiſt at the Hotel de Condé, which brought him to the knowledge and eſteem of the prince. He provided himſelf at length with a laboratory of his own, and might have been made a doctor of phyſic; but he choſe to continue an apothecary, from his attachment to chemiſtry, in which he opened public lectures; and his confluence of ſcholars was ſo great as ſcarcely to allow him room to perform his operations. The true principles of chemiſtry in his time were but ill underſtood: Lemery was the firſt who aboliſhed the ſenſeleſs jargon of barbarous terms, reduced the ſcience to clear and ſimple ideas, and promiſed nothing that he did not perform. In 1681 he was diſturbed on account of his religion, and came to England, where he was well received by Charles II: but affairs not promiſing him the ſame tranquillity, he returned to France, and ſought for ſhelter under a Doctor's degree; but the revocation of the edict of Nantz drove him into the Romiſh communion to avoid perſecution. He then became aſſociate chemiſt and penſionary in the royal academy of ſciences, and died in 1715. He wrote, A courſe of chemiſtry; An univerſal pharmacopœia; An univerſal treatiſe of drugs; and, A treatiſe on antimony.

LEMING, in zoology. See Mus.

LEMMA, (of λαμβανω, "I aſſume,") in mathematics, denotes a previous propoſition, laid down in order to clear the way for ſome following demonſtration; and prefixed either to theorems, in order to render their demonſtration leſs perplexed and intricate; or to problems, to make their reſolution more eaſy and ſhort. Thus, to prove a pyramid one third of a priſm, or parallelopiped, of the ſame baſe and height with it, the demonſtration whereof in the ordinary way is difficult and troubleſome; this lemma may be premiſed, which is proved in the rules of progreſſion, that the ſum of the ſeries of the ſquares, in numbers in arithmetical progreſſion, beginning from 0, and going on 1, 4, 9, 16, 25, 36, &c. is always ſubtriple of the ſum of as many terms, each equal to the greateſt; or is always one third of the greateſt term multiplied by the number of terms. Thus, to find the inflection of a curve line, this lemma is firſt premiſed, that a tangent may be drawn to the given curve in a given point.

So in phyſics, to the demonſtration of moſt propoſitions, ſuch lemmata as theſe are neceſſary firſt to be allowed: that there is no penetration of dimenſions; that all matter is diviſible; and the like. As alſo in the theory of medicine, that where the blood circulates, there is life, &c.

LEMNA, duck-meat, in botany; a genus of the diandria order, belonging to the monœcia claſs of plants: and in the natural method ranking under the 54th order, *Miſcellaneæ*. The male calyx is monophyllous; there is no corolla; the female calyx monophyllous; there is no corolla, one ſtyle; the capſule unilocular. There are three ſpecies, all natives of Britain, growing frequently in ditches and the ſhallow parts of ſtagnant waters. All of them are acceptable food for ducks and geeſe.

LEMNIAN-EARTH, *Terra Lemnia*, a medicinal, aſtringent

ſort of earth, of a fatty conſiſtence and reddiſh colour; uſed in the ſame caſes as BOLE. It has its name from the iſland of Lemnos, whence it is chiefly brought. Many form it into round cakes, and impreſs a ſeal upon it; whence it is alſo called *terra ſigillata*. A ſort is ſaid to be imported from Senegal, which is not properly an earth, though ſo called, but compoſed of the dried pulp of the fruit of the BAOBAB.

LEMNIUS (LÆVINUS), a famous phyſician, born at Ziric-Zee in Zealand in 1505. He practiſed phyſic with applauſe; and after his wife's death being made prieſt, became canon of Ziric-Zee, where he died 1560. He left ſeveral eſteemed works, the principal of which is entitled *De occultis naturæ miraculis*.

LEMNOS (anc. geog.), a noble iſland in the Ægean ſea, near Thrace, called alſo *Dipolis*, from its conſiſting of two towns. The firſt inhabitants were the Pelaſgi, or rather the Thracians, who were murdered by their wives. After them came the children of the Lemnian widows by the Argonauts, whoſe deſcendants were at laſt expelled by the Pelaſgi, about 1100 years before the Chriſtian æra. Lemnos is about 112 miles in circumference, according to Pliny; who ſays, that it is often ſhadowed by mount Athos, though at the diſtance of 87 miles. It has been called *Hipſipyle*, from queen Hipſipyle. It is famous for a certain kind of earth or chalk called *terra Lemnia*, or *terra ſigillata*, from the ſeal or impreſſion which it can bear, and which is uſed for conſolidating wounds. As the inhabitants were blackſmiths, the poets have taken occaſion to fix the forges of Vulcan in that iſland, and to conſecrate the whole country to his divinity. Lemnos is alſo celebrated for a labyrinth, which, according to ſome traditions, ſurpaſſed thoſe of Crete and Egypt. Some remains of it were ſtill viſible in the age of Pliny. The iſland of Lemnos was reduced under the power of Athens by Miltiades.

LEMON, in botany. See CITRUS.

LEMON-*Iſland*, one of the Skelig-iſlands ſo called; ſituated off the coaſt of the county of Kerry, in the province of Munſter in Ireland. It is rather a round rock, always above water, and therefore no way dangerous to ſhips. An incredible number of gannets and other birds breed here; and it is remarkable that the gannet neſtles no where on the ſouthern coaſts of Ireland but on this rock, though many of them are ſeen on all parts of our coaſts on the wing. There is another rock on the northern coaſt of Ireland remarkable for the ſame circumſtance.

LEMONADE, a liquor prepared of water, ſugar, and lemon or citron juice; it is very cooling and grateful.

LEMOVICES, a people of Aquitania, ſituated between the Bituriges Cubi to the north, the Arverni to the eaſt, the Cadurci to the ſouth, and the Pictones to the weſt. Now the *Limoſin* and *La Marche*.

LEMUR, the MAUCAUCO, in zoology, a genus of quadrupeds belonging to the order of primates, the characters of which are theſe: There are four fore-teeth in the upper jaw, the intermediate ones being remote; and ſix long, compreſſed, parallel teeth in the under jaw; the dog-teeth are ſolitary, and the grinders are ſomewhat lobated.

1. The *tardigradus*, or tail-leſs maucauco, a ſmall animal found in Bengal and the iſland of Ceylon. It is of a very ſingular conſtruction, and perhaps longer in proportion to its thickneſs than any other quadruped. The head is roundiſh, with a ſharp-pointed noſe, and ſmall ears: the body is covered with ſhort, ſoft, and ſilky aſh-coloured and reddiſh fur: the toes are naked, and the nails flat; excepting thoſe of the inner toe on each hind foot, which are long, crooked, and ſharp. The length of the animal from the noſe to the rump is ſixteen inches.—It lives in the woods, and feeds on fruits: In a tame ſtate, it appears to be fond of eggs, and it would alſo greedily devour ſmall birds. This animal has the inactivity of the ſloth, and creeps ſlowly along the ground: it is very tenacious of its hold, and makes a plaintive noiſe.—A variety of the above, or according to Mr. Pennant a diſtinct ſpecies, is,

2. The *loris* of Buffon, or *tardigradus* of Seba. It has a produced dog-like viſage, with the forehead high above the noſe: the ears are large, thin, and rounded: the body is ſlender and weak: limbs are very long and ſlender; and thumb on each foot is more diſtinct, and ſeparate from the toes: the hair on the body is univerſally ſhort, and delicately ſoft; the colour on the upper part tawny, beneath whitiſh. In length, from the tip of the noſe to the anus, the animal is only eight inches. It differs totally in form and in nature from the preceding; and notwithſtanding the epithet of *tardigradus* or *ſloth* given in Seba, it is very active, and aſcends trees moſt nimbly. It has the actions of an ape; and, if we credit Seba, the male climbs the trees, and taſtes the fruits before it preſents them to its mate.

3. The *mongooz*, or woolly maucauco, inhabits Madagaſcar, and the iſlands to the eaſtward as far as Celebes. It is about the ſize of a cat, and has the whole upper part of the body covered with long, ſoft, and thick fur, a little curled or waved, of a deep browniſh aſh-colour: the tail is very long, covered with the ſame ſort of hair, and of the ſame colour. It lives on fruits, turns its tail over its head to protect it from rain, and ſleeps on trees: it is very ſportive and good-natured, and very tender.

4. The *catta*, or ring-tailed maki, inhabits Madagaſcar and the neighbouring iſles. It is of the ſize of a cat; has the hair on the top and hind-part of the head of a deep aſh-colour, the back and ſides reddiſh, the belly and inſides of the limbs white: all its hair is very ſoft, cloſe and fine, and erect like the pile of velvet: the tail is twice the length of the body. It is very good-natured, and has all the life of a monkey, without its miſchievous diſpoſition: it is very cleanly, and has a weak cry. In a wild ſtate they go in troops of 30 or 40, and are eaſily tamed when taken young.

5. The *caudatus-niger*, or ruffed maucauco, (the *Vari* of Buffon), is alſo an inhabitant of Madagaſcar. It is ſomewhat larger than the laſt, and has long hair ſtanding out round the ſides of the head like a ruff; a long tail; the colour of the whole animal generally black, but ſometimes white ſpotted with black. In a wild ſtate, it is very fierce; and makes ſuch a violent noiſe in the woods, that the cries of two might be eaſily miſtaken for the noiſe made by a hundred.

6. The *volans*, or flying maucauco, reſembles a bat; being furniſhed with a ſtrong membrane like that animal, by which it is enabled to fly. It inhabits the country about Guzarat, the Molucca iſles, and the Philippines; feeds on the fruits of the trees, and is very diſtinct both from the bat and flying ſquirrel. Its hiſtory, however, is very little known.

7. The *tarſier* of Buffon (ranked by Mr. Pennant under this genus) has a pointed viſage; ſlender noſe, bilobated at the end: eyes large and prominent: ears erect, broad, naked, ſemitranſparent, an inch and a half long, with a tuft of hairs between them on the top of the head, and long hairs on each ſide of the noſe and on the upper eye-brow. In each jaw are two cutting and two canine teeth; which form an exception in this genus. There are four long ſlender toes and a diſtinct thumb on each foot; the thumbs on the hind feet very broad and greatly dilated at their ends: the tail is almoſt naked; the greater part round and ſcaly like that of a rat, but growing hairy towards the end, which is tufted. The penis is pendulous; and the ſcrotum and teſticles are of a vaſt ſize in proportion to the animal. The length of the animal from noſe to tail is near ſix inches; to the hind toes eleven and a half, the hind legs, like thoſe of the jerboa, being of a great length: the tail is nine inches and a half long. It inhabits the

remoteſt iſlands of India, eſpecially Amboyna; and is called by the Macaſſars *podje*.

8. The *little* maucauco has a rounded head, ſharp noſe, long whiſkers; two canine teeth in each jaw; four cutting teeth in the upper jaw, ſix in the lower: ſeven grinders on each ſide; the neareſt ſharp, the more diſtant lobated: the ears are large, roundiſh, naked, and membranaceous; the eyes very large and full. The toes are long, and of unequal lengths; the ends round; the nails round, and very ſhort, except that of the firſt toe, which is long and ſharp: the tail is hairy, of the length of the body, and prehenſile. The animal is rather leſs than the black rat; and, in Mr. Pennant's opinion, ſeems to be the ſame which Buffon calls *le rat de Madagaſcar*. It is ſuppoſed to live in the palm-trees, and feed on fruits. It holds its food in its fore-feet like ſquirrels; is lively, and has a weak cry; and when it ſleeps, it rolls itſelf up.

There are three or four other ſpecies; thoſe above deſcribed are figured on Plate 5.

LEMURES, in antiquity, ſprites or hobgoblins; reſtleſs ghoſts of departed perſons, who return to terrify and torment the living. Theſe are the ſame with *larvæ*, which the ancients imagined to wander round the world, to frighten good people, and plague the bad. For which reaſon at Rome they had *lemur a* or feaſts inſtituted to appeaſe the manes of the defunct. See LARES.

Apuleius explains the ancient notion of manes thus: The ſouls of men releaſed from the bands of the body, and freed from performing their bodily functions, become a kind of dæmons or genii, formerly called *lemures*. Of theſe *lemures*, thoſe that were kind to their families were called *lares familiares*; but thoſe who, for their crimes, were condemned to wander continually, without meeting with any place of reſt, and terrified good men, and hurt the bad, are vulgarly called *larvæ*.

An ancient commentator on Horace mentions, that the Romans wrote *lemures* for *remures*; which laſt word was formed from Remus, who was killed by his brother Romulus, and who returned to earth to torment him. But Apuleius obſerves, that in the ancient Latin tongue *lemures* ſignifies the ſoul of a man ſeparated from the body by death.

LEMURIA, or LEMURALIA, a feaſt ſolemnized at Rome on the 9th of May, to pacify the manes of the dead, or in honour of the lemures. It was inſtituted by Romulus, to appeaſe the ghoſt of his murdered brother Remus, which he thought was continually purſuing him to revenge the horrid crime. The name lemuria is therefore ſuppoſed to be a corruption of Remuria, *i. e.* the feaſt of Remus. Sacrifices continued for three nights, the temples were ſhut up, and marriages were prohibited during the ſolemnity. A variety of whimſical ceremonies were performed, magical words made uſe of, and the ghoſts deſired to withdraw, without endeavouring to hurt or affright their friends above ground. The chief formalities were ablution, putting black beans into their mouths, and beating kettles and pans, to make the goblins keep their diſtance.

LENA, a great river of Siberia in Aſia, which takes its riſe in N. lat. 52. 30. and E. long. 124. 30. from Ferro. After traverſing a large tract of land, it divides itſelf into five branches about lat. 73°. Three of theſe run weſtward, and two eaſtward, by which it diſcharges itſelf into the Icy Sea. Its three weſtern mouths lie in 143° E. long. from Ferro, but the eaſtern ones extend to 153. The current is every where ſlow, and its bed entirely free from rocks. The bottom is ſandy, and the banks are in ſome places rocky and mountainous. Sixteen large rivers fall into the Lena during its courſe to the northern ocean.

LENÆA, a feſtival kept by the Greeks in honour of Bacchus, at which there was much feaſting and Bacchanalian jollity, accompanied with poetical contentions, and the exhibition of tragedies. The poor goat was generally ſacrificed on the occaſion, and treated with various marks of cruelty and contempt, as being naturally fond of browſing on the vine-ſhoots.

LENCICIA, a ſtrong town of Poland, and capital of a palatinate of the ſame name, with a fort ſeated on a rock. The nobility hold their diet here. It ſtands in a moraſs on the banks of the Bſura, in E. lon. 19. 25. N. lat. 52. 12.

LENFANT (JAMES), a learned French writer born in 1661. After ſtudying at Saumur, he went to Heidelberg, where he received impoſition of hands for the miniſtry in 1684. He diſcharged the functions of this character with great reputation there, as chaplain of the electreſs dowager Palatine, and paſtor in ordinary to the French church. The deſcent of the French into the Palatinate obliged our author to depart from Heidelberg in 1688. He went to Berlin, where the elector Frederic, afterward king of Pruſſia, appointed him one of the miniſters. There he continued 39 years, diſtinguiſhing himſelf by his writings. He was preacher to the queen of Pruſſia, Charlotta Sophia; and after her death, to the late king of Pruſſia. In 1707 he took a journey to England and Holland, where he had the honour to preach before Queen Anne; and might have ſettled in London, with the title of *chaplain to her majeſty*. In 1712 he went to Helmſtadt, in 1715 to Leipſic, and in 1725 to Breſlaw, to ſearch for rare books and MSS. It is not certain whether it was he that firſt formed the deſign of the *Bibliotheque Germanique*, which began in 1720; or whether it was ſuggeſted to him by one of the ſociety of learned men, which took the name of *Anonymous*, and who ordinarily met at his houſe. He died in 1728. His principal works are, 1. The Hiſtory of the Council of Conſtance, 2 vols. 4to. 2. A Hiſtory of the Council of Piſa, 2 vols. 4to. 3. The New Teſtament tranſlated from the Greek into the French, with Notes by Beauſobre and Lenfant, 2 vols. 4to. 4. The Hiſtory of Pope Joan, from Spanheim's Latin diſſertation. 5. Several pieces in the *Bibliotheque Choiſie*, *La Republique des Lettres*, *La Bibliotheque Germanique*, &c.

LENGLET (NICHOLAS DU FRESNOY, l'abbe), born at Beauvais in France in 1674, was a moſt fertile and uſeful French author, on a variety of ſubjects, hiſtorical, geographical, political, and philoſophical. The following deſerve particular notice: 1. A Method of Studying Hiſtory, with a Catalogue of the Principal Hiſtorians of every age and country, publiſhed in 1713; a work which eſtabliſhed his reputation as an hiſtorical writer: it was tranſlated into moſt of the modern languages, particularly our own, with conſiderable improvements, by Richard Rawlinſon, LL. D. and F. R. S. and publiſhed at London in 1730, in 2 vols. 8vo. 2. A Copious Abridgment of Univerſal Hiſtory and Biography, in chronological order, under the title of *Tablettes chronologiques*; which made its firſt appearance at Paris in 1744, in 2 vols. ſmall 8vo. and was univerſally admired by the literati in all parts of Europe. The author attended with great candour, as every writer ought, to well-founded judicious criticiſms. In future editions he made ſeveral alterations and improvements; and from one of theſe, we believe that of 1759, an Engliſh tranſlation was made, and publiſhed at London in 1762, in 2 vols. large 8vo. Du Freſnoy died in 1755: the Paris edition of 1759 was printed from the author's corrected copy; and the impreſſion being ſold off, another edition appeared in 1763, with conſiderable improvements by an unknown editor: to the biographical part, a great number of names of reſpectable perſons are added, not to be found in the former edition; and it has this ſuperior advantage in the hiſtorical parts, that the general hiſtory is brought down

to the year 1762. Du Freſnoy, however, has loaded his work with catalogues of ſaints, martyrs, councils ſynods, hereſies, ſchiſms, and other eccleſiaſtical matters, fit only for the libraries of Popiſh convents and ſeminaries.

LENGTH, the extent of any thing material from end to end. In duration, any ſpace of time, whether long or ſhort.

LENGTHENING, in ſhip-carpentry, the operation of cutting a ſhip down acroſs the middle, and adding a certain portion to her length. It is performed by ſawing her planks aſunder in different places of her length, on each ſide of the midſhip frame, to prevent her from being too much weakened in one place. The two ends are then drawn apart to a limited diſtance; which muſt be equal to the propoſed addition of length. An intermediate piece of timber is next added to the keel, upon which a ſufficient number of timbers are erected, to fill up the vacancy produced by the ſeparation. The two parts of the kelſon are afterwards united by an additional piece which is ſcored down upon the floor timbers, and as many beams as may be neceſſary are fixed acroſs the ſhip in the new interval. Finally, the planks of the ſide are prolonged ſo as to unite with each other; and thoſe of the ceiling refitted in the ſame manner; by which the whole proceſs is completed.

LENOX or DUNBARTON *Shire*, a county of Scotland, ſtretching 24 miles in length and 20 in breadth; is bounded on the ſouth by the river and frith of Clyde, on the weſt by Lochlong and Argyleſhire, on the north by the Grampian hills, and on the eaſt by Monteith and Stirlingſhire. Great part of this county conſiſts of hills and heaths, fit for nothing but paſturage and ſport; even in the lower lands, the ſoil is not extremely fertile: yet the face of the country is agreeably diverſified with hill, dale, mountain, heath, ſtreams, lakes, woods, and fields of corn: the ſhire is likewiſe beautified with a great number of agreeable ſeats and plantations, belonging to gentlemen of fortune. Part of this county is waſhed by the river Clyde in its courſe to the ſea: even at the caſtle of Dunbarton, the breadth of it amounts to two miles at high water, and it continues extending in width and depth until it joins the ocean. From the mouth of the Clyde, the two bays of Lochlong and Lochfyn make large indentations in the ſhire of Dunbarton. The only river of any conſideration that runs through this county is the Leven, the Lelanonius of Ptolemy, otherwiſe called *Levinia*, the Latin name for Lenox. The river Leven is a pure tranſparent paſtoral ſtream, that warbles over a bed of pebbles, through a delightful vale adorned with farms, ſeats, woods, and plantations. It derives its origin from the great lake called *Lochlomond*, of which indeed it is the overflowing, and, after a delightful meandering courſe of five or ſix miles, diſembogues itſelf into the Clyde at the caſtle of Dunbarton. But the greateſt curioſity of this county is Lochlomond itſelf, a vaſt body of freſh water, ſupplied by ſubterraneous ſprings and rivulets, ſurrounded with huge mountains, extending 25 miles in length, and in ſome places five miles in breadth, incredibly deep in every part, interſperſed with 24 verdant iſles, ſome of which are ſtocked with red deer, and inhabited. Nothing can be more wildly romantic than this part of the country during the ſummer-ſeaſon, on the ſouth ſide of the lake: the high road runs in ſome places through natural woods; overhung, on one hand, by ſteep mountains, covered with flowery heath; and on the other opening in long viſtas upon the lake, terminated by green iſlands that ſeem to float upon the water. Among the rivers of this ſhire we ſhall likewiſe mention the water of Blane, which, though itſelf an inconſiderable ſtream, hath been rendered famous by the birth of George Buchanan, the celebrated Latin poet and hiſtorian. He was born on the north ſide of the lake, not far from the place called *Buchanan*, where we may behold an elegant ſeat belonging to the duke of Montroſe, head of the noble family of Graham, ſo often diſtinguiſhed by its loyalty, integrity, and valour. The ſame part of this country gave birth to the great mathematician and naturaliſt, Napier, lord Merchiſton, inventor of the logarithms. The title of *Lenox*, with the property of great part of the ſhire, was heretofore veſted in a branch of the royal family of Stuart, with which it was reunited in the perſon of king James VI. whoſe father, Henry, lord Darnly, was ſon to the duke of Lenox. This prince conferred the title upon his kinſman, Eſme Stuart, ſon of John lord d'Aubigny in France: but, his race failing at the death of Charles duke of Lenox and Richmond, and the eſtate devolving to the crown, king Charles II. conferred both titles on his own natural ſon by the ducheſs of Portſmouth; and they are ſtill enjoyed by his poſterity. The people of Lenoxſhire are chiefly Lowlanders, though in ſome parts of it divine ſervice is performed in the Erſe language. The moſt numerous clans in this diſtrict are the Macfarlanes, the Colquhouns, and the Buchanans. They generally profeſs the Proteſtant faith, according to the Preſbyterian diſcipline; yet ſome of the gentlemen follow the Engliſh ritual. The commonalty are for the moſt part ſober, honeſt, and induſtrious; and, though they live poorly, are tall, vigorous, and healthy.

LENS, a piece of glaſs, or any other tranſparent ſubſtance, the ſurfaces of which are ſo formed, that the rays of light, by paſſing through it, are made to change their direction, either tending to meet in a point beyond the lens, or made to become parallel after converging or diverging; or, laſtly, proceeding as if they had iſſued from a point before they fell upon the lens. Some lenſes are convex, or thicker in the middle; ſome concave, or thinner in the middle; ſome plano-convex, or plano-concave; that is, with one ſide flat, and the other convex or concave; and ſome are called *meniſcuſes*, or convex on one ſide and concave on the other. See DIOPTRICS.

LENT, a ſolemn time of faſting in the Chriſtian church, obſerved as a time of humiliation before Eaſter, the great feſtival of our Saviour's reſurrection. Thoſe of the Romiſh church, and ſome of the Proteſtant communion, maintain, that it was always a faſt of 40 days, and, as ſuch, of apoſtolical inſtitution. Others think it was only of eccleſiaſtical inſtitution, and that it was variouſly obſerved in different churches, and grew by degrees from a faſt of 40 hours to a faſt of 40 days. This is the ſentiment of Morton, biſhop Taylor, Du Moulin, Daillé, and others.

Anciently, the manner of obſerving Lent among thoſe who were piouſly diſpoſed, was to abſtain from food till evening: their only refreſhment was a ſupper; and then it was indifferent whether it was fleſh or any other food, provided it was uſed with ſobriety and moderation. Lent was thought the proper time for exerciſing, more abundantly, every ſpecies of charity. Thus what they ſpared from their own bodies by abridging them of a meal, was uſually given to the poor; they employed their vacant hours in viſiting the ſick and thoſe that were in priſon, in entertaining ſtrangers, and reconciling differences. The imperial laws forbad all proſecution of men in criminal actions, that might bring them to corporal puniſhment and torture, during the whole ſeaſon. This was a time of more than ordinary ſtrictneſs and devotion, and therefore in many of the great churches they had religious aſſemblies for prayer and preaching every day. All public games and ſtage-plays were prohibited at this ſeaſon; as alſo the celebration of all feſtivals, birth-days, and marriages, as unſuitable to the preſent occaſion.

The Chriſtians of the Greek church obſerve four Lents:

the firſt commences on the 15th of November; the ſecond is the ſame with our Lent; the third begins the week after Whitſuntide, and continues till the feſtival of St. Peter and St. Paul; and the fourth commences on the firſt of Auguſt, and laſts no longer than till the 15th. Theſe Lents are obſerved with great ſtrictneſs and auſterity; but on Saturdays and Sundays they indulge themſelves in drinking wine and uſing oil, which are prohibited on other days.

LENTIL, in botany. See ERVUM.

LENTINI. See LEONTINI.

LENTISCUS, in botany. See PISTACIA.

LEO, in zoology. See FELIS.

LEO, in aſtronomy, the fifth of the 12 ſigns of the zodiac. The ſtars in the conſtellation *Leo* in Ptolemy's catalogue are 27, beſides the informes, which are 8; in Tycho's, 30; in the Britannic catalogue, 95.

LEO X. whoſe proper name was John de Medicis, is a pope ever to be remembered by Proteſtants, as having proved the cauſe of the reformation begun by Martin Luther. He had been honoured with a cardinal's hat at 14 years of age, and ſome years after with the dignity of legate by Julius II. He was in that quality in the army which was defeated by the French near Ravenna in 1512, where he was taken priſoner. The ſoldiers, who had overcome him, ſhowed him ſuch great veneration, that they humbly aſked his pardon for gaining the victory, beſought him to give them abſolution for it, and promiſed never to bear arms againſt the pope. When pope Julius died, Leo was very ill of the venereal diſeaſe at Florence, and was carried to Rome in a litter. His hurrying about every night to the cardinals of his faction, occaſioned the breaking of his ulcer; and the matter which ran from it exhaled ſuch a ſtench, that all the cells in the conclave, which were ſeparated only by thin partitions, were poiſoned by it. Upon this the cardinals conſulted the phyſicians of the conclave, to know what the matter was. They, being bribed, ſaid the cardinal de Medicis could not live a month; which ſentence occaſioned his being choſen pope. Thus cardinal de Medicis, then not 30 years of age, was elected pope upon a falſe information; and as joy is the moſt ſovereign of all remedies, he ſoon after recovered his health, ſo that the old cardinals had reaſon to repent their credulity.—He was better calculated for a temporal prince, being ambitious, politic, luxurious, a connoiſſeur in the fine arts, and an accompliſhed fine gentleman: thus qualified, it is no wonder that ſo young a pontiff, neglecting the true intereſt of his church, ſhould avail himſelf of the folly of religious dupes, and publicly ſell indulgences to ſupport his prodigality, eſpecially as he was known to diſbelieve Chriſtianity itſelf, which he called *A very profitable fable for him and his predeceſſors*. In 1517 he publiſhed general indulgences throughout Europe (and ordered the prieſts to recommend them) in favour of thoſe who would contribute any ſum towards completing the church of St. Peter; and this was the baſis of the reformation. See LUTHER and INDULGENCE. Leo died in 1521.

It is but juſtice to add, that to this pope was principally owing the revival of polite literature in Italy. He ſpared neither pains nor expence in recovering ancient manuſcripts, and procuring good editions of them; he favoured the arts and ſciences; and gloried in being the patron of learned and ingenious men, who in return have been very laviſh in his praiſe. Mr. Pope, in his Eſſay on Criticiſm, beſtows on him theſe harmonious lines:

> But ſee! each muſe in Leo's golden days
> Starts from her trance, and trims her wither'd bays;
> Rome's ancient Genius, o'er its ruins ſpread,
> Shakes off the duſt, and rears his rev'rend head.
> Then Sculpture and her ſiſter Arts revive:
> Stones leap to form, and rocks begin to live;
> With ſweeter notes each riſing temple rung;
> A Raphael painted, and a Vida ſung.

LEO (St.), a ſmall but ſtrong town of Italy, in the territory of the church and duchy of Urbino, with a biſhop's ſee. It is ſeated on a mountain near the river Marrechia, in E. lon. 12. 25. N. lat. 43. 57.

LEOMINSTER, a town of Herefordſhire, in England, ſeated on the river Lug, which waters the north and eaſt ſides of the town, and over which there are ſeveral bridges. It is a large, handſome, populous borough; and is a great thoroughfare betwixt South-Wales and London, from which laſt it is diſtant 113 meaſured miles. In king John's reign it was burnt, but ſoon rebuilt. It was incorporated by queen Mary, and is governed by a high ſteward, bailiff, recorder, 12 capital burgeſſes (out of whom the bailiff is choſen), and a town-clerk. Its market is on Friday, and its fairs, which are all noted for horſes and black-cattle, on February 13th, Tueſday after Midlent Sunday, May 13th, July 10th, September 4th, and November 1ſt. The market was on Thurſday till it was changed, on a petition from the cities of Hereford and Worceſter complaining of their loſs of trade; ſince which, the vaſt trade it had in wool and wheat is much leſſened. The beſt flax is ſaid to grow here, and it has been equally noted for the beſt wheat, barley, and the fineſt bread. The inhabitants drive a conſiderable trade not only in wool, but in gloves, leather, hat-making, &c. and there are ſeveral rivers in and about the town, on which they have mills and other machines. Near its church are ſome remains of its priory; and on a neighbouring hill are the ruins of a palace, called to this day Comfort-caſtle. It has ſeveral good inns, and ſends two members to parliament. W. lon. 2. 45. N. lat. 52. 20.

LEON, a province of Spain, with the title of a kingdom; bounded on the north by Aſturias; on the weſt by Galicia and Portugal; and on the ſouth by Eſtremadura and Caſtile, which alſo bounds it on the eaſt. It is about 125 miles in length, and 100 in breadth; and is divided into two almoſt equal parts by the river Duero, or Douro. It produces all the neceſſaries of life, and Leon is the capital town.

LEON, an ancient and large epiſcopal town of Spain, and capital of the kingdom of that name, built by the Romans in the time of Galba. It has the fineſt cathedral church in all Spain. It was formerly more rich and populous than at preſent, and had the honour of being the capital of the firſt Chriſtian kingdom in Spain. It is ſeated between two ſources of the river Eſra, in W. lon. 5. 15. N. lat. 42. 55.

LEON (Peter Cieca de), author of the Hiſtory of Peru. He left Spain, his native country, at 13 years of age, in order to go into America, where he reſided 17 years; and obſerved ſo many remarkable things, that he reſolved to commit them to writing. The firſt part of his hiſtory was printed at Seville in 1553. He began it in 1541, and ended it in 1550. He was at Lima, the capital of the kingdom of Peru, when he gave the finiſhing ſtroke to it, and was then 32 years of age.

LEON *de Nicaragua*, a town of North America, in New Spain, and in the province of Nicaragua: the reſidence of the governor, and a biſhop's ſee. It conſiſts of about 1000 houſes, and has ſeveral monaſteries and nunneries belonging to it. At one end of the town is a lake which ebbs and flows like the ſea. The town is ſeated at the foot of a volcano, which renders it ſubject to earthquakes. It was taken by the buccaneers in 1685, in ſight of a Spaniſh army who were ſix to one. W. lon. 86. 10. N. lat. 12. 25.

LEONARD LE NOBLET, St. an ancient town of France,

n the department of Upper Vienne and late territory of Limoſin, with a conſiderable manufacture of paper, and another of cloth for clothing the army. It is ſeated on the Vienne, 12 miles north-eaſt of Limoges, and 195 ſouth of Paris. E. long. 1. 32. N. lat. 45. 54.

LEONARDO DA VINCI. See VINCI.

LEONCLAVIUS (JOHN), one of the moſt learned men of the 16th century, was a native of Weſtphalia. He travelled into Turkey, and collected excellent materials for compoſing *The Ottoman hiſtory*; and it is to him the public is indebted for the beſt account we have of that empire. To his knowledge in the learned languages he had added that of the civil law; whereby he was very well qualified to tranſlate the *Baſilica*. His other verſions were eſteemed, though critics pretend to have found many faults in them. He died in 1593, aged 60.

LEONIDAS I. king of Sparta, a renowned warrior, ſlain in defending the ſtraits of Thermopylæ againſt Xerxes, 480 B. C. See SPARTA.

LEONINE, in poetry, is applied to a kind of verſes which rhyme at every hemiſtic, the middle always chiming to the end. Of which kind we find ſeveral ancient hymns, epigrams, prophecies, &c.—For inſtance, Muretus, ſpeaking of the poetry of Lorenzo Gambara of Breſſe, ſays,

Brixia veſtratis merdoſa volumina vatis,
Non ſunt noſtrates tergere digna nates.

The following one is from the ſchool of Salernum:

Ut vites pœnam *de potibus incipe* cœnam.

The origin of the word is ſomewhat obſcure: Paſquier derives it from one Leoninus or Leonius, who excelled in this way; and dedicated ſeveral pieces to Pope Alexander III.; others derive it from Pope Leo: and others from the beaſt called *lion*, by reaſon it is the loftieſt of all verſes.

LEONTICA, feaſts or ſacrifices celebrated among the ancients in honour of the ſun.—They were called *Leontica*, and the prieſts who officiated at them *Leones*, becauſe they repreſented the ſun under the figure of a lion radiant, bearing a tiara, and griping in his two fore paws the horns of a bull, who ſtruggled with him in vain to diſengage himſelf. The critics are extremely divided about this feaſt. Some will have it anniverſary, and to have made its return not in a ſolar but in a lunar year; but others hold its return more frequent, and give inſtances where the period was not above two hundred and twenty days. The ceremony was ſometimes alſo called *Mithriaca*; Mithras being the name of the ſun among the ancient Perſians. There was always a man ſacrificed at theſe feaſts, till the time of Hadrian, who prohibited it by a law. Commodus introduced the cuſtom afreſh; after whoſe time it was again exploded.

LEONTICE, LION'S-LEAF: A genus of the monogynia order, belonging to the hexandria claſs of plants; and in the natural method ranking under the 24th order, *Corydales*. The corolla is hexapetalous; the nectarium hexaphyllous, ſtanding on the heels of the corolla, with its limb patent; the calyx hexaphyllous, and deciduous. There are four ſpecies, natives of the ſouthern parts of Europe, two of which are ſometimes cultivated in this country. Theſe are, 1. The chryſogonum with winged leaves; and, 2. The leontopetalum with decompounded leaves. Both thoſe plants are natives of the Archipelago iſlands, and alſo grow in the corn-fields about Aleppo in Syria, where they flower ſoon after Chriſtmas. They have large tuberous roots like thoſe of the cyclamen, covered with a dark brown bark. The flowers ſit upon naked footſtalks: thoſe of the firſt ſort ſuſtain many yellow flowers, but the flowers of the ſecond are of a paler colour. Both ſpecies are propagated by ſeeds, which muſt be ſown ſoon after they are ripe, otherwiſe they ſeldom ſucceed. When ſent to diſtant countries, they muſt be preſerved in ſand. The plants are, however, very difficult to be preſerved in this country; for they will not thrive in pots; and when they are planted in the full ground, froſt frequently deſtroys them. The beſt way is to ſow the ſeed as ſoon as it comes from abroad, covering it with glaſſes in the winter to protect it from froſt; and in the ſpring, when the plants begin to appear, they muſt have free air admitted to them at all times when the weather is mild, otherwiſe they will be weak.

LEONTINI, or LEONTIUM (anc. geog.), a town of Sicily on the ſouth ſide of the river Terias, 20 miles north-weſt of Syracuſe. The territory, called *Campi Leontini*, was extremely fertile (Cicero): theſe were the *Campi Leſtrigonii*, anciently ſo called; the ſeat of the Læſtrigons, according to the commentators on the poets. The name *Leontini* is from *Leo*, the impreſſion on their coin being a lion. Now called *Lentini*, a town ſituated in the Val di Noto, in the ſouth-eaſt of Sicily.

LEONTIUM, one of the twelve towns of Achaia, whether on, or more diſtant from, the bay of Corinth, is uncertain. *Leontium* of Sicily. See LEONTINI.

LEONTODON, DANDELION: A genus of the polygamia æqualis order, belonging to the ſyngeneſia claſs of plants; and in the natural method ranking under the 49th order, *Compoſitæ*. The receptacle is naked; the calyx imbricated, with the ſcales ſomewhat looſe; the pappus feathery. There are nine ſpecies, of which the only remarkable one is the Taraxacum, or common dandelion, found on the road ſides, in paſtures, and on the banks of ditches. Early in the ſpring, the leaves whilſt yet white and hardly unfolded are an excellent ingredient in ſalads. The French eat the roots and tender leaves with bread and butter. Children that eat it in the evening experience its diuretic effects in the night, which is the reaſon that other European nations as well as ourſelves vulgarly call it *piſs-a-bed*. When a ſwarm of locuſts had deſtroyed the harveſt in the iſland of Minorca, many of the inhabitants ſubſiſted upon this plant. The expreſſed juice has been given to the quantity of four ounces three or four times a day; and Boerhaave had a great opinion of the utility of this and other lacteſcent plants in viſceral obſtructions. Goats eat it; ſwine devour it greedily; ſheep and cows are not fond of it, and horſes refuſe it. Small birds are fond of the ſeeds.

LEONURUS, LION'S-TAIL: A genus of the gymnoſpermia order, belonging to the didynamia claſs of plants; and in the natural method ranking under the 42d order, *Verticillatæ*. The antheræ are powdered with ſhining points, or ſmall elevated globular particles.

The *Species* are, 1. The *Africana*, with ſpear-ſhaped leaves, is a native of Ethiopia. It riſes with a ſhrubby ſtalk ſeven or eight feet high, ſending out ſeveral four-cornered branches, garniſhed with oblong narrow leaves, acutely indented on their edges, hairy on their upper ſide, and veined on the under ſide, ſtanding oppoſite. The flowers are produced in whorls, each of the branches having two or three of theſe whorls towards their ends. They are of the lip kind, ſhaped ſomewhat like thoſe of the dead-nettle; but are much longer, and covered with ſhort hairs. They are of a golden ſcarlet colour, ſo make a fine appearance. The flowers commonly appear in October and November, and ſometimes continue till the middle of December, but are not ſucceeded by ſeeds in this country. There is a variety with variegated leaves which is admired by ſome, but the whorls of flowers are ſmaller than thoſe of the plain ſort. 2. The *nepetæfolia*, with oval leaves, is a native of the Cape of Good Hope. This riſes with a ſquare ſhrubby ſtalk about three feet high, ſending out ſeveral four-cornered branches, garniſhed with oval crenated leaves, rough on their under ſide like the dead-nettle, but veined on the upper ſide, and placed oppoſite. The flowers come out in whorls like thoſe of the former ſort, but are not ſo long nor ſo deep co-

loured. They appear at the ſame ſeaſon with the firſt, and continue as long in beauty. There are three other ſpecies, but the above are the moſt remarkable.

Both ſorts are propagated by cuttings, which ſhould be expoſed to the air long enough to harden the ſhoots, and planted in the beginning of July, after which they will take root very freely. They ſhould be planted in a loamy border to an eaſtern aſpect; and if they are covered cloſely with a bell or hand-glaſs to exclude the air, and ſhaded from the ſun, it will forward their putting forth roots. As ſoon as they have taken good root, they ſhould be taken up and planted each in a ſeparate pot filled with ſoft loamy earth, and placed in the ſhade till they have taken new root. In October they muſt be removed into the green-houſe.

LEOPARD. See FELIS.

LEOPARD's *Bane*, in botany. See DORONICUM.

LEPANTO, a ſtrong and very conſiderable town of Turkey in Europe, and in Livadia, with an archbiſhop's ſee and a ſtrong fort. It is built on the top of a mountain, in form of a ſugar-loaf; and is divided into four towns, each ſurrounded by walls, and commanded by a caſtle on the top of the mountain. The harbour is very ſmall, and may be ſhut up by a chain, the entrance being but 50 feet wide. It was taken from the Turks by the Venetians in 1687; but was afterwards evacuated, and the caſtle demoliſhed in 1699, in conſequence of the treaty of Carlowitz. It was near this town that Don John of Auſtria obtained the famous victory over the Turkiſh fleet in 1571. The produce of the adjacent country is wine, oil, corn, and rice. Turkey leather is alſo manufactured here. The wine would be exceedingly good if they did not pitch their veſſels on the inſide; but this renders the taſte very diſagreeable to thoſe who are not accuſtomed to it. The Turks have ſix or ſeven moſques here, and the Greeks two churches. It is ſeated on a gulph of the ſame name, in E. lon. 22. 13. N. lat. 38. 34.

LEPAS, the ACORN, in zoology. See BALANUS.

LEPIDIUM, DITTANDER, or *Pepperwort*: A genus of the ſiliculoſæ order, belonging to the tetradynamia claſs of plants; and in the natural method ranking under the 39th order, *Siliquoſæ*. The ſilicula is emarginated, cordated and polyſpermous, with the valves carinated contrary or broader than the partition. There are nineteen ſpecies, of which the only remarkable one is the latifolium or common dittander. This is a native of many parts both of Scotland and England. It hath ſmall, white, creeping roots, by which it multiplies very faſt, and is difficult to be eradicated after it has long grown in any place. The ſtalks are ſmooth, riſe two feet high, and ſend out many ſide-branches. The flowers grow in cloſe bunches towards the top of the branches, coming out from the ſide; they are ſmall, and compoſed of four ſmall white petals. The ſeeds ripen in autumn. The whole plant has a hot biting taſte like pepper; and the leaves have been often uſed by the country people to give a reliſh to their viands inſtead of that ſpice, whence the plant has got the appellation of *poor man's pepper*. It is reckoned an antiſcorbutic, and was formerly uſed inſtead of the *horſeradiſh ſcurvy-graſs*.

LEPIDOPTERA, in zoology, an order of inſects, with four wings, which are covered with imbricated ſquamulæ. See ZOOLOGY.

LEPISMA, in zoology; a genus of apterous inſects, the characters of which are: They have ſix feet formed for running: the mouth is furniſhed with four palpi, two of which are cetaceous and two capitated; the tail is terminated by extended briſtles; and the body imbricated with ſcales. There are ſeven ſpecies. The *ſaccharina* (ſee Plate 10) is an American ſpecies, ſo called becauſe moſtly found among ſugar; but now common in Europe. It is of a leaden colour, but rather inclining to that of ſilver, by reaſon of the ſmall ſilvery ſcales with which it is covered; by which ſame circumſtance it reſembles, eſpecially in its under part, the ſilver fiſh. It is found in gardens, under boxes, and in the crevices of window-ſaſhes in houſes, where it is very common. It runs with great ſwiftneſs, and is difficult to catch. When touched, it loſes part of its ſcales, and its ſoftneſs makes it eaſy to cruſh.

LEPIUM, in natural hiſtory, a genus of foſſils of the harder gypſum, compoſed of very ſmall particles, and of a leſs glittering hue.

There is only one ſpecies of this genus, being one of the leaſt valuable and moſt impure of the claſs of gypſums. It is of an extremely rude, irregular, coarſe, and unequal ſtructure; a little ſoft to the touch, of a very dull appearance, and of different degrees of a greyiſh white. It is burnt in plaſter for the coarſer works; it calcines very ſlowly and unequally, and makes but a very coarſe and ordinary plaſter.

LEPROSY, a foul cutaneous diſeaſe, appearing in dry, white, thin, ſcurfy ſcabs, either on the whole body, or only ſome part of it, and uſually attended with a violent itching and irritation. See MEDICINE. The leproſy is of various kinds, but the Jews were particularly ſubject to that called *Elephantiaſis*. Hence the Jewiſh law excluded lepers from communion with mankind, baniſhing them into the country or uninhabited places, without excepting even kings. When a leper was cleanſed, he came to the city gate, and was there examined by the prieſts: after this he took two live birds to the temple, and faſtened one of them to a wiſp of cedar and hyſſop tied together with a ſcarlet ribbon; the ſecond bird was killed by the leper, and the blood of it received into a veſſel of water: with this water the prieſt ſprinkled the leper, dipping the wiſp and the live bird into it: this done, the live bird was let go; and the leper, having undergone this ceremony, was again admitted into ſociety and to the uſe of things ſacred. See Levit. xiii. 46, 47. and Levit. xiv. 1, 2, &c.

LEPTODECORHOMBES, in natural hiſtory, a genus of foſſils of the order of the ſelenitæ; conſiſting of ten planes, each ſo nearly equal to that oppoſite to it as very much to approach to a decahedral parallelopiped, though never truly or regularly ſo. Of this genus there are only five known ſpecies. 1. A thin, fine, pellucid, and ſlender-ſtreaked one, with tranſverſe ſtriæ, found in conſiderable quantities in the ſtrata of clay in moſt parts of England, particularly near Heddington in Oxfordſhire. 2. A thin, dull-looking, opaque, and ſlender-ſtreaked one, more ſcarce than the former, and found principally in Leiceſterſhire and Staffordſhire. 3. A thin fine-ſtreaked one, with longitudinal ſtriæ, found in the clay-pits at Richmond, and generally lying at great depths. This has often on its top and bottom a very elegant ſmaller rhomboide, deſcribed by four regular lines. 4. A rough kind, with thick tranſverſe ſtriæ, and a ſcabrous ſurface, very common in Leiceſterſhire and Yorkſhire. And, 5. A very ſhort kind, with thick plates, common in the clay-pits of Northamptonſhire and Yorkſhire.

LEPTOPOLYGINGLIMI, in natural hiſtory, a genus of foſſil ſhells, diſtinguiſhed by a number of minute teeth at the cardo; whereof we find great numbers at Harwich-cliff, and in the marle-pits of Suſſex.

LEPTUM, in antiquity, a ſmall piece of money, which, according to ſome, was only the eighth part of an obolus; but others will have it to be a ſilver or braſs drachm.

LEPTURA, in zoology, a genus of inſects belonging to the order of coleoptera, the characters of which are theſe:—The feelers are briſtly; the elytra are attenuated towards the apex; and the thorax is ſomewhat cylindrical. There are 25 ſpecies, principally diſtinguiſhed by their colour. See pl. 11.

LEPUS, in zoology, a genus of quadrupeds belonging to

the order of glires. See pl. 5. The characters are theſe:—They have two fore-teeth in each jaw; thoſe in the upper-jaw are double, the interior ones being ſmalleſt.

1. The *timidus*, or common hare, has a ſhort tail: the points of the ears are black; the upper-lip is divided up to the noſtrils; the length of the body is generally about a foot and a half; and the colour of the hair is reddiſh, interſperſed with white. The hare is naturally a timid animal. He ſleeps in his form or ſeat during the day; and feeds, copulates, &c. in the night. In a moon-light evening, a number of them are ſometimes ſeen ſporting together, leaping and purſuing each other: But the leaſt motion, the falling of a leaf, alarms them; and then they all run off ſeparately, each taking a different route. They are extremely ſwift in their motion, which is a kind of gallop, or a ſucceſſion of quick leaps. When purſued, they always take to the higher grounds: as their fore-feet are much ſhorter than the hind ones, they run with more eaſe up-hill than down-hill. The hare is endowed with all thoſe inſtincts which are neceſſary for his own preſervation. In winter he chooſes a form expoſed to the ſouth, and in ſummer to the north. He conceals himſelf among vegetables of the ſame colour with himſelf. Mr. Fouilloux ſays, that he obſerved a hare, as ſoon as he heard the ſound of the horn, or the noiſe of the dogs, although at a mile's diſtance, riſe from her ſeat, ſwim acroſs a rivulet, then lie down among the buſhes, and by this means evade the ſcent of the dogs. After being chaſed for a couple of hours, a hare will ſometimes puſh another from his form, and lie down in it himſelf. When hard preſſed, the hare will mingle with a flock of ſheep, run up an old wall and conceal himſelf among the graſs on the top of it, or croſs a river ſeveral times at ſmall diſtances. He never runs againſt the wind, or ſtraight forward; but conſtantly doubles about, in order to make the dogs loſe their ſcent.

It is remarkable that the hare, although ever ſo frequently purſued by the dogs, ſeldom leaves the place where ſhe was brought forth, or even the form in which ſhe uſually ſits. It is common to find them in the ſame place next day, after being long and keenly chaſed the day before. The females are more groſs than the males, and have leſs ſtrength and agility; they are likewiſe more timid, and never allow the dogs to approach ſo near their form before riſing as the males. They likewiſe practiſe more arts, and double more frequently than the males.

The hare is diffuſed almoſt over every climate; and, notwithſtanding they are every where hunted, their ſpecies never diminiſhes. They are in a condition of propagating the firſt year of their lives; the females go with young about 30 days, and produce four or five at a time; and as ſoon as they have brought forth, they again admit the embraces of the male; ſo that they may be ſaid to be always pregnant. The eyes of the young are open at birth; the mother ſuckles them about 20 days, after which they ſeparate from her, and procure their own food. The young never go far from the place where they were brought forth; but ſtill they live ſolitary, and make forms about 30 paces diſtant from each other: Thus, if a young hare be found any-where, you may almoſt be certain of finding ſeveral others within a very ſmall diſtance. The hare is not ſo ſavage as his manners would indicate. He is gentle, and is ſuſceptible of a kind of education. He is pretty eaſily tamed, and will even ſhow a kind of attachment to the people of the houſe: But ſtill this attachment is not ſo ſtrong or laſting as to engage him to become altogether domeſtic; for although taken when very young, and brought up in the houſe, he no ſooner arrives at a certain age, than he takes the firſt opportunity of recovering his liberty, and flying to the fields. The hare lives about ſeven or eight years. He feeds upon graſs and other vegetables. His fleſh is excellent food.

Hares are very ſubject to fleas. Linnæus tells us, that the Dalecarlians make a ſort of cloth called *felt*, of the fur; which, by attracting theſe inſects, preſerves the wearer from their troubleſome attacks. The hair of this creature makes a great article in the hat-manufacture; and, as our country cannot ſupply a ſufficient quantity, a great deal is annually imported from Ruſſia and Siberia. The hare was reckoned a great delicacy among the Romans; the Britons, on the contrary, thought it impious even to taſte it: yet this animal was cultivated by them, either for the pleaſure of the chace, or for the purpoſes of ſuperſtition; as we are informed, that Boadicea, immediately before her laſt conflict with the Romans, let looſe a hare ſhe had concealed in her boſom, which taking what was deemed a fortunate courſe, animated her ſoldiers by the omen of an eaſy victory over a timid enemy.

2. The *variabilis*, or varying hare of Pallas, has ſoft hair, which in ſummer is grey, with a ſlight mixture of black and tawny: the ears are ſhorter, and the legs more ſlender, than thoſe of the common hare: the tail is entirely white, even in ſummer; and the feet are moſt cloſely and warmly furred. In winter, the whole animal changes to a ſnowy whiteneſs, except the tips and edges of the ears, which remain black, as are the ſoles of the feet, on which, in Siberia, the fur is doubly thick, and of a yellow colour. It is leſs than the common ſpecies.—Theſe animals inhabit the higheſt Scottiſh Alps, Norway, Lapland, Ruſſia, Siberia, Kamtſchatka, and the banks of the Wolga, and Hudſon's-Bay. In Scotland, they keep on the tops of the higheſt hills, and never deſcend into the vales; nor do they ever mix with the common hare, though theſe abound in this neighbourhood. They do not run faſt; and are apt to take ſhelter in clefts of rocks. They are eaſily tamed, and are full of frolic. They are fond of honey and carraway comfits; and they are obſerved to eat their own dung before a ſtorm. This ſpecies changes its colour in September; reſumes its grey coat in April; and in the extreme cold of Greenland only is always white. Both kinds of hares are common in Siberia, on the banks of the Wolga, and in the Orenburg government. The one never changes colour: the other, native of the ſame place, conſtantly aſſumes the whiteneſs of the ſnow during winter. This it does, not only in the open air and in a ſtate of liberty, but, as experiment has proved, even when kept tame, and preſerved in houſes in the ſtove-warmed apartments, in which it experiences the ſame changes of colour as if it had dwelt on the ſnowy plains.—They collect together, and are ſeen in troops of five or ſix hundred, migrating in ſpring, and returning in autumn. They are compelled to this by the want of ſubſiſtence, quitting in the winter the lofty hills, the ſouthern boundaries of Siberia, and ſeek the plains and northern wooded parts, where vegetables abound; and towards ſpring ſeek again the mountainous quarters.

Mr. Muller ſays, he once ſaw two black hares, in Siberia, of a wonderful fine gloſs, and of as full a black as jet. Near Caſan was taken another, in the middle of the winter 1768. Theſe ſpecimens were much larger than the common kind.

In the ſouthern and weſtern provinces of Ruſſia is a mixed breed of hares, between this and the common ſpecies. It ſuſtains, during winter only, a partial loſs of colour: the ſides, and more expoſed parts of the ears and legs, in that ſeaſon becoming white; the other parts retaining their colours. This variety is unknown beyond the Uralian chain. It is called by the Ruſſians *ruſſack*; they take them in great numbers in ſnares, and export their ſkins to England and other places for the manufacture of hats. The Ruſſians and Tartars, like the Britons of old, hold the fleſh of hares in deteſtation, eſteeming it impure: that of the variable, in its white ſtate, is exceſſively inſipid.

There have been ſeveral inſtances of what may be called

monſters in this ſpecies, horned hares, having excreſcences growing out of their heads, like to the horns of the roe-buck. Such are thoſe figured in Geſner's hiſtory of quadrupeds, p. 634; in the *Muſeum Regium Hafniæ*, N° 48. tab. iv; and in Klein's Hiſtory of quadrupeds, 32. tab. iii.; and again deſcribed in Mormius's Muſeum, p. 321, and in Grew's Muſeum of the Royal Society. Theſe inſtances have occurred in Saxony, in Denmark, and near Aſtracan.

3. The *Americanus*, American hare, or hedge-coney, has the ears tipt with grey: the upper part of the tail is black, the lower white: the neck and body are mixed with cinereous, ruſt-colour, and black; the legs are of a pale ferruginous colour; and the belly is white: the fore-legs are ſhorter, and the hind legs longer, in proportion, than thoſe of the common hare. In length it is 18 inches; and weighs from 3 to 4½ pounds.—This ſpecies inhabits all parts of North America. In New Jerſey, and the colonies ſouth of that province, it retains its colour the whole year. In New England, Canada, and about Hudſon's Bay, at the approach of winter, it changes its ſhort ſummer's fur for one very long, ſilky, and ſilvery, even to the roots of the hairs; the edges of the ears only preſerving their colour. At that time theſe hares are in the higheſt ſeaſon for the table; and are of vaſt uſe to thoſe who winter in Hudſon's Bay, where they are taken in great abundance in ſpringes made of braſs-wire, to which they are led by a hedge made for that purpoſe, with holes left before the ſnares for the animals to paſs through.—They breed once or twice a-year, and have from five to ſeven at a time. They do not migrate, like the preceding; but always haunt the ſame places: neither do they burrow; but lodge under fallen timber, and in hollow trees. They breed in the graſs; but in ſpring ſhelter their young in the trees, to which they alſo run when purſued; from whence, in the ſouthern colonies, the hunters force them by means of a hooked ſtick, or by making a fire, and driving them out by the ſmoke.

4. The *tolai*, or Baikal hare, has a tail longer than that of a rabbit; and the ears are longer in the male in proportion than thoſe of the varying hare: the fur is of the colour of the common hare; and the ſize between that of the common and the varying hare. It inhabits the country beyond lake Baikal, and extends through the great Gobée even to Thibet. The Tanguts call it *Rangwo*, and conſecrate it among the ſpots of the moon. The Mongols call it *Tolai*. It agrees with the common rabbit in colour of the fleſh; but does not burrow, running inſtantly (without taking a ring as the common hare does) for ſhelter, when purſued, into holes of rocks. The fur is bad, and of no uſe in commerce.

5. The *Capenſis*, or Cape-hare, has long ears dilated in the middle; the outſides naked, and of a roſe colour, the inſide and edges covered with ſhort grey hairs: the crown and back are of a duſky colour mixed with tawny; the cheeks and ſides cinereous; the breaſt, belly, and legs, ruſt-coloured: the tail is buſhy, carried upwards, and of a pale ferruginous colour. The animal is about the ſize of a rabbit. It inhabits the country three days north of the Cape of Good Hope; where it is called the *mountain hare*, for it lives only in the rocky mountains, and does not burrow. It is difficult to ſhoot it, as it inſtantly, on the ſight of any one, runs into the fiſſures of the rocks.

Allied to this, in Mr. Pennant's opinion, ſeems the viſcachos, or viſcachas, mentioned by Acoſta and Feuillée, in their accounts of Peru: they compare them to hares or rabbits. The laſt ſays, they inhabit the colder parts of the country. Their hair is very ſoft, and of a mouſe-colour; the tail is pretty long, and turns up; and the ears and whiſkers are like thoſe of the common rabbit. In the time of the Incas, the hair was ſpun, and wove into cloth, which was ſo fine as to be uſed only by the nobility.

6. The *cuniculus*, or rabbit, has a very ſhort tail, and naked ears. The colour of the fur, in a wild ſtate, is brown; the tail black above, white beneath: in a tame ſtate the general colour varies to black, pied, and quite white; and the eyes are of a fine red. The native country of this ſpecies is Spain, where they were formerly taken with ferrets, as is practiſed in this country at preſent. They love a temperate and warm climate, and are incapable of bearing great cold; ſo that in Sweden they are obliged to be kept in houſes. They abound in Britain. Their furs make a conſiderable article in the hat manufactories; and of late ſuch part of the fur as is unfit for that purpoſe, has been found as good as feathers for ſtuffing beds and bolſters. Numbers of the ſkins are annually exported into China. The Engliſh counties moſt noted for rabbits are Lincolnſhire, Norfolk, and Cambridgeſhire. Methold, in the laſt county, is famous for the beſt kind for the table; the ſoil there is ſandy, and full of moſſes and the *carex* graſs. Rabbits ſwarm in the iſles of Orkney, where their ſkins form a conſiderable article of commerce. The rabbits of thoſe iſles are in general grey; thoſe which inhabit the hills grow hoary in winter.

The variety called the *ſilver-haired* rabbit was formerly in great eſteem for lining of clothes, and their ſkins were ſold for 3s a-piece; but ſince the introduction of more elegant furs, their price has fallen to 6d. The Sunk iſland in the Humber was once famous for a mouſe-coloured ſort, which has ſince been extirpated by reaſon of the injury they did to the banks by burrowing.—Other varieties are,

The *Angora* rabbit, with hair long, waved, and of a ſilky fineneſs, like that of the goat of Angora;—and the *Hooded rabbit*, deſcribed by Edwards as having a double ſkin over the back into which it can withdraw its head, and another under the throat in which it can place its forefeet: it has ſmall holes in the looſe ſkin on the back, to admit light to the eyes. The colour of the body is cinereous; of the head and ears, brown.

The fecundity of the rabbit is ſtill greater than that of the hare. They will breed ſeven times in the year, and the female ſometimes brings eight young ones at a time. Suppoſing this to happen regularly for four years, the number of rabbits from a ſingle pair will amount to 1,274,840. By this account we might juſtly apprehend being overſtocked with theſe animals: but a great number of enemies prevents their increaſe; not only men, but hawks and beaſts of prey making dreadful havoc among them. Notwithſtanding all theſe different enemies, however, we are told by Pliny and Strabo, that they once proved ſuch a nuiſance to the inhabitants of the Balearic iſlands, that they were obliged to implore the aſſiſtance of a military force from Auguſtus in order to exterminate them. They devour herbage of all kinds, roots, grain, fruits, &c. They are in a condition for generating at the end of ſix months; and, like the hare, the female is almoſt conſtantly in ſeaſon: ſhe goes with young about 30 days, and brings forth from four to eight at a litter. A few days before littering, ſhe digs a hole in the earth, not in a ſtraight line, but in a zig-zag form: the bottom of this hole ſhe enlarges every way, and then pulls off a great quantity of hair from her belly, of which ſhe makes a kind of bed for her young. During the two firſt days after birth, ſhe never leaves them, but when preſſed with hunger, and then ſhe eats quickly and returns: and in this manner ſhe ſuckles and attends her young for ſix weeks. All this time both the hole and the young are concealed from the male: ſometimes, when the female goes out, ſhe, in order to deceive the male, fills up the mouth of the hole with earth mixed with her own urine. But when the young ones begin to come to the mouth of the hole, and to eat ſuch herbs as the mother brings to them, the father ſeems to know them: he takes them betwixt his paws, ſmooths their hair, and careſſes them with great fondneſs.

The following ſpecies are without tails.

7. The *Alpinus*, or Alpine rabbit, has ſhort, broad, rounded ears; a long head, and very long whiſkers, with two very long hairs above each eye: the colour of the fur at the bottom is duſky, towards the ends of a bright ferruginous colour; the tips white, and intermixed are ſeveral long duſky hairs, though on firſt inſpection the whole ſeems of a bright bay. The length of the animal is nine inches. This ſpecies is firſt ſeen on the Altaic chain; extends to lake Baikal; from thence to Kamtſchatka; and, as is ſaid, is found in the new diſcovered Fox or Aleutian iſlands. They inhabit always the middle region of the ſnowy mountains, in the rudeſt places, wooded and abounding with herbs and moiſture. They ſometimes form burrows between the rocks, and oftener lodge in the crevices. They are generally found in pairs: but in cloudy weather they collect together, and lie on the rocks, and give a keen whiſtle, ſo like that of a ſparrow, as to deceive the hearer. On the report of a gun, they run into their holes; but ſoon come out again, ſuppoſing it to be a clap of thunder, to which they are ſo much uſed in their lofty habitations. By wonderful inſtinct they make a proviſion againſt the rigorous ſeaſon in their inclement ſeats. A company of them, towards autumn, collect together vaſt heaps of choice herbs and graſſes, nicely dried, which they place either beneath the over-hanging rocks, or between the chaſms, or round the trunk of ſome tree. The way to theſe heaps is marked by a worn path. In many places the herbs appear ſcattered, as if to be dried in the ſun and harveſted properly. The heaps are formed like round or conoid ricks; and are of various ſizes, according to the number of the ſociety employed in forming them. They are ſometimes of a man's height, and many feet in diameter, but uſually about three feet. Without this proviſion of winter's ſtock they muſt periſh, being prevented by the depth of ſnow from quitting their retreats in queſt of food. They ſelect the beſt of vegetables, and crop them when in the fulleſt vigour, which they make into the beſt and greeneſt hay by the judicious manner in which they dry it. Theſe ricks are the origin of fertility amidſt the rocks; for the reliques, mixed with the dung of the animals, rot in the barren chaſms, and create a ſoil productive of vegetables. Theſe ricks are alſo of great ſervice to thoſe people who devote themſelves to the laborious employment of ſable-hunting; for, being obliged to go far from home, their horſes would often periſh for want if they had not the proviſion of theſe little induſtrious animals to ſupport them; which is eaſily to be diſcovered by their height and form, even when covered with ſnow. It is for this reaſon that this little creature has a name among every Siberian and Tartarian nation, which otherwiſe would have been overlooked and deſpiſed. The people of Jakutz are ſaid to feed both their horſes and cattle with the reliques of the winter ſtock of theſe hares. Theſe animals are neglected as a food by mankind; but are the prey of ſables and the Siberian weaſel, which are joint inhabitants of the mountains. They are likewiſe greatly infeſted by a ſort of gadfly, which lodges its egg in their ſkin in Auguſt and September, and often proves deſtructive to them.

8. The *ogotona* has oblong oval ears, a little pointed; with ſhorter whiſkers than the former, and hairs long and ſmooth: the colour of thoſe on the body is brown at the roots, light grey in the middle, and white at the ends, intermixed with a very few duſky hairs: there is a yellowiſh ſpot on the noſe, and ſpace about the rump of the ſame colour: the outſide of the limbs are yellowiſh; the belly is white. The length is about ſix inches: weight of the male, from $6\frac{1}{2}$ to $7\frac{1}{4}$ ounces; of the female, from 4 to $4\frac{3}{4}$. This ſpecies inhabits only the country beyond lake Baikal, and from thence is common in all parts of the Mongolian deſert, and the vaſt deſert of Gobée, which extends on the back of China and Thibet, even to India. It frequents the open valleys and gravelly or rocky naked mountains. Theſe little creatures are called by the Mongols *Ogotona*; and are found in vaſt abundance. They live under heaps of ſtones; or burrow in the ſandy ſoil, leaving two or three entrances, which all run obliquely. They make a neſt of ſoft graſs; and the old females make for ſecurity a number of burrows near each other, that they may if diſturbed retreat from one to the other. They wander out chiefly in the night. Their voice is exceſſively ſhrill, and emits a note like that of a ſparrow, twice or thrice repeated, but very eaſily to be diſtinguiſhed from that of the Alpine rabbit. They live principally on the tender bark of a ſort of ſervice and the dwarf-elm; in the ſpring, on different herbs. Before the approach of ſevere cold, in the early ſpring, they collect great quantities of herbs, and fill their holes with them, which the inhabitants of the country conſider as a ſure ſign of change of weather. Directed by the ſame inſtinct with the former ſpecies, they form in autumn their ricks of hay of a hemiſpherical ſhape, about a foot high and wide: in the ſpring theſe elegant heaps diſappear, and nothing but the relics are ſeen. They copulate in the ſpring, and about the latter end of June their young are obſerved to be full grown. They are the prey of hawks, magpies, and owls: but the cat Manul (ſee FELIS) makes the greateſt havock among them; and the ermine and fitchet are equally their enemy.

9. The *puſillus*, or calling rabbit, with a long head thickly covered with fur even to the tip of the noſe; numerous hairs in the whiſkers; ears large and rounded; legs very ſhort, and the ſoles furred beneath: its whole coat is very ſoft, long, and ſmooth, with a thick, long, fine down beneath, of a browniſh lead-colour: the hairs are of the ſame colour, towards the ends of a light grey and tipt with black: the lower part of the body is hoary: the ſides and ends of the fur are yellowiſh. The length of the animal is about ſix inches: weight from $3\frac{1}{4}$ to $4\frac{1}{2}$ oz. but in winter ſcarcely $2\frac{1}{2}$. This ſpecies inhabits the ſouth-eaſt parts of Ruſſia, and about all the ridge of hills ſpreading ſouthward from the Urallian chain; alſo about the Irtiſh, and in the weſt part of the Altaic chain; but no where in the eaſt beyond the Oby. They delight in the moſt ſunny valleys and herby hills, eſpecially near the edges of woods, to which they run on any alarm. They live in ſo concealed a manner as very rarely to be ſeen: but are often taken in winter in the ſnares laid for the ermines; ſo are well known to the hunters. About the Volga they are called *ſemlanoi ſactſhik*, or *ground hare*: the Tartars, from their voice, ſtyle them *tſchot-tſchot* or *ittſitſkan*, or the *barking-mouſe*: The Kalmucs call them *ruſla*. They chooſe for their habitations a dry ſpot, amidſt buſhes covered with a firm ſod, preferring the weſtern ſides of the hills. In theſe they burrow, leaving a very ſmall hole for the entrance; and forming long galleries, in which they make their neſts. Thoſe of the old ones and females are numerous and intricate: ſo that their place would be ſcarcely known but for their excrements; and even thoſe they drop, by a wiſe inſtinct, under ſome buſh, leſt their dwelling ſhould be diſcovered by their enemies among the animal creation. Their voice alone betrays their abode; it is like the piping of a quail, but deeper, and ſo loud as to be heard at the diſtance of half a German mile. It is repeated by juſt intervals, thrice, four times, and often ſix. The voice is emitted at night and morning; in the day, except in rainy and cloudy weather. It is common to both ſexes; but the female is ſilent for ſome time after parturition, which is about the beginning of May N. S. She brings forth ſix at a time, blind and naked; which ſhe ſuckles often, and covers carefully with the materials of her neſt. Theſe moſt harmleſs and inoffenſive animals never go from their holes. They feed and make their little excurſions

by night: they are eaſily made tame, and will ſcarcely bite when handled. The males in confinement are obſerved to attack one another, and expreſs their anger by a grunting noiſe. There are three or four other ſpecies of Lepus.

Lepus, the hare, in aſtronomy, a conſtellation of the ſouthern hemiſphere; whoſe ſtars in Ptolemy's catalogue are 12; in that of Tycho's 13; and in the Britannic 19.

LERCHEA, in botany; a genus of the pentandria order, belonging to the monadelphia claſs of plants. The calyx is five-toothed; the corolla funnel-ſhaped and quinquefid; there are five antheræ ſitting on the tube of the germ; there is one ſtyle; the capſule trilocular and polyſpermous.

LERI (John de), a Proteſtant miniſter of the province of Burgundy. He was ſtudying at Geneva when it was reported there that Villegagnon deſired they would ſend him ſome paſtors into Brazil. He made that voyage with two miniſters, whom the church of Geneva ſent thither in 1556; and wrote an account of that voyage, which has been much commended by Thuanus and others.

LERIA, or Leiria, a ſtrong town of Eſtremadura in Portugal, with a caſtle and biſhop's ſee. It contains about 3500 inhabitants, and was formerly the reſidence of the kings of Portugal. W. lon. 7. 50. N. lat. 39. 40.

LERIDA, an ancient, ſtrong, and large town of Spain, in Catalonia, with a biſhop's ſee, an univerſity, and a ſtrong caſtle. This place declared for king Charles after the reduction of Barcelona in 1705: but it was retaken by the duke of Orleans in 1707, after the battle of Almanza. It is ſeated on a hill near the river Segra, and in a fertile ſoil, in E. lon. 0. 35. N. lat. 41. 31.

LERINA, or Planasia, (anc. geog.), one of the two ſmall iſlands over againſt Antipolis, called alſo *Lerinas* and *Lirinus*. Now St. Honorat, on the coaſt of Provence, ſcarce two leagues to the ſouth of Antibes.

LERINS, the name of two iſlands in the Mediterranean ſea, lying on the coaſt of Provence in France, five miles from Antibes; that near the coaſt, called *St. Margaret*, is guarded by invalids, ſtate-priſoners being ſent here. It was taken by the Engliſh in 1746, but Marſhal Belleiſle retook it in 1747. The other is called *St. Honorat*; and is leſs than the former, but has a Benedictine abbey.

LERMA, a town of Spain, in Old Caſtile, ſeated on the river Arlanza, with the title of a duchy. W. lon. 3. 5. N. lat. 42. 2.

LERNA (anc. geog.), not far from Argos, on the confines of Laconica; ſuppoſed to be a town of Laconica, but on the borders of Argolis; the poſition which Pauſanias allots to it, near Temenium, on the ſea; without adding whether it is town, river, or lake. According to Strabo, it is a lake, ſituated between the territories of Argos and Mycene, in contradiction to Pauſanias. If there was a town of this name, it ſeems to have ſtood towards the ſea, but the lake to have been more inland. Mela calls it a well known town on the Sinus Argolicus; and Statius by Lerna ſeems to mean ſomething more than a lake. This, however, is the lake in which, as Strabo ſays, was the fabled Hydra of Hercules: therefore called *Lerna Anguifera* (Statius). The lake runs in a river or ſtream to the ſea, and perhaps ariſes from a river (Virgil). From the lake the proverb, *Lerna Malorum*, took its riſe; becauſe, according to Strabo, religious purgations were performed in it; or, according to Heſychius, becauſe the Argives threw all their filth into it.

LERNEA, in zoology; a genus of inſects of the order of Vermes molluſca, the characters of which are: The body fixes itſelf by its tentacula, is oblong, and rather tapering; there are two ovaries like tails, and the tentacula are ſhaped like arms. (See three ſpecimens in Plate 10.) The *cyprinacea* has four tentacula, two of which are lunulated at the top. It is a ſmall ſpecies; about half an inch long, and of the thickneſs of a ſmall ſtraw: the body is rounded, of a pale greyiſh white, gloſſy on the ſurface, and ſomewhat pellucid: it is thruſt out of a kind of coat or ſheath, as it were at the baſe, which is of a white colour and a thick ſkin: towards the other extremity of the body there are three obtuſe tubercules, one of which is much larger than the reſt: the mouth is ſituated in the anterior part, and near it there are two ſoft and fleſhy proceſſes; and near theſe there is alſo on each ſide another ſoft proceſs, which is lunated at the extremity. It is found on the ſides of the bream, carp, and roach, in many of our ponds and rivers, in great abundance. 2. The *ſalmonea*, or ſalmon-louſe, has an ovated body, cordated thorax, and two linear arms approaching nearly to each other. 3. The *aſellina*, has a lunated body and cordated thorax; and inhabits the gills of the cod-fiſh and ling of the northern ocean.

LERNICA, formerly a large city in the iſland of Cyprus, as appears from its ruins; but is now no more than a large village, ſeated on the ſouthern coaſt of that iſland, where there is a good road, and a ſmall fort for its defence.

LERO (anc. geog.), one of the two ſmall iſlands in the Mediterranean, oppoſite to Antipolis, and half a mile diſtant from it to the ſouth. Now *St. Margarita*, over againſt Antibes, on the coaſt of Provence.

Lero, or *Leros*, an iſland of the Archipelago, and one of the Sporades; remarkable, according to ſome authors, for the birth of Patroclus. E. lon. 26. 15. N. lat. 37. 0.

Le Roy le veut, the king's aſſent to public bills. See the articles Bill, Statute, and Parliament.

LERWICK, the chief town of the Shetland Iſlands, ſituate on the eaſt ſide of Mainland, the principal iſland. It is the rendezvous of the fiſhing buſſes from Britain, Holland, Denmark, and other parts. W lon. 1. 30. N. lat. 60. 20.

LESBOS, a large iſland in the Ægean ſea, on the coaſt of Æolia, of about 168 miles in circumference. It has been ſeverally called *Pelaſgia*, from the Pelaſgi by whom it was firſt peopled; *Macaria*, from Macareus who ſettled in it; and *Leſbos*, from the ſon-in-law and ſucceſſor of Macareus who bore the ſame name. The chief towns of Leſbos were Methymna and Mitylene. It was originally governed by kings, but they were afterwards ſubjected to the neighbouring powers. The wine which it produced was greatly eſteemed by the ancients, and ſtill is in the ſame repute among the moderns. The Leſbians were ſo debauched and diſſipated, that the epithet of *Leſbian* was often uſed to ſignify debauchery and extravagance. Leſbos has given birth to many illuſtrious perſons, ſuch as Arion, Terpander, Sappho, &c. See Mitylene.

LESCAILLE (James), a celebrated Dutch poet and printer, was born at Geneva. He and his daughter Catharine Leſcaille have excelled all the Dutch poets. That lady, who was ſurnamed the *Sappho of Holland*, and the *tenth Muſe*, died in 1711. A collection of her poems has been printed, in which are the Tragedies of Genſeric, Wenceſlaus, Herod and Mariamne, Hercules and Dejaneira, Nicomedes, Ariadne, Caſſandra, &c. James Leſcaille her father deſerved the poet's crown, with which the emperor Leopold honoured him in the year 1603: he died about the year 1677, aged 67.

LESCAR, a town of France, in the department of the Lower Pyrenées and late territory of Béarn. It was lately a biſhop's ſee; and is ſeated on a hill, three miles north weſt of Pau, and 42 ſouth-eaſt of Bayonne. W. lon. 0. 7. N. lat. 43. 17.

LESGUIS, a people of Aſia, whoſe country is indifferently called by the Georgians *Leſguiſtan* and *Daghеſtan*. It is bounded to the ſouth and eaſt by Perſia and the Caſpian, to the ſouth-weſt and weſt by Georgia, the Oſſi, and Kiſti, and to the

north by the Kisti and Tartar tribes. It is divided into a variety of districts, generally independent, and governed by chiefs elected by the people. Guldenstaedt has remarked, in the Lesguis language, eight different dialects, and has classed their tribes in conformity to this observation.

The first dialect comprehends 15 tribes, which are as follow: 1. Avar, in Georgian Chunsagh. The chief of this district, commonly called *Avar-Khan*, is the most powerful prince of Lesguistan, and resides at Kabuda, on the river Kaseruk. The village of Avar is, in the dialect of Andi, called *Harbul*. 2. Kaseruk, in the high mountains, extending along a branch of the Koisu, called *Karak*. This district is dependent on the Khan of the Kasi Kumyehs. 3. Idatle, on the Koisu, joining on the Andi; subject to the Avar Khan. 4. Mukratle, situated on the Karak, and subject to the Avan Khan. 5. Onsekul, subject to the same, and situated on the Koisu. 6. Karakhle, upon the Karak, below Kaseruk, subject to the same. 7. Ghumbet, on the river Ghumbet, that joins the Koisu, subject to the chief of the Coumyks.. 8. Arakan; and, 9. Burtuma, on the Koisu. 10. Antsugh, on the Samura, subject to Georgia. 11. Tebel, on the same river, independent. 12. Tamurgi, or Tumural, on the same river. 13. Akhti: and, 14. Rutal, on the same. 15. Dshar, in a valley that runs from the Alazan to the Samura. It was formerly subject to Georgia, but is now independent. In this district are seen remains of the old wall that begins at Derbent, and probably terminates at the Alazan.—The inhabitants of Derbent believe that their town was built by Alexander, and that this wall formerly extended as far as the Black Sea. It is, however, probable, from many inscriptions in old Turkish, Persian, Arabic, and Russish characters, that the wall, and the aqueducts with their various subterraneous passages, many of which are now filled up, are of high antiquity. This town suffered greatly during its siege by Sultan Amurath, who entirely destroyed the lower quarter, then inhabited by Greeks. It was again taken by Schach Abbas. (Gaerber.) This town is the old Pylæ Caspiæ.

The second dialect is spoken in the two following districts: 1. Dido, or Didonli, about the source of the Samura. This district is rich in mines; a ridge of uninhabited mountains divides it from Caket. 2. Unso, on the small rivulets that join the Samura. These two districts, containing together about 1000 families, were formerly subject to Georgia, but are now independent.

The third dialect is that of Kabutsh, which lies on the Samura rivulets, east of Dido, and north of Caket.

The fourth dialect is that of Andi, situated on a rivulet that runs into the Koisu. Some of its villages are subject to the Avar-Khan, but the greater part to the khan of Axai. The whole consists of about 800 families.

The fifth dialect is common to four districts, namely, 1. Akusha, on the Koisu, subject to the Usmei, or khan of the Caitaks, and Kara-Caitaks, containing about 1000 families. The following custom is attributed by Colonel Gaerber to the subjects of this prince: "Whenever the Usmei has a son, he is carried round from village to village, and alternately suckled by every woman who has a child at her breast until he is weaned. This custom, by establishing a kind of brotherhood between the prince and his subjects, singularly endears them to each other." 2. Balkar. 3. Zudakara, or Zudakh, down the Koisu, subject to the Usmei. 4. Kubesha, near the Koisu. Colonel Gaerber, who wrote an account of these countries in 1728, gives the following description of this very curious place: "Kubesha is a large strong town, situated on a hill between high mountains. Its inhabitants call themselves Franki (Franks, a name common in the east to all Europeans), and relate, that their ancestors were brought hither by some accident, the particulars of which are now forgotten. The common conjecture is, that they were mariners cast away upon the coast; but those who pretend to be better versed in their history, tell the story this way:—The Greeks and Genoese, say they, carried on, during several centuries, a considerable trade, not only on the Black sea, but likewise on the Caspian, and were certainly acquainted with the mines contained in these mountains, from which they drew by their trade with the inhabitants great quantities of silver, copper, and other metals. In order to work these upon the spot, they sent hither a number of workmen to establish manufactures, and instruct the inhabitants. The subsequent invasions of the Arabs, Turks, and Monguls, during which the mines were filled up, and the manufactures abandoned, prevented the strangers from effecting their return, so that they continued here, and erected themselves into a republic. What renders this account the more probable is, that they are still excellent artists, and make very good fire-arms, as well rifled as plain; sabres, coats of mail, and several articles in gold and silver, for exportation. They have likewise, for their own defence, small copper cannons, of three pounds calibre, cast by themselves. They coin Turkish and Persian silver money, and even rubles, which readily pass current, because they are of the full weight and value. In their valleys they have pasture and arable lands, as well as gardens; but they purchase the greater part of their corn, trusting chiefly for support to the sale of their manufactures, which are much admired in Persia, Turkey, and the Crimea. They are generally in good circumstances, are a quiet inoffensive people, but high-spirited and independent. Their town is considered as a neutral spot, where the neighbouring princes can deposit their treasures with safety. They elect yearly twelve magistrates, to whom they pay the most unlimited obedience; and as all the inhabitants are on a footing of perfect equality, each individual is sure to have in his turn a share in the government. In the year 1725, their magistrates, as well as the Usmei, acknowledged the sovereignty of Russia, but without paying any tribute." 5. Zudakara, or Zadakh, down the Koisu, subject to the Usmei. It contains about 2000 families.

The sixth dialect belongs to the districts on the eastern slope of Caucasus, between Tarku and Derbent, which are, 1. Caitak; and 2. Tabasseran, or Kara-Caitak, both subject to the Usmei.

The seventh dialect is that of Kasi-Coumyk, on a branch of the Konisu, near Zudakara. This tribe has a khan, whose authority is recognised by some neighbouring districts.

The eighth dialect is that of Kuraele, belonging to the khan of Cuba.

Besides these, there are some other Lesguis tribes, whose dialects Mr. Guldenstaedt was unable to procure. From a comparison of those which he has obtained, it appears that the language of the Lesguis has no kind of affinity with any other known language, excepting only the Samoyede, to which it has a remote resemblance.

This people is probably descended from the tribes of mountaineers known to ancient geographers under the name of *Lesgæ*, or *Ligyes*. The strength of their country, which is a region of mountains, whose passes are known only to themselves, has probably at all times secured them from foreign invasion; but as the same cause must have divided them into a number of tribes, independent of each other, and perhaps always distinguished by different dialects, it is not easy to imagine any common cause of union which can ever have assembled the whole nation, and have led them to undertake very remote conquests. Their history, therefore, were it known, would probably be very uninteresting to us. They subsist by raising cattle, and by predatory expeditions into the

countries of their more wealthy neighbours. During the troubles in Perſia, towards the beginning of this century, they repeatedly ſacked the towns of Shamachie and Ardebil, and ravaged the neighbouring diſtricts; and the preſent wretched ſtate of Georgia, and of part of Armenia, is owing to the frequency of their incurſions. In their perſons and dreſs, and in their general habits of life, as far as theſe are known to us, they greatly reſemble the Circaſſian.

LESKARD, a town in Cornwall, ſeated in a level, is a corporation, and ſends two members to parliament. It had formerly a caſtle, now in ruins. It is one of the largeſt and beſt built towns in Cornwall, with the greateſt market. It was firſt incorporated by Edward earl of Cornwall, afterwards by king John's ſon, Richard king of the Romans, and had privileges from Edward the Black Prince. Queen Elizabeth granted it a charter; by which it was to have a mayor and burgeſſes, who ſhould have a perpetual ſucceſſion, purchaſe lands, &c. Here is a handſome town-hall built on ſtone pillars, with a turret on it, and a noble clock with four dials that coſt near 200l. Here are a large church, a meeting-houſe, an eminent free-ſchool, and a curious conduit; and on the adjacent commons, which feed multitudes of ſheep, there have been frequent horſe-races. It has a market on Saturday, and ſeven fairs in the year. The liſt of its parliament men begins the 23d of Edward I. Here is a very great trade in all manufactures of leather; and ſome ſpinning is ſet up here lately, encouraged by the clothiers of Devonſhire. On the hills of North Leſkard, and in the way from hence to Launceſton, are many mines of tin, which is caſt at the blowing-houſes into blocks, that are ſent hither to be coined.

LESLIE (Charles), an Iriſh divine, and a zealous Proteſtant: but being attached to the houſe of Stuart, he left Ireland, and went to the pretender at Bar le Duc, and reſided with him till near the time of his death; conſtantly endeavouring to make him a Proteſtant, but without effect. He died in 1722. His principal works are, 1. A ſhort and eaſy method with the Deiſts. 2. A ſhort and eaſy method with the Jews. 3. The ſnake in the graſs. 4. Hereditary right to the crown of England aſſerted. 5. The Socinian controverſy diſcuſſed. 6. The charge of Socinianiſm againſt Dr. Tillotſon conſidered; and many others. All his theological pieces, except that againſt archbiſhop Tillotſon, were collected and publiſhed by himſelf, in 2 vols. folio.

LESSER TONE, in muſic. See Tone.

LESSINES, a town of the Auſtrian Netherlands, in Hainault, ſeated on the river Dender, and famous for its linen manufacture. W. lon. 3. 53. N. lat. 51. 41.

LESSONS, among eccleſiaſtical writers, portions of the Holy Scripture, read in Chriſtian churches at the time of divine ſervice. In the ancient church, reading the Scriptures was one part of the ſervice of the catechumens; at which all perſons were allowed to be preſent, in order to obtain inſtruction. The church of England, in the choice of leſſons, proceeds as follows: For the firſt leſſon on ordinary days, ſhe directs, to begin at the beginning of the year with Geneſis, and ſo continue on, till the books of the Old Teſtament are read over; only omitting the Chronicles, which are for the moſt part the ſame with the books of Samuel and Kings, and other particular chapters in other books, either becauſe they contain names of perſons, places, or other matters leſs profitable to ordinary readers.

The courſe of the firſt leſſons for Sundays is regulated after a different manner. From Advent to Septuageſima-Sunday, ſome particular chapters of Iſaiah are appointed to be read, becauſe that book contains the cleareſt prophecies concerning Chriſt. Upon Septuageſima Sunday Geneſis is begun, becauſe that book, which treats of the fall of man, and the ſevere judgement of God inflicted on the world for ſin, beſt ſuits with a time of repentance and mortification. After Geneſis, follow chapters out of the books of the Old Teſtament, as they lie in order; only on feſtival Sundays, ſuch as Eaſter, Whitſunday, &c. the particular hiſtory relating to that day is appointed to be read; and on the ſaints days, the church appoints leſſons out of the moral books, ſuch as Proverbs, Eccleſiaſtes, Eccleſiaſticus, &c. as containing excellent inſtructions for the conduct of life.

As to the ſecond leſſons, the church obſerves the ſame courſe both on Sundays and week-days: reading the goſpels and Acts of the Apoſtles in the morning, and the epiſtles in the evening, in the order they ſtand in the New Teſtament: excepting on ſaints-days and holy days, when ſuch leſſons are appointed as either explain the myſtery, relate the hiſtory, or apply the example to us.

LESTOFF, or Leostoff, a town of Suffolk, ſeated on the ſea-ſhore, 117 miles north-weſt of London. It is concerned in the fiſheries of the North-ſea, cod, herrings, mackarels, and ſprats; has a church, and a diſſenting meeting-houſe; and for its ſecurity, ſix eighteen-pounders, which they can move as occaſion requires; but it has no battery. The town conſiſts of 500 houſes; but the ſtreets, though tolerably paved, are narrow. It has a market on Wedneſdays, and two fairs in the year for petty chapmen. The coaſt is there very dangerous for ſtrangers.

L'ESTRANGE (Sir Roger), a noted writer in the 17th century, was deſcended from an ancient family, ſeated at Hunſtanton-hall in the county of Norfolk, where he was born in 1616, being the youngeſt ſon of Sir Hammond L'Eſtrange baronet, a zealous royaliſt. Having in 1644 obtained a commiſſion from king Charles I. for reducing Lynn in Norfolk, then in poſſeſſion of the parliament, his deſign was diſcovered, and his perſon ſeized. He was tried by a court martial at Guildhall in London, and condemned to die as a ſpy; but was reprieved, and continued in Newgate for ſome time. He afterward went beyond ſea; and in Auguſt 1653 returned to England, where he applied himſelf to the protector Oliver Cromwell; and having once played before him on the baſs-viol, he was by ſome nicknamed *Oliver's fiddler*. Being a man of parts, maſter of an eaſy humorous ſtyle, but withal in narrow circumſtances, he ſet up a newſpaper, under the title of *The Public Intelligencer*, in 1663; but which he laid down, upon the publication of the firſt London gazette in 1665, having been allowed, however, a conſideration by government. Some time after the Popiſh plot, when the Tories began to gain the aſcendant over the Whigs, he, in a paper called the *Obſervator*, became a zealous champion for the former. He was afterwards knighted, and ſerved in the parliament called by king James II. in 1685. But things taking a different turn in that prince's reign, in point of liberty of conſcience, from what moſt people expected, our author's *Obſervators* were diſuſed, as not at all ſuiting the times. However, he continued licenſer of the preſs till king William's acceſſion, in whoſe reign he met with ſome trouble as a diſaffected perſon. However, he went to his grave in peace, after he had in a manner ſurvived his intellectuals. He publiſhed a great many political tracts, and tranſlated ſeveral works from the Greek, Latin, and Spaniſh; *viz.* Joſephus's works, Cicero's Offices, Seneca's Morals, Eraſmus's Colloquies, Æſop's Fables, and Bonas's Guide to Eternity. The character of his ſtyle has been variouſly repreſented; his language being obſerved by ſome to be eaſy and humorous, while Mr. Gordon ſays, "that his productions are not fit to be read by any who have taſte or good-breeding. They are full of phraſes picked up in the ſtreets, and nothing can be more low or nauſeous."

LESTWEITHEL, or Lestwithiel, a town of Cornwall,

229 miles distant from London. It is a well-built town, where are kept the common gaol, the weights and measures for the whole stannary, and the county courts. It stands on the river Foy, which brought up vessels from Fowey before it was choaked up with sand coming from the tin-mines, and therefore its once flourishing trade is decayed; but it holds the bushelage of coals, salt, malt, and corn, in the town of Fowey, as it does the anchorage in its harbour. It was made a corporation by Richard earl of Cornwall when he was king of the Romans, and has had other charters since. It consists of seven capital burgesses (whereof one is a mayor), and 17 assistants or common council. It is part of the duchy of Cornwall, to which it pays 11l. 19s. 10d. a year for its liberties. Its chief trade is the woollen manufactory. Its church has a spire, the only one except that of Helston in the county. Its market is on Friday, and its fairs are three. It first returned members to parliament in the 33d of Edward I. They are chosen by their burgesses and assistants. It was anciently the shire-town, and the knights of the shire are still chosen here.

LETCHLADE, a town of Gloucestershire, 90 miles from London, on the borders of Oxfordshire and Berks, and the great road to Gloucester; had anciently a nunnery, and a priory of black canons. In this parish is Clay-hill. The market is on Tuesday; and it has two fairs. It is supposed to have been a Roman town; for a plain Roman road runs from hence to Cirencester: and by digging in a meadow near it some years ago, an old building was discovered, supposed to be a Roman bath, which was 50 feet long, 40 broad, and 4 high, supported with 100 brick pillars, curiously inlaid with stones of divers colours of tesseraic work. The Leech, the Coln, the Churn, and Isis, which all rise in the Cotswould-hill, join here in one full stream, and become one river, called the *Thames*, which begins here to be navigable, and barges take in butter, cheese, and other goods, at its quay, for London.

LETHARGY, in medicine (from λεθη *oblivion*, and αρσια *numbness, laziness*), a disease consisting of a profound drowsiness or sleepiness, from which the patient can scarce be awakened; or, if awakened, he remains stupid, without sense or memory, and presently sinks again into his former sleep.

LETHE, in the ancient mythology, one of the rivers of hell, signifying oblivion or forgetfulness; its waters having, according to poetic fiction, the peculiar quality of making those who drank them forget every thing that was past.

LETI (Gregorio), an eminent Italian writer, was descended of a family which once made a considerable figure at Bologna: Jerom, his father, was page to prince Charles de Medicis; served some time in the troops of the grand duke as captain of foot; and settling at Milan, married there in 1628. He was afterward governor of Almantea in Calabria, and died at Salerno in 1639. Our author was born at Milan in 1630, studied under the jesuits at Cosenza, and was afterward sent by an uncle to Rome, who would have him enter into the church; but he being averse to it went into Geneva, where he studied the government and the religion there. Thence he went to Lausanne; and contracting an acquaintance with John Anthony Guerin, an eminent physician, lodged at his house, made profession of the Calvinist religion, and married his daughter. He settled at Geneva; where he spent almost twenty years, carrying on a correspondence with learned men, especially those of Italy. Some contests obliged him to leave that city in 1679; upon which he went to France, and then into England, where he was received with great civility by Charles II. who, after his first audience, made him a present of a thousand crowns, with a promise of the place of historiographer. He wrote there the History of England; but that work not pleasing the court on account of his too great liberty in writing, he was ordered to leave the kingdom. He went to Amsterdam in 1682, and was honoured with the place of historiographer to that city. He died suddenly in 1701. He was a man of indefatigable application, as the multiplicity of his works show. The principal of these are, 1. The universal monarchy of Louis XIV. 2. The life of pope Sixtus V. 3. The life of Philip II. king of Spain. 4. The life of the emperor Charles V. 5. The life of Elizabeth, queen of England. 6. The history of Oliver Cromwell. 7. The history of Great Britain, 5 vols. 12mo. 8. The history of Geneva, &c.

LETRIM, a county of Ireland, in the province of Connaught, 44 miles in length and 17 in breadth; bounded on the east and north-east by Cavan and Fermanagh, by Sligo and Roscommon on the west and south-west, and by Longford on the east and south-east. It is a hilly country, with rank grass, which feeds a great number of cattle. The chief town is Letrim, seated not far from the river Shannon. It contains 4000 houses, 21 parishes, 5 baronies, 2 boroughs, and sends 6 members to parliament.

LETTER, a character used to express one of the simple sounds of the voice; and as the different simple sounds are expressed by different letters, these, by being differently compounded, become the visible signs or characters of all the modulations and mixtures of sounds used to express our ideas in a regular language. (See Language.) Thus, as by the help of speech we render our ideas audible; by the assistance of letters we render them visible, and by their help we can wrap up our thoughts, and send them to the most distant parts of the earth, and read the transactions of different ages. As to the first letters, what they were, who first invented them, and among what people they were first in use, there is still room to doubt. Philo attributes this great and noble invention to Abraham; Josephus, St. Irenæus, and others, to Enoch; Bibliander, to Adam; Eusebius, Clemens Alexandrinus, Cornelius Agrippa, and others, to Moses; Pomponius Mela, Herodian, Rufus Festus, Pliny, Lucan, &c. to the Phœnicians; St. Cyprian, to Saturn; Tacitus, to the Egyptians; some, to the Ethiopians; and others, to the Chinese: but, with respect to these last, they can never be entitled to this honour, since all their characters are the signs of words, formed without the use of letters; which renders it impossible to read and write their language without a vast expence of time and trouble; and absolutely impossible to print it by the help of types, or any other manner but by engraving or cutting in wood. See Printing.

There have been also various conjectures about the different kinds of letters used in different languages: thus, according to Crinitus, Moses invented the Hebrew letters; Abraham, the Syriac and Chaldee; the Phœnicians, those of Attica, brought into Greece by Cadmus, and from thence into Italy by the Pelasgians; Nicostrata, the Roman; Isis, the Egyptian; and Vulfilas, those of the Goths.

It is probable, that the Egyptian hieroglyphics were the first manner of writing: but whether Cadmus and the Phœnicians learned the use of letters from the Egyptians, or from their neighbours of Judea or Samaria, is a question; for since some of the books of the Old Testament were then written, they are more likely to have given them the hint, than the hieroglyphics of Egypt. But wheresoever the Phœnicians learned this art, it is generally agreed that Cadmus the son of Agenor first brought letters into Greece; whence, in following ages, they spread over the rest of Europe. See Alphabet and Writing.

Letters make the first part or elements of grammar; an assemblage of these compose syllables and words, and these compose sentences. The alphabet of every language consists of a number of letters, which ought each to have a different

ſound, figure, and uſe. As the difference of articulate ſounds was intended to expreſs the different ideas of the mind, ſo one letter was originally intended to ſignify only one ſound, and not, as at preſent, to expreſs ſometimes one ſound and ſometimes another; which practice has brought a great deal of confuſion into the languages, and rendered the learning of the modern tongues much more difficult than it would otherwiſe have been. This conſideration, together with the deficiency of all the known alphabets, from their wanting ſome letters to expreſs certain ſounds, has occaſioned ſeveral attempts towards an univerſal alphabet, to contain an enumeration of all ſuch ſingle ſounds or letters as are uſed in any language. See ALPHABET.

Grammarians diſtinguiſh letters into vowels, conſonants, mutes, liquids, diphthongs, and characteriſtics. They are likewiſe divided into capital and ſmall letters. They are alſo denominated from the ſhape and turn of the letters; and in writing are diſtinguiſhed into different hands, as round-text, German-text, round-hand, Italian, &c. and in printing, into Roman, Italic, and black letter.

The term LETTER, or *Type*, among Printers, not only includes the CAPITALS, SMALL-CAPITALS, and ſmall letters, but all the points, figures, and other marks caſt and uſed in printing; and alſo the large ornamental letters, cut in wood or metal, which take place of the illumined letters uſed in manuſcripts. The letters uſed in printing are caſt at the ends of ſmall pieces of metal, about three quarters of an inch in length; and the letter being not indented, but raiſed, eaſily gives the impreſſion, when, after being blacked with a glutinous ink, paper is cloſely preſſed upon it. See the articles PRINTING and TYPE. A fount of letters includes ſmall letters, capitals, ſmall capitals, points, figures, ſpaces, &c.; but beſides, they have different kinds of two-line letters, only uſed for titles, and the beginning of books, chapters, &c. See FOUNT.

LETTER, a writing addreſſed and ſent to a perſon. See EPISTLE. The art of epiſtolary writing, as the tranſlator of Pliny's Letters has obſerved, was eſteemed by the Romans in the number of liberal and polite accompliſhments; and we find Cicero mentioning with great pleaſure, in ſome of his letters to Atticus, the elegant ſpecimen he had received from his ſon of his genius in this way. It ſeems indeed to have formed part of their education; and, in the opinion of Mr. Locke, it well deſerves to have a ſhare in ours. "The writing of letters (as that judicious author obſerves) enters ſo much into all the occaſions of life, that no gentleman can avoid ſhewing himſelf in compoſitions of this kind. Occurrences will daily force him to make this uſe of his pen, which lays open his breeding, his ſenſe, and his abilities, to a ſeverer examination than any oral diſcourſe." It is to be wondered we have ſo few writers in our own language who deſerve to be pointed out as models upon ſuch an occaſion. After having named Sir William Temple, it would perhaps be difficult to add a ſecond. The elegant writer of Cowley's life mentions him as excelling in this uncommon talent; but as that author declares himſelf of opinion, "That letters which paſs between familiar friends, if they are written as they ſhould be, can ſcarce ever be fit to ſee the light," the world is deprived of what no doubt would have been well worth its inſpection. A late diſtinguiſhed genius treats the very attempt as ridiculous, and profeſſes himſelf a mortal enemy to what they call a *fine letter*." His averſion, however, was not ſo ſtrong, but he knew to conquer it when he thought proper; and the letter which cloſes his correſpondence with biſhop Atterbury is, perhaps, the moſt genteel and manly addreſs that ever was penned to a friend in diſgrace. The truth is, a fine letter does not conſiſt in ſaying fine things, but in expreſſing ordinary ones in an uncommon manner. It is the *proprie communia dicere*, the art of giving grace and elegance to familiar occurrences, that conſtitutes the merit of this kind of writing. Mr. Gay's letter concerning the two lovers who were ſtruck dead with the ſame flaſh of lightning, is a maſter-piece of the ſort; and the ſpecimen he has there given of his talents for this ſpecies of compoſition, makes it much to be regretted we have not more from the ſame hand.

Of the Style of Epiſtolary Compoſition. Purity in the choice of words, and juſtneſs of conſtruction, joined with perſpicuity, are the chief properties of this ſtyle. Accordingly Cicero ſays: "In writing letters, we make uſe of common words and expreſſions." And Seneca more fully: "I would have my letters to be like my diſcourſes, when we either ſit or walk together, unſtudied and eaſy." And what prudent man, in his common diſcourſe, aims at bright and ſtrong figures, beautiful turns of language, or laboured periods? Nor is it always requiſite to attend to exact order and method. He that is maſter of what he writes, will naturally enough expreſs his thought without perplexity and confuſion; and more than this is ſeldom neceſſary, eſpecially in familiar letters.

Indeed, as the ſubjects of epiſtles are exceedingly various, they will neceſſarily require ſome variety in the manner of expreſſion. If the ſubject be ſomething weighty and momentous, the language ſhould be ſtrong and ſolemn; in things of a lower nature, more free and eaſy; and upon lighter matters, jocoſe and pleaſant. In exhortations, it ought to be lively and vigorous; in conſolations, kind and compaſſionate; and in adviſing, grave and ſerious. In narratives, it ſhould be clear and diſtinct; in requeſts, modeſt; in commendations, friendly; in proſperity cheerful, and mournful in adverſity. In a word, the ſtyle ought to be accommodated to the particular nature of the thing about which it is converſant.

Beſides, the different character of the perſon, to whom the letter is written, requires a like difference in the modes of expreſſion. We do not uſe the ſame language to private perſons, and thoſe in a public ſtation; to ſuperiors, inferiors, and equals. Nor do we expreſs ourſelves alike to old men and young, to the grave and facetious, to courtiers and philoſophers, to our friends and ſtrangers. Superiors are to be addreſſed to with reſpect, inferiors with courteſy, and equals with civility; and every one's character, ſtation, and circumſtances in life, with the relation we ſtand in to him, occaſions ſome variety in this reſpect. But when friends and acquaintances correſpond by letters, it carries them into all the freedom and good humour of converſation; and the nearer it reſembles that, the better, ſince it is deſigned to ſupply the room of it. For when friends cannot enjoy each other's company, the next ſatisfaction is to converſe with each other by letters. Indeed, ſometimes greater freedom is uſed in epiſtles, than the ſame perſons would have taken in diſcourſing together; becauſe, as Cicero ſays, "A letter does not bluſh." But ſtill nothing ought to be ſaid in a letter, which, conſidered in itſelf, would not have been fit to ſay in diſcourſe; though modeſty, perhaps, or ſome other particular reaſon, might have prevented it. And thus it frequently happens in requeſts, reproofs, and other circumſtances of life. A man can aſk that by writing, which he could not do by words, if preſent; or blame what he thinks amiſs in his friend with greater liberty when abſent, than if they were together. From hence it is eaſy to judge of the fitneſs of any expreſſion to ſtand in an epiſtle, only by conſidering, whether the ſame way of ſpeaking would be proper in talking with the ſame perſon. Indeed, this difference may be allowed, that as perſons have more time to think, when they write, than when they ſpeak; a greater accuracy of language may ſometimes be expected in one, than the other. However, this makes no odds as to the kind of ſtyle; for every one would chooſe to ſpeak as correctly as he writes, if he could. And therefore all ſuch words and expreſſions, as are unbecoming in converſation, ſhould be avoided in letters; and

a manly ſimplicity free of all affectation, plain, but decent and agreeable, ſhould run through the whole. This is the uſual ſtyle of Cicero's epiſtles, in which the plainneſs and ſimplicity of his diction is accompanied with ſomething ſo pleaſant and engaging, that he keeps up the attention of his reader without ſuffering him to tire. On the other hand, Pliny's ſtyle is ſuccinct and witty; but generally ſo full of turns and quibbles upon the ſound of words, as apparently render it more ſtiff and affected than agrees with converſation, or than a man of ſenſe would chooſe in diſcourſe, were it in his power. You may in ſome meaſure judge of Pliny's manner, by one ſhort letter to his friend, which runs thus: "How fare you? As I do in the country? pleaſantly? that is, at leiſure? For which reaſon I do not care to write long letters, but to read them; the one as the effect of niceneſs, and the other of idleneſs. For nothing is more idle than your nice folks, or curious than your idle ones. Farewell." Every ſentence here conſiſts of an antitheſis, and a jingle of words, very different from the ſtyle of converſation, and plainly the effect of ſtudy. But this was owing to the age in which he lived, at which time the Roman eloquence was ſunk into puns, and an affectation of wit; for he was otherwiſe a man of fine ſenſe and great learning.

LETTER *of Attorney*, in law, is a writing by which one perſon authoriſes another to do ſome lawful act in his ſtead; as to give ſeiſin of lands, to receive debts, ſue a third perſon, &c. The nature of this inſtrument is to transfer to the perſon to whom it is given, the whole power of the maker, to enable him to accompliſh the act intended to be performed. It is either general or ſpecial: and ſometimes it is made revocable, which is when a bare authority is only given; and ſometimes it is irrevocable, as where debts, &c. are aſſigned from one perſon to another. It is generally held, that the power granted to the attorney muſt be ſtrictly purſued; and that where it is made to three perſons, two cannot execute it. In moſt caſes, the power given by a letter of attorney determines upon the death of the perſon who gave it. No letter of attorney made by any ſeamen, &c. in any ſhip of war, or having letters of marque, or by their executors, &c. in order to empower any perſon to receive any ſhare of prizes or bounty-money, ſhall be valid, unleſs the ſame be made revocable, and for the uſe of ſuch ſeamen, and be ſigned and executed before, and atteſted by, the captain and one other of the ſigning officers of the ſhip, or the mayor or chief magiſtrate of ſome corporation.

LETTER *of Mart* or *Marque*. See MARQUE.

LETTERS *Patent* or *Overt*, are writings ſealed with the great ſeal of England, whereby a man is authoriſed to do or enjoy any thing, which, of himſelf, he could not do. See PATENT. They are ſo called, by reaſon of their form; as being open, with the ſeal affixed, ready to be ſhown for the confirmation of the authority given by them.

LETTUCE, in botany. See LACTUCA.

LEVANT, in geography, ſignifies any country ſituated to the eaſt of us, or in the eaſtern ſide of any continent or country, or that on which the ſun riſes.

LEVANT, is alſo a name given to the eaſtern part of the Mediterranean ſea, bounded by Natolia or the Leſſer Aſia on the north, by Syria and Paleſtine on the eaſt, by Egypt and Barca on the ſouth, and by the iſland of Candia and the other part of the Mediterranean on the weſt.

LEVATOR, in anatomy, a name given to ſeveral muſcles. See ANATOMY, *Table of the Muſcles*.

LEUCA, in antiquity, a geographical meaſure of length in uſe among the later Gauls; which, according to Jornandes, who calls it *leuga*, contained fifteen hundred paces, or one mile and a half. Hence the name of *league*, now reckoned at three miles; in the lower age, called *leuva*.

LEUCADENDRON, in botany: A genus of the monogynia order, belonging to the tetrandria claſs of plants; and in the natural method ranking under the 48th order, *Aggregatæ*. The florets are tripetalous, with one petal of each trifid; the receptacle is a little villous; there is no proper calyx; the antheræ are almoſt coalited.

LEUCADIA, formerly called *Neritis*, a peninſula of Acarnania, (Homer); but afterwards, by cutting through the peninſula, made an iſland, as it is at this day, called *St. Maura*.

LEUCAS (anc. geog.), formerly called *Neritos* and *Neritum*, a town of Leucadia or Leucas; ſituated near a narrow neck of land, or iſthmus, on a hill facing the eaſt and Acarnania: the foot or lower part of the town was a plain lying on the ſea by which Leucadia was divided from Acarnania (Livy); though Thucydides places Leucas more inward in the iſland, which was joined to the continent by a bridge. It was an illuſtrious city, the capital of Acarnania, and the place of general aſſembly.

LEUCATA, or LEUCATE, (anc. geog.); a promontory of Leucadia according to Strabo, a white rock projecting into the ſea towards Cephalenia, on which ſtood a temple of Apollo ſurnamed *Leucadius*. At his feſtival, which was annually celebrated here, the people were accuſtomed to offer an expiatory ſacrifice to the god, and to avert on the head of the victim all the calamities with which they might be threatened. For this purpoſe, they made choice of a criminal condemned to die; and, leading him to the brink of the promontory, precipitated him into the ſea amidſt the loud ſhouts of the ſpectators. The criminal, however, ſeldom periſhed in the water: for it was the cuſtom to cover him with feathers, and to faſten birds to his body, which by ſpreading their wings might ſerve to break his fall. No ſooner did he touch the ſea, than a number of boats ſtationed for the purpoſe flew to his aſſiſtance, and drew him out; and after being thus ſaved, he was baniſhed for ever from the territory of Leucadia. (*Strabo*, lib. 10. p. 452.)

According to ancient authors, a ſtrange opinion concerning this promontory prevailed for ſome time among the Greeks. They imagined that the leap of Leucata was a potent remedy againſt the violence of love. Hence diſappointed or deſpairing lovers, it is ſaid, were often known to have come to Leucadia; and, having aſcended the promontory, offered ſacrifices in the temple, and engaged by a formal vow to perform the deſperate act, to have voluntarily precipitated themſelves into the ſea. Some are reported to have recovered from the effects of the fall; and among others mention is made of a citizen of Buthroton, in Epirus, whoſe paſſions always taking fire at new objects, he four times had recourſe to the ſame remedy, and always with the ſame ſucceſs. As thoſe who made the trial, however, ſeldom took any precaution to render their fall leſs rapid, they were generally deſtroyed; and women often fell victims to this act of deſperation.—At Leucata was ſhown the tomb of Artemiſia, that celebrated queen of Caria, who gave ſo many proofs of courage at the battle of Salamis. Inflamed with a violent paſſion for a young man who inflexibly refuſed her love, ſhe ſurpriſed him in his ſleep and put out his eyes. Regret and deſpair ſoon brought her to Leucata, where ſhe periſhed in the waves notwithſtanding every effort to ſave her. Such likewiſe was the end of the unhappy Sappho. Forſaken by her lover Phaon, ſhe came hither to ſeek relief from her ſufferings, and found her death. (*Menand. ap. Strab.* lib. 10. p. 452.)

LEUCIPPUS, a celebrated Greek philoſopher and mathematician; firſt author of the famous ſyſtem of atoms and vacuums, and of the hypotheſis of ſtorms; ſince attributed to the moderns. He flouriſhed about 428 B. C.

LEUCOGÆUS (anc. geog.), a hill ſituated between Puteoli and Neapolis in Campania, abounding in ſulphur; now *l'Alumera*. Whence there were alſo ſprings called *Leucogæi fontes*; the waters of which, according to Pliny, gave a firm-

nefs to the teeth, clearnefs to the eyes, and proved a cure in wounds.

LEUCOJUM, GREAT SNOW-DROP; a genus of the monogynia order, belonging to the hexandria clafs of plants; and in the natural method ranking under the ninth order, *Spathaceæ*. The corolla is campanulated, fexpartite, the fegments increafed at the points, the ftigma fimple. The *fpecies* are, 1. The *vernum*, or fpring leucojum, has an oblong bulbous root, fending up feveral flat leaves fix or eight inches long; and amidft them an upright, channelled, hollow, naked ftalk, about a foot high, terminated by a fpatha, protruding one or two white flowers on flender foot ftalks drooping downwards, and appearing in March. 2. The *æftivum*, or fummer leucojum, has a large oblong bulbous root, crowned with feveral long, flat, broad leaves; and amidft them an upright, thick, hollow ftalk, 15 or 18 inches high; terminated by a fpatha, protruding many white flowers, on flender footftalks, drooping downwards; flowering in May. 3. The *autumnale*, or autumnal leucojum, hath a large oblong bulbous root, crowned with many narrow leaves, an upright, naked, hollow ftalk, terminated by a fpatha protruding many white flowers on long weak footftalks, hanging downwards, and flowering in autumn. All the three fpecies are very hardy, durable in root, and increafe exceedingly by offsets, which may be feparated every two or three years.

LEUCOMA, in antiquity, was a public regifter amongft the Athenians, in which were inferted the names of all the citizens, as foon as they were of age to enter upon their paternal inheritance.

LEUCOMA, in furgery, a film or white fpot on the tranfparent cornea of the eye, otherwife called ALBUGO.

LEUCOPETRA (anc. geog.), fo called from its white colour (Strabo); a promontory of the Bruttii, in the territory of Rhegium: the termination of the Apennine. The outmoft extremity of the Bruttii, or the modern *Calabria Ultra*; as the Japygium is of the ancient Calabria, or the modern Calabria Citra.

LEUCOPETRIANS, in eccleſiaſtical hiſtory, the name of a fanatical fect which fprang up in the Greek and Eaftern churches towards the clofe of the 12th century: the fanatics of this denomination profeffed to believe in a double trinity, rejected wedlock, abftained from flefh, treated with the utmoft contempt the facraments of Baptifm and the Lord's Supper, and all the various branches of external worfhip; placed the eſſence of religion in internal prayer alone, and maintained, as it is faid, that an evil being, or genius, dwelt in the breaft of every mortal, and could be expelled from thence by no other method than by perpetual fupplication to the Supreme Being. The founder of this enthufiaftical fect is faid to have been a perfon called *Leucopetrus*, and his chief difciple Tychicus, who corrupted, by fanatical interpretations, feveral books of Scripture, and particularly St. Matthew's gofpel.

LEUCOPHLEGMATIA, in medicine, a kind of dropfy, otherwife called ANASARCA. See MEDICINE.

LEUCOTHOE, or LEUCOTHEA (fab. hift.), the wife of Athamus, changed into a fea deity; fee INO. She was called *Matuta* by the Romans. She had a temple at Rome, where all the people, particularly women, offered vows for their brother's children. They did not entreat the deity to protect their own children, becaufe Ino had been unfortunate in hers. No female flaves were permitted to enter the temple; or, if their curiofity tempted them to tranfgrefs this rule, they were beaten with the greateft feverity. To this fupplicating for other people's children, Ovid alludes in thefe lines:

Non tamen hanc pro ſtirpe ſuâ pia mater adorat,
Ipſa parum felix viſa fuiſſe parens. Faſt. 6.

LEUCTRA (anc. geog.), a town of Bœotia, to the weft of Thebes, or lying between Plateæ and Theſpiæ, where the Lacedemonians had a great defeat given them by Epaminondas and Pelopidas the Theban generals. The Theban army conſiſted at moſt but of 6000 men, whereas that of the enemy was at leaſt thrice that number: but Epaminondas truſted moſt in his horſe, wherein he had much the advantage, both in their quality and good management: the reſt he endeavoured to ſupply by the diſpoſition of his men, and the vigour of the attack. He even refuſed to ſuffer any to ſerve under him in the engagement, but ſuch as he knew to be fully reſolved to conquer or die. He put himſelf at the head of the left wing, oppoſite to Cleombrotus king of Sparta, and placed the main ſtreſs of the battle there; rightly concluding, that if he could break the body of the Spartans, which was but 12 men deep, whereas his own was 50, the reſt would be ſoon put to flight. He cloſed his own with the ſacred band, which was commanded by Pelopidas; and placed his horſe in the front. His right, from which he had drawn ſo many men, he ordered to fall back, in a ſlanting line, as if they declined to fight, that they might not be too much expoſed to the enemy, and might ſerve him for a corps of reſerve in caſe of need. This was the wiſe diſpoſition which the two Theban generals made of their few but reſolute forces; and which ſucceeded in every part, according to their wiſh. Epaminondas advanced with his left wing, extending it obliquely, in order to draw the enemy's right from the main body; and Pelopidas charged them with ſuch deſperate ſpeed and fury, at the head of his battalion, before they could reunite, that their horſe, not being able to ſtand the ſhock, were forced back upon their infantry, which threw the whole into the greateſt confuſion: ſo that though the Spartans were of all the Greeks the moſt expert in recovering from any ſurpriſe, yet their ſkill on this occaſion either failed them or proved of no effect; for the Thebans, obſerving the dreadful impreſſion they had made on them with their horſe, puſhed furiouſly upon the Spartan king, and opened their way to him with a great ſlaughter. Upon the death of Cleombrotus, and ſeveral officers of note, the Spartans, according to cuſtom, renewed the fight with double vigour and fury, not ſo much to revenge his death as to recover his body, which was ſuch an eſtabliſhed point of honour as they could not give up without the greateſt diſgrace. But here the Theban general wiſely choſe rather to gratify them in that point, than to hazard the ſucceſs of a ſecond onſet; and left them in poſſeſſion of their king, whilſt he marched ſtraight againſt their other wing, commanded by Archidamus, and conſiſted chiefly of ſuch auxiliaries and allies as had not heartily engaged in the Spartan intereſt: theſe were ſo diſcouraged by the death of the king and the defeat of that wing, that they betook themſelves to flight, and were preſently after followed by the reſt of the army. The Thebans, however, purſued them ſo cloſely, that they made a ſecond dreadful ſlaughter among them; which completed Epaminondas's victory, who remained maſter of the field, and erected a trophy in memory of it. This was the concluſion of the famed battle of Leuctra, in which the Lacedemonians loſt 4000 men, and the Thebans but 300.

LEVEL, an inſtrument wherewith to draw a line parallel to the horizon, by means of which the true level, or the difference of aſcent or deſcent between ſeveral places, may be found, for conveying water, draining fens, &c. There are ſeveral inſtruments of different contrivance and matter, invented for the perfection of levelling; all of which, for the practice, may be reduced to the following.

Air-LEVEL, that which ſhows the line of level by means of a bubble of air incloſed with ſome liquor in a glaſs tube of an indeterminate length and thickneſs, whoſe two ends are hermetically ſealed. When the bubble fixes itſelf at a certain mark, made exactly in the middle of the tube, the plane or ruler

wherein it is fixed is level. When it is not level, the bubble will rise to one end. This glass-tube may be set in another of brass, having an aperture in the middle, whence the bubble of air may be observed. The liquor wherewith the tube is filled is oil of tartar, or aqua fecunda; these not being liable to freeze as common water, nor to rarefaction and condensation, as spirit of wine is. This application of a bubble of air was the invention of Dr. Hooke.

There is one of these instruments made with sights, being an improvement upon that last described, which, by the addition of more apparatus, becomes more commodious and exact. It consists of an air-level, fig. 1. pl. 6. about eight inches long, and seven or eight lines in diameter, set in a brass tube, 2, with an aperture in the middle, C. The tubes are carried in a strong straight ruler, a foot long; at whose ends are fixed two sights, 3, 3, exactly perpendicular to the tubes, and of an equal height, having a square hole, formed by two fillets of brass crossing each other at right angles, in the middle whereof is drilled a very little hole, through which a point on a level with the instrument is descried. The brass tube is fastened on the ruler by means of two screws; one whereof, marked 4, serves to raise or depress the tube at pleasure, for bringing it towards a level. The top of the ball and socket is riveted to a little ruler that springs, one end whereof is fastened with screws to the great ruler, and at the other end has a screw, 5, serving to raise and depress the instrument when nearly level.

The instrument just described, however, is yet less commodious than the following one; because, though the holes be ever so small, yet they will still take in too great a space to determine the point of level precisely.

The instrument alluded to consists of an air-level, with telescope sights. This level (fig. 2.) is like the last; with this difference, that, instead of plain sights, it carries a telescope to determine exactly a point of level at a good distance. The telescope is a little brass tube, about 15 inches long, fastened on the same ruler as the level. At the end of the tube of the telescope, marked 1, enters the little tube 1, carrying the eye-glass and an hair horizontally placed in the focus of the object-glass, 2; which little tube may be drawn out, or pushed into the great one, for adjusting the telescope to different sights: at the other end of the telescope is placed the object-glass. The screw 3, is for raising or lowering the little fork, for carrying the hair, and making it agree with the bubble of air when the instrument is level; and the screw 4, is for making the bubble of air, D or E, agree with the telescope: the whole is fitted to a ball and socket. M. Huygens is said to be the first inventor of this level; which has this advantage, that it may be inverted by turning the ruler and telescope half round; and if then the hair cut the same point that it did before, the operation is just.

It may be observed, that one may add a telescope to any kind of level, by applying it upon, or parallel to, the base or ruler, when there is occasion to take the level of remote objects.

Dr. Desaguliers contrived an instrument, by which the difference of level of two places, which could not be taken in less than four or five days with the best telescope-levels, may be taken in as few hours. The instrument is as follows: To the ball C (fig. 3.) is joined a recurve tube BA, with a very fine bore, and a small bubble at top A, whose upper part is open. It is evident from the make of this instrument, that if it be inclined in carrying, no prejudice will be done to the liquor, which will always be right both in the ball and tube when the instrument is set upright. If the air at C be so expanded with heat, as to drive the liquor to the top of the tube, the cavity A will receive the liquor, which will come down again and settle at D, or near it, according to the level of the place where the instrument is, as soon as the air at C returns to the same temperament as to heat and cold. To preserve the same degree of heat, when the different observations are made, the machine is fixed in a tin vessel EF, filled with water up to *g h*, above the ball, and a very sensible thermometer has also its ball under water, that one may observe the liquor at D, in each experiment, when the thermometer stands at the same height as before. The water is poured out when the instrument is carried; which one may do conveniently by means of the wooden frame, which is set upright by the three screws, S, S, S, fig. 4. and a line and plummet P P, fig. 5. At the back part of the wooden frame, from the piece at top K, hangs the plummet P, over a brass point at N; M *m* are brackets to make the upright board K N continue at right angles with the horizontal one at N. Fig. 6. represents a front view of the machine, supposing the fore part of the tin-vessel transparent; and here the brass-socket of the recurve-tube, into which the ball is screwed, has two wings at I I, fixed to the bottom, that the ball may not break the tube by its endeavour to emerge when the water is poured in as high as *g h*.

After the Doctor had contrived this machine, he considered, that as the tube is of a very small bore, if the liquor should rise into the ball at A (fig. 3.) in carrying the instrument from one place to another, some of it would adhere to the sides or the ball A, and upon its descent in making the experiment, so much might be left behind, that the liquor would not be high enough at D to show the difference of the level: therefore, to prevent that inconveniency, he contrived a blank screw, to shut up the hole at A, as soon as one experiment is made, that, in carrying the machine, the air in A may balance that in C, so that the liquor shall not run up and down the tube, whatever degree of heat and cold may act upon the instrument, in going from one place to another. Now, because one experiment may be made in the morning, the water may be so cold, that when a second experiment is made at noon the water cannot be brought to the same degree of cold it had in the morning; therefore, in making the first experiment, warm water must be mixed with the cold, and when the water has stood for some time, before it comes to be as cold as it is likely to be at the warmest part of that day, observe and set down the degree of the thermometer at which the spirit stands, and likewise the degree of the water in the barometer at D; then screw on the cape at A, pour out the water, and carry the instrument to the place whose level you would know; then pour in your water, and when the thermometer is come to the same degree as before, open the screw at top, and observe the liquor in the barometer.

The Doctor's scale for the barometer is ten inches long, and divided into tenths; so that such an instrument will serve for any heights not exceeding ten feet, each tenth of an inch answering to a foot in height.

The Doctor made no allowance for the decrease of density in the air, because he did not propose this machine for measuring mountains (though, with a proper allowance for the decreasing density of the air, it will do very well), but for heights that want to be known in gardens, plantations, and the conveyance of water, where an experiment that answers two or three feet in a distance of 20 miles, will render this a very useful instrument.

Artillery Foot-LEVEL is in form of a square, having its two legs or branches of an equal length; at a juncture whereof is a little hole, whence hangs a thread and plummet playing on a perpendicular line in the middle of a quadrant. It is divided into twice 45 degrees from the middle. Fig. 7. pl. 6. This instrument may be used on other occasions, by placing the ends of its two branches on a plane; for when the thread plays perpendicularly over the middle division of the quadrant, that plane is assuredly level. To use it in gunnery, place the two ends on the piece of artillery, which you may raise to any proposed height, by means of the plummet, whose thread will give the degree above the level.

Carpenter's and Pavior's LEVEL, conſiſts of a long ruler, in the middle whereof is fitted, at right angles, another ſomewhat bigger, at the top of which is faſtened a line, which, when it hangs over a fiducial line at right angles with the baſe, ſhows that the ſaid baſe is horizontal. Sometimes this level is all of one board. Fig. 8.

Gunner's LEVEL, for levelling cannons and mortars, conſiſts of a triangular braſs plate, about four inches high, fig. 9. pl. 6. at the bottom of which is a portion of a circle, divided into 45 degrees; which number is ſufficient for the higheſt elevation of cannons and mortars, and for giving ſhot the greateſt range: on the centre of this ſegment of a circle is ſcrewed a piece of braſs, by means of which it may be fixed or ſcrewed at pleaſure: the end of this piece of braſs is made ſo as to ſerve for a plummet and index, in order to ſhow the different degrees of elevation of pieces of artillery. This inſtrument has alſo a braſs foot, to ſet upon cannons or mortars, ſo as, when thoſe pieces are horizontal, the inſtrument will be perpendicular. The foot of this inſtrument is to be placed on the piece to be elevated, in ſuch a manner, as that the point of the plummet may fall on the proper degree: this is what they call *levelling the piece*.

Maſon's LEVEL, is compoſed of three rules, ſo joined as to form an iſoſceles-rectangle, ſomewhat like a Roman A; at the vertex whereof is faſtened a thread, from which hangs a plummet, that paſſes over a fiducial line, marked in the middle of the baſe, when the thing to which the level is applied is horizontal; but declines from the mark, when the thing is lower on the one ſide than on the other.

Plumb LEVEL, that which ſhows the horizontal lines by means of another line perpendicular to that deſcribed by a plummet or pendulum. This inſtrument, fig. 10. pl. 6, conſiſts of two legs or branches, joined together at right angles, whereof that which carries the thread and plummet is about a foot and a half long; the thread is hung towards the top of the branch, at the point 2. The middle of the branch where the thread paſſes is hollow, ſo that it may hang free every where: but towards the bottom, where there is a little blade of ſilver, whereon is drawn a line perpendicular to the teleſcope, the ſaid cavity is covered by two pieces of braſs, making as it were a kind of caſe, leſt the wind ſhould agitate the thread; for which reaſon the ſilver blade is covered with a glaſs G, to the end that it may be ſeen when the thread and plummet play upon the perpendicular: the teleſcope is faſtened to the other branch of the inſtrument, and is about two feet long; having an hair placed horizontally acroſs the focus of the object-glaſs, which determines the point of the level. The teleſcope muſt be fitted at right angles to the perpendicular. It has a ball and ſocket, by which it is faſtened to the foot, and was invented by M. Picard.

Reflecting LEVEL, that made by means of a pretty long ſurface of water repreſenting the ſame object inverted which we ſee erected by the eye, ſo that the point where theſe two objects appear to meet is a level with the place where the ſurface of the water is found. This is the invention of M. Marriotte. There is another reflecting level conſiſting of a mirror of ſteel, or the like, well poliſhed, and placed a little before the object-glaſs of a teleſcope, ſuſpended perpendicularly. This mirror muſt make an angle of 45° with the teleſcope, in which caſe the perpendicular line of the ſaid teleſcope is converted into a horizontal line, which is the ſame with the line of level. This is the invention of M. Caſſini.

Water-LEVEL, that which ſhows the horizontal line by means of a ſurface of water or other liquor; founded on this principle, that water always places itſelf level. The moſt ſimple is made of a long wooden trough or canal, whoſe ſides are parallel to the baſe; ſo that being equally filled with water, its ſurface ſhows the line of level. This is the chorobates of the ancients. See CHOROBATA It is alſo made with two cups fitted to the two ends of a pipe, three or four feet long, about an inch in diameter, by means whereof the water communicates from the one to the other cup; and this pipe being moveable on its ſtand by means of a ball and ſocket, when the two cups become equally full of water, their two ſurfaces mark the line of level.

This inſtrument, inſtead of cups, may alſo be made with two ſhort cylinders of glaſs three or four inches long, faſtened to each extreme of the pipe with wax or maſtic. Into the pipe is poured ſome common or coloured water, which ſhows itſelf through the cylinders, by means whereof the line of level is determined; the height of the water, with reſpect to the centre of the earth, being always the ſame in both cylinders: this level, though very ſimple, is yet very commodious for levelling ſmall diſtances.

LEVEL *of Mr. Huygens's invention*, conſiſts of a teleſcope *a*, pl. 6. fig. 11. in form of a cylinder, going through a ferrule, in which it is faſtened by the middle. This ferrule has two flat branches *b b*, one above, and the other below; at the ends whereof are faſtened little moving pieces, which carry two rings, by one of which the teleſcope is ſuſpended to an hook at the end of the ſcrew 3, and by the other a pretty heavy weight is ſuſpended, in order to keep the teleſcope *in æquilibrio*. This weight hangs in the box 5, which is almoſt filled with linſeed oil, oil of walnuts, or other matter that will not eaſily coagulate, for more aptly ſettling the balance of the weight and teleſcope. The inſtrument carries two teleſcopes cloſe and very parallel to each other; the eye-glaſs of the one being againſt the object glaſs of the other, that one may ſee each way without turning the level. In the focus of the object-glaſs of each teleſcope muſt a little hair be ſtrained horizontally, to be raiſed and lowered as occaſion requires by a little ſcrew. If the tube of the teleſcope be not found level when ſuſpended, a ferrule or ring, 4, is put on it, and is to be ſlid along till it fixes to a level. The hook on which the inſtrument is hung is fixed to a flat wooden croſs; at the ends of each arm whereof there is a hook ſerving to keep the teleſcope from too much agitation in uſing or carriage. To the ſaid flat croſs is applied another hollow one, that ſerves as a caſe for the inſtrument; but the two ends are left open, that the teleſcope may be ſecured from the weather and always in a condition to be uſed. The foot of this inſtrument is a round braſs plate, to which are faſtened three braſs ferrules, moveable by means of joints whereon are put ſtaves, and on this foot is placed the box. Fig. 12. marked I, is a balance-level, which being ſuſpended by the ring, the two ſights, when *in æquilibrio*, will be horizontal, or in a level.

Spirit LEVEL. The moſt accurate levelling inſtrument, and that poſſeſſed of the greateſt eſſential advantages in uſe, is the ſpirit-level; which was firſt conſtructed by the late Mr. Siſſon, and to which ſome ſmall additions and improvements have been ſince made. The following is a deſcription of one of the beſt of theſe levels, as made by the principal mathematical inſtrument makers. Fig. 13. in pl. 6. is a repreſentation of the inſtrument mounted on its complete ſtaves, copied (except the letters) from Mr. Adams's Graphical Eſſays, Plate xvii. fig. 3. The teleſcope (ABC) is made from 15 inches to 2 feet in length, as may be required. It is achromatic, of the beſt kind, and ſhows the objects erect. In the focus of the eye-glaſſes are exceedingly fine croſs wires, the interſection of which is evidently ſhown to be perfectly in the axis of the tube; for by turning it round on its two ſupporters DE, and looking through the teleſcope, the interſection of the wires will conſtantly cut the ſame part of the object viewed. By turning

the ſcrew *a* at the ſide of the teleſcope, the object-glaſs at *g* is moved; and thus the teleſcope is exactly adapted to the eye. If theſe croſs wires are at any time out of their adjuſtment, which is diſcovered by their interſection not cutting the ſame part of the object during the revolution of the teleſcope on its axis, they are eaſily adjuſted by means of the four ſcrews *bbb*, placed on the teleſcope about an inch from the end for the eye. Theſe ſcrews act in perpendicular directions to one another, by unſcrewing one and tightening the other oppoſite to the wire, ſo that, if connected with it, it may be moved either way at pleaſure; and in this manner the other wire perpendicular to it may be moved, and thus the interſection of the wires brought exactly in the axis of the tube.

To the teleſcope is fixed, by two ſmall ſcrews *cc*, the level tube containing the ſpirits, with a ſmall bubble of air: This bubble of air, when the inſtrument is well adjuſted, will ſettle exactly in the ſame place, in or near the middle of its tube, whether the teleſcope be reverſed or not on the ſupporters, which in this caſe are kept unmoved.

It is evident, that the axis of the teleſcope, or the interſection of the wires, as before ſhown, muſt be in this caſe truly level. In this facile mode of adjuſtment conſiſts the new improvement of the inſtrument; and it is hereby capable of being adjuſted by only one ſtation and one object, which will at the ſame time determine it to be in a true level. If by change of weather, accident, or otherwiſe, the inſtrument ſhould have loſt its level adjuſtment or ſtate, it may thus be readily reſtored and readjuſted at the firſt ſtation; which is an advantage none of the inſtruments formerly made have been capable of. The two ſupporters D E, on which the level reſts and turns, are ſhaped like the letter Y. The teleſcope reſts within the upper part of them; and the inner ſides of each of theſe Ys are tangents to the cylindric tube of the teleſcope, which is turned to a true cylinder, and each touches it but at one place only.

The lower end of theſe ſupporters are inſerted into a ſtrong braſs plate (FE), and ſo as to ſtand perpendicularly on it. One is kept faſt by a tightening ſcrew G, and to the other is applied a fine threaded ſcrew H, to adjuſt the tube when on its ſupporters to a true level. To the ſupporter D is ſometimes applied a line of tangents as far as 12 degrees, in order to take an angle of depreſſion or elevation to that extent. Between the ſupporters is alſo ſometimes fixed a compaſs-box I, divided into 360 degrees, and again into four 90°; having a centre pin and needle, and trigger, at *d*, to throw off the needle from the centre when not uſed; ſo in this manner it conſtitutes a perfect circumferenter, connected with all the foregoing improvements. This plate is fixed on a conical braſs ferrule K, which is adapted to the bell-metal fruſtum of a cone at top of the braſs head of the ſtaves, having a ball and ſocket, with three bell-metal joints, two ſtrong braſs parallel plates L L, the four ſcrews *eeee* for adjuſting the horizontal motion, a regulating ſcrew M to this motion, and a faſtening ſcrew N to lighten it on the cone when neceſſary. The faſtening ſcrew N, and the regulating ſcrew M, by which the whole inſtrument is moved with accuracy through a ſmall ſpace in an horizontal direction, was an addition of Mr. Ramſden's.

The manner of adjuſting the ſpirit-level at the firſt ſtation. The whole level being now placed ſteadily on its ſtaves, it muſt be rendered parallel to the axis of the teleſcope before you adjuſt the horizontal motion. To this end the teleſcope muſt be placed in a line with two of the ſcrews *ee*, and then levelled thereby till the bubble of air in the ſpirit-tube keeps its poſition in the middle, while turned about to three points, making nearly right angles at the centre to one another.

The horizontal motion being thus adjuſted, the rims *ff* of the Ys are to be opened, the teleſcope taken off and laid the contrary way upon the ſupporters. If the bubble of air then reſts exactly the ſame, the level and teleſcope are adjuſted rightly to one another; but if the bubble does not remain the ſame, the end to which the air bubble goes muſt be noticed, and the diſtance of it from the teleſcope altered; correcting one half the error by the ſcrews *cc*, and the other half by the ſcrews *ee*.

Now the interſection of the wires being directed to any diſtant object, it may be one of the vanes of the ſtaves hereafter deſcribed: if they continue to be againſt it preciſely while the teleſcope is turned round on its Ys, it proves, as before mentioned, that the axis of the teleſcope coincides with the interſection of the wires, and that the inſtrument will give the true level direction.

The operation of levelling being of a very accurate and important nature, and the beſt inſtrument when out of its adjuſtment being of little uſe, it is quite neceſſary that every perſon uſing ſuch an inſtrument ſhould have it readily in his power to correct it; and the one above deſcribed appears to be the beſt adapted for that purpoſe of any hitherto contrived.

LEVELLING may be defined, the art which inſtructs us in finding how much higher or lower any given point on the ſurface of the earth is than another; or, in other words, the difference in their diſtance from the centre of the earth. The practice of levelling therefore conſiſts, 1. In finding and marking two or more points that ſhall be in the circumference of a circle whoſe centre is that of the earth. 2. In comparing the points thus found with other points, to aſcertain the difference in their diſtances from the earth's centre.

With regard to the theory of levelling, we muſt obſerve, that a plumb-line, hanging freely in the air, points directly towards the centre of the earth; and a line drawn at right angles, croſſing the direction of the plumb-line, and touching the earth's ſurface, is a true level only in that particular ſpot; but if this line which croſſes the plumb be continued for any conſiderable length, it will riſe above the earth's ſurface, and the apparent level will be above the true one, becauſe the earth is globular; and this riſing will be as the ſquare of the diſtance to which the ſaid right line is produced; that is to ſay, however much it is raiſed above the earth's ſurface at one mile's diſtance, it will riſe four times as much at the diſtance of two miles, nine times at the diſtance of three, &c. This is owing to the globular figure of the earth; and this riſing is the difference betwixt the true and apparent levels; the real curve of the earth being the true level, and the tangent to it the apparent level. Hence it appears, that the leſs diſtance we take betwixt any two ſtations, the truer will be our operations in levelling; and ſo ſoon does the difference betwixt the true and apparent levels become perceptible, that it is neceſſary to make an allowance for it if the diſtance betwixt the two ſtations exceeds two chains in length. The following infallible rule for determining the allowance to be made, is drawn from "Leach's Inland Navigation."

"Multiply the number of Gunter's decimal ſtatute chains that are contained in length between any two ſtations where the levels are to be taken by itſelf, and the product ariſing therefrom again by 124; which is a common multiplier for all manner of diſtances for this purpoſe on account of the earth's curvature: then divide the ſecond product ariſing therefrom by 100,000; or, which is alſo the ſame, with the daſh of the pen cut off five figures on the right hand ſide of the product, and what remains on the left ſide is inches, and the five figures cut off decimal parts of an inch."

The following is *A Table of Curvature of the Earth*, and shows the quantity below the apparent level at the end of every number of chains to 100.

Chains.	Inches.	Chains.	Inches.	Chains.	Inches.	Chains.	Inches.
1	0.00125	14	0.24	27	0.91	40	2.00
2	0.005	15	0.28	28	0.98	45	2.28
3	0.01125	16	0.32	29	1.05	50	3.12
4	0.02	17	0.36	30	1.12	55	3.78
5	0.03	18	0.40	31	1.19	60	4.50
6	0.04	19	0.45	32	1.27	65	5.31
7	0.06	20	0.50	33	1.35	70	6.12
8	0.08	21	0.55	34	1.44	75	7.03
9	0.10	22	0.60	35	1.53	80	8.00
10	0.12	23	0.67	36	1.62	85	9.03
11	0.15	24	0.72	37	1.71	90	10.12
12	0.18	25	0.78	38	1.80	95	11.28
13	0.21	26	0.84	39	1.91	100	12.50

Levelling is either simple or compound. The former is when the level points are determined from one station, whether the level be fixed at one of the points or between them. Compound levelling is nothing more than a repetition of many simple operations.

An example of simple levelling is given in pl. 7. fig. 1. where A B are the station-points of the level; C D the two points ascertained. Let the height

	Feet.	Inches.
From A to C be - -	6	0 0
From B to D be -	9	0 0
The difference -	3	0 0

shows that B is three feet lower than A.

If the station-points of the level are above the line of sight, as in fig. 2. and the distance from A to C be six feet, and from B to D nine feet, the difference will still be three feet which B is higher than A.

As an example of compound levelling, suppose it were required to know the difference of height between the point A on the river *Zome*, and N on the river *Belann*, fig. 3. (As our author could find no satisfactory examples in any English author, he copied this and the following ones from M. le Febure.) In this operation stakes should be driven down at A and N, exactly level with the surface of the water; and these stakes should be so fixed, that they may not be changed until the whole operation be finished: a plan of the ground between the two rivers should then be made, by which it will be discovered, that the shortest way between the rivers is by the dotted line AC, CH, HN; from whence also the number of stations necessary to be taken will be determined. The operator will also be enabled to distribute them properly according to the nature and situation of the ground. In the figure 12. stations are marked. Stakes ought then to be driven in at the limits of each station, as A, B, C, D, &c. They ought to be about two or three inches above the ground, and driven 18 inches into it. Stakes should also be driven in at each station of the instrument, as 1, 2, 3, 4, &c.

The operation may be begun in the following manner: Let the first station be at 1, equally distant from the two points A and B, which themselves are distant 166 yards. Write down then in one column the first limit A; in another, the number of feet, inches, and tenths; with the points of sight indicated on the station-staff at A, viz. 7. 6. 0. In the third column, the second limit B; in the fourth, the height indicated at the station staff B, viz. 6. 0. 0. Lastly, in the fifth column, the distance from one station-staff to the other; which in this case is 166 yards. Remove now the level to the point marked 2, which is in the middle between B and C, the two places where the station-staves are to be held; observing that B, which was the second limit in the former operation, is the first in this. Then write down the observed heights as before; in the first column B; in the second 4. 6. 0; in the third C; in the fourth 5. 6. 2.; in the fifth 560, the distance between B and C.

It being impossible, on account of the inequality of the ground at the third station, to place the instrument in the middle between the two station-staves, find the most convenient point as at 3; then measure exactly how far this is from each station-staff, and you will find that from 3 to C is 160 yards; from 3 to D, 80 yards; and the remainder of the operation will be as in the preceding station.

In the fourth operation, we must endeavour to compensate for any error which might have happened in the last. Mark out, therefore, 80 yards from the station-staff D to the point 4; and 160 yards from 4 to E; and this must be carefully attended to, as by such compensations the work may be much facilitated. Proceed in the same manner with the eight remaining stations, observing to enter every thing in its proper column; and when the whole is finished, add the sums of each column together, and then subtract the lesser from the greater: the difference, which in the present case is 5. 4. 8. shows the ground at N to be thus much lower than the ground at A.

To obtain a section of this level, draw the dotted line *o o*, fig. 4. either above or below the plan; which may be taken for the level or horizontal line. Let fall then perpendiculars upon this line from all the station-points and places where the station-staves were fixed. Beginning now at A, set off 7 feet 6 inches upon the line from A to *a*: for the height of the level-point determined on the staff at this place, draw a line through *a* parallel to the dotted line *o o*, which will cut the third perpendicular at *b*, the second station-staff. Set off from this point downwards six feet to B, which shows the second limit of the first operation; and that the ground at B is one foot six inches higher than at A: place your instrument between these two lines at the height of the level line, and trace the ground according to its different heights. Now set off, on the second station-staff B, four feet six inches to C, the height determined by the level at the second station; and from C draw a line parallel to *o o*, which will cut the fifth perpendicular at *d*, the third station-staff. From this point set off 5 feet 6 inches $\frac{6}{8}$ downwards to C, which will be our second limit with respect to the preceding one, and the third with respect to the first. Then draw your instrument in the middle between B and C, and delineate the ground with its inequalities. Proceed in the same manner from station to station, till you arrive at the last N, and you will have the profile of the ground over which the level was taken.

This method answers very well where only a general profile of the different stations is required; but where it is necessary to have an exact detail of the ground between the limits, we must then go to work more particularly. Suppose, therefore, the level to have been taken from A to N by another route, but on more uniform ground, in order to form a canal marked O, P, Q, R, S, T, U, X, Y. Draw at pleasure a line Z, Y, fig. 5. to represent the level, and regulate the rest; then let fall on this line perpendiculars to represent the staves at the limits of each station, taking care that they be fixed accurately at their respective distances from each other. The difference between the extreme limits, in this case, ought to be the same as in the former, *viz.* 5 feet 4 inches $\frac{8}{9}$. Set off this measure upon the perpendicular *o* the first limit; and from *o*,

prolonging the perpendicular, mark off at *a* the height determined at the firſt ſtation-ſtaff; then do the ſame with the ſecond and third, and ſo on with the following, till this part of the work is finiſhed: there remains then only to delineate in detail the ground between the ſtation-ſtaves, the diſtances in this example being aſſumed larger on account of the detail.

To obtain the ſection of the ground between O and P, place your inſtrument at one of the limits, as P, fixing it ſo that the croſs hairs may anſwer to the point C; then look towards the firſt limit *o*, raiſing or depreſſing the vane till it coincides with the interſection of the croſs hairs; and the line of ſight from one point to the other will mark the level or horizontal line.

To ſet off the height of the brink of the river above the firſt limit, drive a ſtake down cloſe to the ground at *a*; and place your ſtation-ſtaff upon it, obſerving where the hairs interſect the vane, which will be at 4 feet 10 inches; then, laying off upon the line *oz* the diſtance from the firſt to the laſt ſtake, let fall from thence a perpendicular, and ſet off thereon 4 10. 0 to *a*, which gives the height at the firſt ſtake; or, which is the ſame, the height from the edge of the river above the ſurface of the water, as is evident from the ſection. Drive a ſecond ſtake at 6, in a line between the limits; place the ſtation-ſtaff upon this ſtake, and obſerve the height 4. 6. interſected by the croſs hairs, the inſtrument ſtill remaining in the ſame ſituation. Set off on the level-line the diſtance from the firſt ſtake *a* to the ſecond *b*; and then let fall a perpendicular, and mark upon it 4. 6 to *b*, which gives the height of the ground at this place.

The ſmall hollow *c* is marked out by driving down a third ſtake even with the ground, in the middle of it at *c*; but the exact diſtance of the ſecond ſtake *b* from the third *c*, muſt be marked upon the level line: then let fall a perpendicular from *c*, and ſet off upon it 6. 8. 0, pointed out by the croſs hairs on the ſtaff, which determines the depth of the hollow, as appears from the figure. As the diſtances between the ſtakes are now very ſhort, they can eaſily be marked by the operator, who can ſettle any little inequalities by a compariſon with thoſe already aſcertained. Proceed thus with the other ſtations till you arrive at the laſt, and you will always obtain an accurate ſection of your work; by which it is eaſy to form a juſt eſtimation of the land to be dug away, in order to form the canal, by adding the depth to be given to it.

Fig. 6. gives an example of compound levelling, where the ſituation is ſo ſteep and mountainous, that the ſtaves cannot be placed at equal diſtances from the inſtrument, or where it is even impoſſible to make a reciprocal levelling from one ſtation to the other. Thus ſuppoſe the point K to be the bottom of a baſon where it is required to make a fountain, the reſervoir being at A; ſo that, in order to know the height to which the jet d'eau will riſe, it is neceſſary to know how high the point A is above K.

In great heights ſuch as this, it will be neceſſary to proceed by ſmall deſcents, as from A to D. The inſtrument muſt be adjuſted with all poſſible care; and it will even be proper, in ſome part of the work, to uſe a ſmaller inſtrument. The following is a table of the different operations uſed in making this level, it having been taken from M. le Febure's practice.

	feet	in.		feet	in.	yrds.
A	21	6	C	0	9	90
C	4	3	D	0	3	40
D	3	9	E	16	3	350
E	5	0	F	17	9	250
F	10	6	G	5	0	375
G	5	0	H	19	0	300
H	5	0	K	47	3	1000
	95	0		106	9	2405

In this caſe only two levellings are made between A and D, though more would have been neceſſary; but they are omitted to avoid confuſion. In the fourth ſtation the height found was 16 feet 8 inches; but on account of the great length, it was requiſite to reduce the apparent level to the true one, which is always neceſſary where the length is conſiderable. At the laſt limit we get the height from N to *o*; then from *o* to I; from I to K, fig. 7. &c.; all which added together, and then corrected for the curvature, gives 47 feet 3 inches. Now, by adding each column together, and ſubtracting one from the other, we have 51 feet 9 inches for the height which the point A is above the bottom of the baſon, and which will cauſe the jet d'eau to riſe about 45 feet. The general ſection of this operation is ſhown at fig. 7, 8. but an exact profile of the mountain is more difficult, as requiring many operations; though ſome of theſe might be obtained by meaſuring from the level line without moving the inſtrument.

The laſt example given by our author is likewiſe from M. le Febure, and includes a length of near five German miles (25 of ours) in a ſtraight line, and 9 or 10 (45 or 50 Engliſh) including the turnings and windings. In this the declivity of the river *Haynox* was meaſured from Lignebruk to Villebourg. The firſt operation was to drive ſtakes at ſeveral parts of the river even with the water's edge; the firſt of which a little above the mills of Lignebruk ſhowed the upper water-mark, and another ſhowed the lower water-mark at the ſame mills. Two ſtakes above and below the mills of Mazurance, ſomewhat more than half way between Lignebruk and Villebourg, pointed out the difference between high and low water there, and formed likewiſe the third and fourth limits of the operation; while the ſtakes above and below the mills of Villebourg pointed out the difference between high and low water, and likewiſe formed the laſt limits of the operation.

Theſe marks were all made at the edge of the water, exactly even with its ſurface, and all made at the different parts of the river nearly at the ſame inſtant of time. "The principal limits of the levelling (ſays Mr Adams) being now determined and fixed, it only remains to find the level between the limits, according to the methods already pointed out, uſing every advantage that may contribute to the ſucceſs of the work, and at the ſame time avoiding all obſtacles and difficulties that may retard or injure the operations. The firſt rule is always to take the ſhorteſt poſſible way from one limit to another, though this rule ought not to be followed if there are conſiderable obſtacles in the way, as hills, woods, marſhy ground, or if, by going aſide, any advantage can be obtained." In the preſent caſe it was found neceſſary to deviate very conſiderably from the general rule, in order to take in ſeveral ponds, the ſurfaces of which might all be taken for a perfect level; and thus levels were frequently taken acroſs the country for a conſiderable way. The difference of height between the mills of Lignebruk and Villebourg was at laſt found to be about 19 feet, indicating a deſcent of not quite a foot in a mile.

LEVELLING-*Staves*, inſtruments uſed in levelling, ſerving to carry the marks to be obſerved, and at the ſame time to meaſure the heights of thoſe marks from the ground. They uſually conſiſt of two mahogany ſtaves ten feet long, in two parts, that ſlide upon one another to about $5\frac{1}{10}$ feet, for the more portable carriage. They are divided into 1000 equal parts, and numbered at every tenth diviſion by 10, 20, 30, &c. to 1000; and on one ſide the feet and inches are alſo ſometimes marked. See pl. 6, fig. 14. A vane A ſlides up and down upon each ſet of theſe ſtaves, which by braſs ſprings will ſtand at any part. Theſe vanes are about 10 inches long and 4 inches broad; the breadth is firſt divided into three equal parts, the two extremes painted white, the middle ſpace di-

vided again into three equal parts, which are leſs; the middle one of them is alſo painted white, and the two other parts black; and thus they are ſuited to all the common diſtances. Theſe vanes have each a braſs wire acroſs a ſmall ſquare hole in the centre, which ſerve to point out the height correctly, by coinciding with the horizontal wire of the teleſcope of the level.

LEVEN, a river of Lenox or Dunbartonſhire in Scotland. See LENOX.

LEVER, in mechanics, is a bar of iron or wood, one part of which being ſupported by a prop, all other parts turn upon that prop as their centre of motion. This inſtrument is of two kinds. Firſt, the common ſort, where the weight we deſire to raiſe reſts at one end of it, our ſtrength is applied at the other end, and the prop is between both. When we ſtir up the fire with a poker, we make uſe of this lever; the poker is the lever, it reſts upon one of the bars of the grate as a prop, the incumbent fire is the weight to be overcome, and the other end held in the hand is the ſtrength or power. In this, as in all the reſt, we have only to increaſe the diſtance between the ſtrength and prop to give the man that works the inſtrument greater power. The lever of the ſecond kind has the prop at one end, the ſtrength is applied to the other, and the weight to be raiſed reſts between them. Thus in raiſing the water-plug in the ſtreets, the workman puts his iron lever through the hole of the plug till he reaches the ground on the other ſide, and, making that his prop, liſts the plug with his ſtrength at the other end of the lever. In this lever alſo, the greater the diſtance of the prop from the ſtrength, the greater is the workman's power.

Theſe inſtruments, as we ſee, aſſiſt the ſtrength; but ſometimes a workman is obliged to act at a diſadvantage, in raiſing either a piece of timber or a ladder upon one end. We cannot, with grammatical propriety, call this a *lever*, ſince ſuch a piece of timber in fact in no way contributes to raiſe the weight. In this caſe, the man, who is the ſtrength or power, is in the middle, the part of the beam already raiſed is the weight, the part yet at the ground is the prop on which the beam turns or reſts. Here the man's ſtrength will be diminiſhed, in proportion to the weight it ſuſtains. The weight will be greater the farther it is from the prop, therefore the man will bear the greater weight the nearer he is to the prop. See MECHANICS.

LEVERET, among ſportſmen, denotes a hare in the firſt year of her age.

LEVIGATION, in pharmacy, the reducing hard and ponderous bodies to an impalpable powder, by grinding them on a porphyry, or in a mill. A new method of reducing powders to a great degree of fineneſs has lately been invented by means of a fanner. This has the advantage over the other methods, in being much more expeditious, and attended with leſs trouble and expence; the degree of fineneſs to which they are reducible being thus alſo in a manner unlimited. The conſtruction of the fanner employed for this purpoſe is different from that employed for winnowing corn; the blaſt not being collected into a ſmall compaſs as in the latter, but diffuſed over a conſiderable ſpace, leſt a violent blaſt ſhould hurry off both coarſe and fine together. For this purpoſe, the leaves of the fanner are made as long in the direction parallel to the axis as can be done conveniently. In the other direction projecting from it, they differ not from the ordinary length, nor do they in the general ſituation with reſpect to each other. Before the leaves is a wooden partition reaching half way up, to prevent the groſs powder from falling in among the leaves, which reaches about half way from bottom to top; and about two feet or leſs from this, according to the ſize of the fanner, is another partition in a ſloping direction, reaching from the bottom of the box to near the top. The whole is incloſed in a large box ſix or ſeven feet long, having in the end fartheſt off from the leaves a ſlit equal to the ſpace left betwixt the top of the box and the ſloping partition already mentioned. On the top of this is another box, extending from the farthermoſt end of the former to the hopper which holds the coarſe powder, with a hole in the end neareſt to the fanner; and upon this another box, &c. as long as it is found that the air carries off with it any quantity of powder. This will be beſt underſtood from the following deſcription of the figure. A, pl. 6. repreſents the fanner itſelf, having a hole in the caſe for the admiſſion of the air, as uſual. B, the firſt wooden diviſion, to prevent the return of the powder upon the leaves of the fanner. C, the ſecond diviſion, reaching not quite to the top of the box. Its uſe is to direct the current of air produced by the fanner obliquely upwards: thus it ſtrikes the powder, falling down from the hopper, in the ſame oblique direction, and carries off the fine parts, firſt through the aperture *a*; after which ſome of them are lodged in the box D; the ſtill finer particles are carried through the aperture *b* into the ſecond box E, where part of them are lodged: they next paſs through the aperture *c* into the box F, and through *d* into the box G; the powder becoming ſtill finer and in ſmaller quantity as it aſcends into the higher boxes, until at laſt the waſte becomes ſo trifling, that the air may be allowed to paſs off entirely through the aperture *h* in the fourth or ſome other box, as is found moſt convenient.

Thus it is evident we may obtain powders of every degree of fineneſs, and ſuch as neither ſieve nor levigating mill could equal. Waſhing over with water may indeed produce powders equally fine; but the length of time requiſite for ſettling, and the trouble of drying them again, muſt decidedly give the preference to the fanner; eſpecially when we conſider, that there is not any occaſion for taking out the powder in ſmall quantities, as is the caſe in ſifting, waſhing, or levigating; but it may be allowed to remain till as much is collected in the boxes as we deſire.

The principal difficulty in the conſtruction of this fanner is the letting down the powder in a proper manner, ſo that the ſtream of air, which ought not to be very ſtrong, may freely paſs through it. For this purpoſe, the hopper muſt not let it fall in a large body, as in winnowing of corn, but in a long and thin ſheet, which can eaſily be pervaded. The beſt method ſeems to be to make the hopper extend the whole breadth of the box, having a narrow ſlit at bottom. Cloſe on the under part of this ſlit a fluted roller ought to turn, which ſhutting up the aperture exactly, cannot allow any powder to paſs but what does ſo in conſequence of the hollow flutes of the roller; for a ſmooth round one would allow nothing to paſs. It would be proper alſo that the flutes be but ſmall, that a thin and nearly continued ſtream of powder be always deſcending; for this will contribute greatly to the fineneſs of the produce: and on this account the powder ought, before it is put into the hopper, to be paſſed through a lawn ſieve. In the figure, *e* repreſents the hopper, and *f* the fluted roller. Motion is eaſily communicated to the latter by means of a wheel faſtened on the axis of the fanner.

The coarſe powder is kept back by the partition C, and deſcends through a ſlit *i* in the bottom of the lowermoſt box, into a receptacle *k*, which may be removed occaſionally. All the joints and ſeams of the machine muſt be very cloſe, for the fine powder is very penetrating; for this reaſon alſo the hopper ought to have a lid.

LEWDNESS. See FORNICATION.—Lewdneſs is puniſhable by our law by fine, impriſonment, &c. And Mich. 15 Car. II. a perſon was indicted for open lewdneſs, in ſhowing his naked body in a balcony, and other miſdemeanors; and

was fined 2000 marks, impriſoned for a week, and bound to his good behaviour for three years. 1 Sid. 168. In times paſt, when any man granted a leaſe of his houſe, it was uſual to inſert an expreſs covenant, that the tenant ſhould not entertain any lewd women, &c.

LEVITE, in a general ſenſe, means all the deſcendants of Levi, among whom were the Jewiſh prieſts themſelves, who, being deſcended from Aaron, were likewiſe of the race of Levi. In a more particular ſenſe, *Levite* is uſed for an order of officers in that church, who were employed in performing the manual ſervice of the temple. They were obedient to the prieſts in their miniſtration, and brought them wood, water, and other neceſſaries for the ſacrifice.—They ſung and played upon inſtruments in the temple and in other places. They applied themſelves to the ſtudy of the law, and were the ordinary judges of the country, but always ſubordinate to the prieſts. Their ſubſiſtence was the tythes of corn, fruit, and cattle, throughout Iſrael: but the prieſts were entitled to a tenth of their tythes, by way of firſt-fruits, to the Lord. Eight-and-forty cities were aſſigned for the reſidence of the Levites, of which the prieſts claimed thirteen, ſix whereof were choſen for cities of refuge. They were conſecrated before they entered upon their miniſtry, by ſhaving their fleſh, waſhing their clothes, and ſprinkling with the water of expiation. Impoſition of hands was uſed in conſecration, and two bullocks were offered at the door of the tabernacle. They waited weekly, and by turns, in the temple, beginning their attendance on one ſabbath and ending the next: during this time they were maintained out of the offerings, &c. In the time of Solomon, the number of Levites, from the age of 20 and capable of ſerving, was 38,000.

LEVITICUS, a canonical book of the Old Teſtament, ſo called from its containing the laws and regulations relating to the prieſts, Levites, and ſacrifices.

LEUK, a town of Switzerland, almoſt in the middle of the Valais; remarkable for its natural ſtrength, for the aſſembly of the ſtates that often meet there, and for its baths, whoſe water is ſo hot that it will boil eggs.

LEUNCLAVIUS (Johannes), a learned German, was deſcended from a noble family, and born at Amelbrun in Weſtphalia, 1533. He travelled through almoſt all the countries of Europe. While he was in Turkey, he collected very good materials for an "Hiſtory of the Ottoman Empire;" which he publiſhed, and alſo ſeveral other pieces concerning it, in Latin. He gave Latin tranſlations alſo of Xenophon, Zoſimus, &c. To a knowledge of the learned languages he added that of the civil law. He died at Vienna in 1593, aged 60.

LEUSDEN (John), a celebrated philologer, born in 1624. He ſtudied the learned languages and mathematics at Utrecht; and then went to Amſterdam, to converſe with the rabbis, and perfect himſelf in the Hebrew tongue. After which, he was profeſſor of Hebrew at Utrecht, where he acquired a great reputation, and died in 1699. He wrote many valuable works; the principal of which are, 1. *Onomaſticum Sacrum*, 8vo. 2. *Clavis Hebraica & Philologica Veteris Teſtamenti*, 4to. 3. *Novi Teſtamenti Clavis Græca, cum Annotationibus Philologicis*, 8vo. 4. *Compendium Biblicum Veteris Teſtamenti*, 8vo. 5. *Compendium Græcum Novi Teſtamenti*; the beſt edition of which is that of London, in 1668, 12mo. 6. *Philologus Hebræus*, 4to. 7. *Philologus Hebræo mixtus*, 4to. 8. *Philologus Hebræo-Græcus*, 4to. 9. Notes on Jonas, Joel, Hoſea, &c. He alſo gave correct editions of ſeveral learned works.

LEUTKIRK, a free and imperial town of Germany, in Suabia, and in Algow, ſeated on a rivulet that falls into the Illar, in E. lon. 10. 10. N. lat. 47. 53.

LEUTMERITZ, a town of Bohemia, capital of a circle of the ſame name, with a biſhop's ſee, ſeated on the river Elbe, in E. lon. 14. 25. N. lat. 50. 34.

LEWARDEN, a handſome, rich, and ſtrong town of the United Provinces, capital of Oſtergow, Weſtergow, Sevenwolden, and Weſt Frieſland. Before the new order of things in that country, it was the uſual place of reſidence of the Stadtholder; and in buildings, as well public as private, is very magnificent. It has ſeveral canals running through the ſtreets, which are of great ſervice to their trade, eſpecially as they are continued to the ſea and to the moſt conſiderable towns of the province. E. lon. 5. 42. N. lat. 53. 12.

LEEUWENHOEK (Anthony de), a celebrated Dutch phyſician and naturaliſt, was born at Delft in 1632, of an ancient family of that city; and acquired a very great reputation throughout all Europe, by his experiments and diſcoveries. He particularly excelled in making glaſſes for microſcopes and ſpectacles, and died in 1723. His letters to the Royal Society of London, of which he was a member, were printed at Leyden in 1722, in 4to.

LEVY, in law, ſignifies to gather or collect; as to levy money, and to levy a fine of lands in the paſſing a fine.

LEWENTZ, a town of Upper Hungary, in the county of Gran, and on the river of the ſame name, where the Turks were defeated in 1644. E. lon. 18. 19. N. lat. 48. 15.

LEWES, a large well-built town in the county of Suſſex, ſeated on an eminence on the banks of the river Ouſe, 50 miles from London. It is famous for a bloody battle near it, wherein king Henry III. was defeated and taken priſoner by the barons; and is ſo ancient, that we read the Saxon king Athelſtan appointed two mint-houſes here, and that in the reign of Edward the confeſſor it had 127 burgeſſes. It is a borough by preſcription, by the ſtyle of conſtables and inhabitants. The conſtables are choſen yearly. It has handſome ſtreets and two ſuburbs, with ſix pariſh-churches. It carries on a good trade; and the river Ouſe runs through it, which brings goods in boats and barges from a port 8 miles off. On this river are ſeveral iron-works, where cannon are caſt for merchant-ſhips, beſides other uſeful works. A charity-ſchool was opened here in 1711, where 20 boys are taught, clothed, and maintained, at the expence of a private gentleman, by whom they were alſo furniſhed with books; and 8 boys more are taught here at the expence of other gentlemen. Here are horſe-races almoſt every ſummer for the king's plate of 100l. The roads here are deep and dirty; but then it is the richeſt ſoil in this part of England. The market here is on Saturday; and the fairs May 6, Whit-Tueſday, and October 2. The timber of this part of the county is prodigiouſly large. The trees are ſometimes drawn to Maidſtone and other places on the Medway, on a ſort of carriage called a *tug*, drawn by 22 oxen a little way, and then left there for other tugs to carry it on; ſo that a tree is ſometimes two or three years drawing to Chatham; becauſe, after the rain is once ſet in, it ſtirs no more that year, and ſometimes a whole ſummer is not dry enough to make the roads paſſable. It is cheap living here; and the town not being under the direction of a corporation, but governed by gentlemen, it is reckoned an excellent retreat for half-pay officers, who cannot ſo well confine themſelves to the rules of a corporation. It ſends two members to parliament.

LEWIS, one of the largeſt of the Hebrides or weſtern iſlands of Scotland, extending about 60 miles in length from north to ſouth, and from 13 to 14 in breadth, conſiſting of a great number of iſles and rocks, and parted by the ſea into two diviſions, called *Lewis* and *Harries*, the former lying to the weſtward of the other. Lewis belongs to the ſhire of Roſs; is divided by ſeveral channels, diſtinguiſhed by ſeveral

names, and portioned out among different proprietors; but the *Lewis*, ſtrictly ſo called, ſtretches about 36 miles in length, from the north point of Bowling-head to the ſouthern extremity of Huſſineſs in Harries.

LEXINGTON, a town of North America, and capital of Kentucky. It ſtands on the head waters of Elkhorn river, and is reckoned the capital of Kentucky. Here the courts are held, and buſineſs regularly conducted. In 1786 it contained about 100 houſes and ſeveral ſtores, with a good aſſortment of dry goods. It muſt have greatly increaſed ſince.

LEX, Law. See Law.—The Roman laws were of three kinds: 1ſt, Such as were made by their kings. 2d, The laws of the twelve tables brought by the *Decemviri* from Athens, &c. And, 3d, Such as were propoſed by the ſuperior magiſtrates in the times of the republic. The laws of this laſt claſs were enacted in the following manner:

No law could be propoſed but by ſome of the following magiſtrates, viz. the *Prætor*, the *Conſuls*, the *Dictator*, the *Interrex*, the *Decemviri*, the *Military Tribunes*, *Triumviri*, and *Tribunes* of the people. If any of theſe propoſed a law, it was firſt committed to writing, and privately examined as to its utility and probable conſequences, by ſome perſons well qualified for the taſk; ſometimes it was referred to the whole ſenate for their ſentiments. It was then hung up publicly for three market-days, that all the people might have time to examine it, and conſider its tendency: This was called *legis promulgatio*, *quaſi provulgatio*. If the perſon who framed the bill did not ſee cauſe in the mean time to drop it, the people were convened *in comitia*, and he addreſſed them in an oration, being alſo ſeconded by his friends, ſetting forth the expediency and probable utility of ſuch a law: This was called *rogatio legis*, becauſe the addreſs was always prefaced with this petitionary form of words, *Velitis Jubeatiſne, Quirites?* "Will you, O Romans, conſent and order this law to paſs?" This being done, thoſe that diſliked the motion delivered their ſentiments in oppoſition to it. An urn was then brought to certain prieſts who attended upon the occaſion, into which were caſt the names of the tribes, centuries, or *curia*, as the *comitia* happened to be *tributa*, *centuriata*, or *curiata*. The names were ſhaken together; and the firſt drawn tribe or century was called *prærogativa*, becauſe their ſuffrages were firſt taken. The *curia* that was firſt drawn was called *principium* for the ſame reaſon. The other tribes, centuries, &c. were called *tribus jure vocatæ*, *centuriæ jure vocatæ*, &c.

Matters being in this ſituation, the *veto* or negative voice of the tribunes of the people might put an entire end to the proceedings, and diſſolve the aſſembly. The tribune's interference was called *interceſſio*. The conſul alſo had it in his power to ſtop further proceedings, by commanding any of the holidays called *feriæ imperativæ* to be obſerved. The *comitia* would of courſe be diſſolved alſo by any of the perſons preſent being ſeized with the falling-ſickneſs, or upon the appearance of any unlucky omen. But ſuppoſing the buſineſs to meet with no interruption of this ſort, the people were each of them preſented with two tablets, on one of which was written in large characters A. on the other U. R. Their diſapprobation of the bill was expreſſed by throwing into an urn the tablet inſcribed A. ſignifying "I forbid it;" *antiquo*, "I prefer the old." Their aſſent was ſignified by throwing in the tablet marked U. R. i. e. *uti rogas*, "be it as you deſire." According to the majority of theſe tablets the law paſſed or not. If it paſſed, it was written upon record, and carried into the treaſury; this was called *legem ferre*. Afterwards it was engraved upon plates of braſs, and hung up in the moſt public and conſpicuous places: this was termed *legem figere*, and a future repeal of this law was *legem refigere*.

If a law paſſed in the *comitia curiata*, it was called *lex curiata*; if in the *comitia centuriata*, it had the name of *lex centuriata*; but if it paſſed in the *comitia tributa*, it was termed *plebiſcitum*. The laws, too, generally bore the names of the propoſers, as *lex Ælia*, *lex Fufia*, &c.

Romulus uſed to make laws by his own ſingle authority, but ſucceeding kings fought the approbation of the people.

LEXIARCHI, at Athens, ſix officers aſſiſted by 30 inferior ones, whoſe buſineſs it was to lay fines upon ſuch as came not to the public aſſemblies, and alſo to make ſcrutiny among ſuch as were preſent. The lexiarchi kept a regiſter of the age, manners, and abilities of all the citizens, who were always inrolled at the age of 20.

LEXICON, the ſame with dictionary. The word is chiefly uſed in ſpeaking of Greek dictionaries: it is derived from the Greek λεξις, *word, diction*; of λεγω *I ſpeak*.

LEYDEN, a city of the United Provinces, in Holland, four miles and a half in circumference. It has eight gates, and contains 50 iſlands, and 145 bridges, the greateſt part built of freeſtone. The principal church is a ſuperb ſtructure, whoſe high roof is ſupported by three rows of columns; and the reſt of the public buildings are very handſome. There are ſeveral large hoſpitals, and a univerſity, which has generally 200 ſtudents, though there are but two colleges; for the ſcholars board in the town, and have no dreſs to diſtinguiſh them. The ſchool conſiſts of a large pile of brick building, three ſtories high; in the uppermoſt of which the famous Elzevir had his printing-office. Adjoining to the ſchool is the phyſic-garden, where the profeſſor reads lectures in botany. The library contains curious manuſcripts; and the theatre for anatomy is one of the fineſt in Europe. Here are manufactures of the beſt cloths and ſtuffs in Holland. Leyden is famous for the long ſiege it ſuſtained in 1573, againſt the Spaniards. It is ſeated near the ancient bed of the Rhine, four miles eaſt of the German Ocean, and 20 ſouth-weſt of Amſterdam. E. lon. 4. 33. N. lat. 52. 10.

Leyden *Phial*, a phial coated on the inſide and outſide with tinfoil, or other proper conducting ſubſtance, and furniſhed with a braſs wire and knob, for giving the electrical ſhock. See Electricity.

LEYSERA, in botany: A genus of the polygamia ſuperflua order, belonging to the ſyngeneſia claſs of plants; and in the natural method ranking under the 49th order, *Compoſitæ*. The receptacle is naked; the pappus paleaceous; that of the diſc plumy; the calyx ſcarious.

LEYTE, one of the Philippine iſlands in the Eaſt Indies, ſituated in E. lon. 118. 0. N. lat. 11. 0. Its greateſt length is about 40 leagues, and its circumference about 90 or 100. Its ſoil on the eaſt ſide is very fruitful; but there are very high mountains which cut it almoſt through the middle, and occaſion ſo great an alteration in the air, that when it is winter on the north ſide, it is ſummer on the ſouthern part of the iſland. Thus when the inhabitants of one half of the iſland reap, the others ſow; and they have two plentiful harveſts in a year, to which the rivers running down from the above-mentioned mountains contribute not a little. The iſland contains about 9000 inhabitants, who pay tribute to the Spaniards in rice, wax, and quilts.

LHUYD, or Lhoyd (Humphrey), a learned antiquarian of the 16th century, born at Denbigh, who applied himſelf to the ſtudy of phyſic; and living moſtly within the walls of Denbigh caſtle, practiſed there as a phyſician; and died in 1570, with the character of a well-bred gentleman. He wrote and tranſlated ſeveral pieces relative to hiſtory and antiquities; in particular, The hiſtory of Cambria, now called *Wales*, from Caradoc of Langearvan, &c. but died before it was finiſhed: however, Sir Henry Sidney, lord preſident of Wales, employed Dr. David Powel to finiſh it, who publiſhed it in 1584. A new and improved edition of this work was publiſhed in 1774.

LHUYD (Edward), keeper of the Muſeum at Oxford, was a native of South Wales, the ſon of Charles Lhuyd, Eſq. of Llanvorde. He was educated at Jeſus College, Oxford, where he was created M. A. July 21, 1701. He was bred under Dr. Plot, whom he ſucceeded as keeper of the Aſhmolean muſeum, and had the uſe of all Vaughan's collections. With inceſſant labour and great exactneſs he employed a conſiderable part of his life in ſearching into the Welſh antiquities; had peruſed or collected a great deal of ancient and valuable matter from their MSS.; tranſcribed all the old charters of their monaſteries that he could meet with; travelled ſeveral times over Wales, Cornwall, Scotland, Ireland, Armoric Bretagne, countries inhabited by the ſame people, compared their antiquities, and made obſervations on the whole; but died in July 1709, before he had digeſted them into the form of a diſcourſe, as he intended, on the ancient inhabitants of this iſland. The untimely death of this excellent antiquary prevented the completing of many admirable deſigns. For want of encouragement, he did little towards underſtanding the Britiſh bards, having ſeen but one of thoſe of the ſixth century, and not being able to procure acceſs to two of the principal libraries in the country. He communicated many obſervations to Biſhop Gibſon, whoſe edition of the *Britannia* he reviſed; and publiſhed "*Archæologia Britannica*, giving ſome account additional to what has been hitherto publiſhed of the languages, hiſtories, and cuſtoms of the original inhabitants of Great Britain, from collections and obſervations in travels through Wales, Cornwall, Bas Bretagne, Ireland, and Scotland, Vol. I. Gloſſography, Oxford 1707," fol. He left in MS. a Scottiſh or Iriſh-Engliſh Dictionary, propoſed to be publiſhed in 1732 by ſubſcription, by Mr. David Malcolme, a miniſter of the church of Scotland, with additions; as alſo the Elements of the ſaid language; with neceſſary and uſeful informations for propagating more effectually the Engliſh language, and for promoting the knowledge of the ancient Scottiſh or Iriſh, and very many branches of uſeful and curious learning. Lhuyd, at the end of his preface to the Archæologia, promiſes an hiſtorical dictionary of Britiſh perſons and places mentioned in ancient records. It ſeems to have been ready for the preſs, though he could not ſet the time of publication. His collections for a ſecond volume, which was to give an account of the antiquities, monuments, &c. in the principality of Wales, were numerous and well choſen; but, on account of a quarrel between him and Dr. Wynne, then fellow, afterwards principal of the college, and biſhop of St. Aſaph, he refuſed to buy them, and they were purchaſed by Sir Thomas Seabright, of Beachwood in Hertfordſhire, in whoſe library the greateſt part ſtill remain, but ſo indigeſted, and written with ſo many abbreviations, that nobody can undertake to publiſh them. They conſiſt of about 40 volumes in folio, 10 in quarto, and above 100 ſmaller, and all relate to Iriſh or Welſh antiquities, and chiefly in thoſe languages. Carte made extracts from them about or before 1736; but theſe were chiefly hiſtorical. Sir John Seabright has given Mr. Pennant 23 of Lhuyd's MSS. Latin and Engliſh. Many of his letters to Liſter, and other learned contemporaries, were given by Dr. Fothergill to the univerſity of Oxford, and are now in the Aſhmolean muſeum. Lhuyd undertook more for illuſtrating this part of the kingdom than any one man beſide ever did, or than any one man can be equal to.

LIBANIUS, a famous Greek rhetorician and ſophiſt in the 4th century, was born at Antioch, and had a great ſhare in the friendſhip of Julian the Apoſtate. That prince offered him the dignity of *Præfectus Prætorio*; but Libanius refuſed it, thinking the name of *ſophiſt*, or *profeſſor of eloquence*, much more honourable. There are ſtill extant ſeveral of his letters and Greek orations, by which he acquired great reputation; but his ſtyle is ſomewhat affected and obſcure. He was a pagan. Baſil and Chryſoſtom were his diſciples about the year 360. His letters were publiſhed at Amſterdam in 1738; his orations at Venice, 1755.

LIBANOMANTIA, in antiquity, a ſpecies of divination performed with frankincenſe; which, if it preſently caught fire, and ſent forth a grateful odour, was eſteemed a happy omen, and *vice verſa*.

LIBANUS, the name of a chain of mountains of Turkey in Aſia, which lie between Proper Syria and Paleſtine, extending, from weſt to eaſt, from the Mediterranean ſea as far as Arabia. The ſummits of theſe mountains are ſo high, that they are always covered with ſnow; but below are very pleaſant and fruitful valleys. They were formerly famous for the great number of cedar-trees growing thereon; but now there are very few remaining. Geographers diſtinguiſh this chain into Libanus and Antilibanus; the latter of which lies on the ſouth ſide of the valley, riſing near the ruins of Sidon, and terminates at others in Arabia, in N. lat. 34. They are ſeparated from each other at an equal diſtance throughout, and form a baſon or country called by the ancients *Cœlo-Syria*.

LIBATION, amongſt the Greeks and Romans, was an eſſential part of ſolemn ſacrifices. It was alſo performed alone, as a drink-offering, by way of procuring the protection and favour of the gods, in the ordinary affairs of life. Libations, according to the different natures of the gods in honour of whom they were made, conſiſted of different liquids, but wine was the moſt uſual. The wine offered to the gods was always unmixed with water. We meet with libations of water, libations of honey, libations of milk, and libations of oil; theſe are called *νηφαλια ἱερα*. The libation was made with a ſerious deportment and ſolemn prayer. At ſacrifices, the libation, after it had been taſted by the prieſt, and handed to the by-ſtanders, was poured upon the victim. At entertainments, a little wine was generally poured out of the cup, before the liquor began to circulate, to ſhow their gratitude to the gods for the bleſſings they enjoyed. Libations were alſo in uſe among the Hebrews, who poured an hin of wine on the victim after it was killed, and the ſeveral pieces of the ſacrifice were laid on the altar, ready to be conſumed in the flames.

LIBAW, a ſea-port town of Courland, lying on the Baltic ſea, conſiſting entirely of wooden houſes. It belongs to the duke of Courland, and is ſituated in E. lon. 21. 27. N. lat. 56. 27.

LIBEL, *(libellus famoſus)*, taken in its largeſt and moſt extenſive ſenſe, ſignifies any writing, picture, or the like, of an immoral or illegal tendency; but, in a peculiar ſenſe, is uſed to denote a malicious defamation of any perſon, and eſpecially a magiſtrate, made public by either printing, writing, ſigns or pictures, in order to provoke him to wrath, or expoſe him to public hatred, contempt, and ridicule. The direct tendency of theſe libels is the breach of the public peace, by ſtirring up the objects of them to revenge, and perhaps to bloodſhed. The communication of a libel to any one perſon is a publication in the eye of the law: and therefore the ſending an abuſive private letter to a man is as much a libel as if it were openly printed, for it equally tends to a breach of the peace.

With regard to libels in general, there are, as in many other caſes, two remedies; one by indictment, and another by action. The former for the *public* offence; for every libel has a tendency to break the peace, or provoke others to break it: which offence is the ſame whether the matter contained be true or falſe; and therefore the defendant, on an indictment for publiſhing a libel, is not allowed to allege the truth of it by way of juſtification. But in the remedy by action on the caſe, which is to repair the party in damages for the injury done him, the defendant may, as for words

ſpoken, juſtify the truth of the facts, and ſhow that the plaintiff has received no injury at all. What was ſaid with regard to words ſpoken, will alſo hold in every particular with regard to libels by writing or printing, and the civil actions conſequent thereupon: but as to ſigns or pictures, it ſeems neceſſary always to ſhow, by proper innuendos and averments of the defendant's meaning, the import and application of the ſcandal, and that ſome ſpecial damage has followed; otherwiſe it cannot appear that ſuch libel by picture was underſtood to be levelled at the plaintiff, or that it was attended with any actionable conſequences.

In a civil action, then, a libel muſt appear to be falſe as well as ſcandalous; for, if the charge be true, the plaintiff has received no private injury, and has no ground to demand a compenſation for himſelf, whatever offence it may be againſt the public peace: and therefore, upon a civil action, the truth of the accuſation may be pleaded in bar of the ſuit. But, in a criminal proſecution, the tendency which all libels have to create animoſities, and to diſturb the public peace, is the ſole conſideration of the law. And therefore, in ſuch proſecutions, the only points to be conſidered are, firſt, the making or publiſhing of the book or writing; and, ſecondly, whether the matter be criminal: and, if both theſe points are againſt the defendant, the offence againſt the public is complete. The puniſhment of ſuch libellers, for either making, repeating, printing, or publiſhing the libel, is a fine, and ſuch corporal puniſhment as the court in its diſcretion ſhall inflict; regarding the quantity of the offence, and the quality of the offender. By the law of the twelve tables at Rome, libels, which affected the reputation of another, were made a capital offence: but, before the reign of Auguſtus, the puniſhment became corporal only. Under the emperor Valentinian it was again made capital, not only to write, but to publiſh, or even to omit deſtroying them. Our law, in this and many other reſpects, correſponds rather with the middle age of Roman juriſprudence, when liberty, learning, and humanity, were in their full vigour, than with the cruel edicts that were eſtabliſhed in the dark and tyrannical ages of the ancient decemviri or the latter emperors.

In this and other inſtances, where blaſphemous, immoral, treaſonable, ſchiſmatical, ſeditious, or ſcandalous libels are puniſhed by the Engliſh law, ſome with a greater, others with a leſs degree of ſevcrity; the *liberty of the preſs*, properly underſtood, is by no means infringed or violated. See LIBERTY *of the Preſs*.

LIBELLA, a piece of money amongſt the Romans, being the tenth part of the denarius, and equal in value to the as. It was called *libella*, as being a little pound, becauſe equal to a pound of braſs.—Its value in our money is 1 ob. 1 qu. or a half-penny farthing. See MONEY.

LIBELLI, was the name given to the bills which were put up amongſt the Romans, giving notice of the time when a ſhow of gladiators would be exhibited, with the number of combatants and other circumſtances. This was called *munus pronunciare* or *proponere*.—Theſe bills were ſometimes termed *edicta*. Theſe public notices were given by the perſon who deſigned to oblige the people with the ſhow, and were frequently attended with pictures repreſenting the engagement of ſome celebrated gladiators. This cuſtom is alluded to by Horace, lib. ii. ſat. vii. v. 96, &c. There was alſo the *famoſus libellus*, a defamatory libel. Seneca calls them *contumelioſi libelli*, infamous rhymes, which by a Roman ordinance were puniſhable with death. Libellus alſo, in the civil law, ſignifies the declaration or ſtate of the proſecutor's charge againſt the defendant; and it has the like ſignification in our ſpiritual courts.

LIBELLULA, in zoology, a genus of four-winged flies, called in Engliſh *dragon flies* or *adder flies*; the characters of which are theſe: The mouth is furniſhed with jaws: the feelers are ſhorter than the breaſt; and the tail of the male terminates in a kind of hooked forceps. There are 21 ſpecies, chiefly diſtinguiſhed by their colour. See pl. 10. They have all two very large and reticulated eyes, covering the whole ſurface of the head. They fly very ſwiftly, and prey upon the wing, clearing the air of innumerable little flies. They are found in Auguſt and September in our fields and gardens, eſpecially near places were there are waters, as they have their origin from worms living in that element. The great ones uſually live all their time about waters; but the ſmaller are common among hedges, and the ſmalleſt of all frequent gardens. The ſmaller kind often ſettle upon buſhes, or upon the ground; but the large ones are almoſt always upon the wing, ſo that it is very difficult to take them. Their eyes are beautiful objects for the microſcope. The largeſt ſpecies is produced from a water-worm that has ſix feet, which, yet young and very ſmall, is transformed into a chryſalis, that has its dwelling in the water. People have thought they diſcovered them to have gills like fiſhes. It wears a maſk as perfectly formed as thoſe that are worn at a maſquerade; and this maſk, faſtened to the inſect's neck, and which it moves at will, ſerves it to hold its prey while it devours it. The period of tranſformation being come, the chryſalis makes to the water-ſide, undertakes a voyage in ſearch of a convenient place; fixes on a plant, or ſticks faſt to a bit of dry wood. Its ſkin, grown parched, ſplits at the upper part of the thorax. The winged inſect iſſues forth gradually, throws off its ſlough, expands its wings, flutters, and then flies off with gracefulneſs and eaſe. The elegance of its ſlender ſhape, the richneſs of its colours, the delicacy and reſplendent texture of its wings, afford infinite delight to the beholder. The ſexual parts of the libellulæ are differently ſituated in the male and female. It is under the body at the joining of the thorax that thoſe parts are diſcovered in the males: thoſe of the females are known by a ſlit placed at the extremity of the body. Their amours conclude in a rape. The male, while hovering about, watches, and then ſeizes the female by the head with the pincers with which the extremity of his tail is armed. The raviſher travels thus through the air, till the female yielding to ſuperior ſtrength, or rather to inclination, forms her body into a circle that terminates at the genitals of the male, in order to accompliſh the purpoſe of nature. Theſe kinds of rapes are common. Libellulæ are ſeen thus coupled in the air, exhibiting the form of a ring. The female depoſits her eggs in the water, from whence ſpring water-worms, which afterwards undergo the ſame transformations.

LIBER, in vegetables, the bark or rind, principally of trees. This is to be conceived as conſiſting of a number of cylindric and concentric ſurfaces whoſe texture is reticular, and in ſome trees plainly extruſible every way, by reaſon that the fibres are ſoft and flexible. While in this condition, they are either hollow regular canals, or, if not ſo, they have interſtitial ſpaces which ſerve the office of canals. The nutritious juice which they are continually receiving, remains in part in them, makes them grow in length and thickneſs, and ſtrengthens and brings them cloſer together; and by this means the texture which was before reticular becomes an aſſemblage of ſtraight fibres ranged vertically and parallel to each other; that is, as they are thus altered behind one another, they by degrees become a new ſubſtance, more woody, called *lbea*.

LIBERA, in mythology, the name of a goddeſs, which Cicero, in his book Of the Gods, repreſents as the daughter of Jupiter and Ceres. Ovid, in his Faſti, ſays that the name was given by Bacchus to Ariadne. Libera is exhibited on

medals as a kind of female Baechus, crowned with vine leaves.

LIBERAL ARTS, are fuch as depend more on the labour of the mind than on that of the hands: or, that conſiſt more in ſpeculation than operation; and have a greater regard to amuſement and curioſity than to neceſſity. The word comes from the Latin *liberalis*, which among the Romans ſignified a perſon who was not a ſlave; and whoſe will, of conſequence, was not checked by the command of any maſter. Such are grammar, rhetoric, painting, ſculpture, architecture, muſic, &c. The liberal arts uſed formerly to be ſummed up in the following Latin verſe: "*Lingua, Tropus, Ratio, Numerus, Tonus, Angulus, Aſtra.*" And the mechanical arts, which, however, are innumerable, under this: "*Rus, Nemus, Arma, Faber, Vulnera, Lana, Rates.*" See ARTS.

LIBERALIA, feaſts celebrated by the ancient Romans, in honour of Liber or Bacchus, the ſame with thoſe which the Greeks called DIONYSIA, and *Dionyſiaca*. They took their name from *liber*, i. e. *free*, a title conferred on Bacchus in memory of the liberty or freedom which he granted to the people of Bœotia; or, perhaps, becauſe wine, whereof he was the reputed deity, delivers men from care, and ſets their mind at eaſe and freedom. Varro derives the name of this feaſt from *liber*, conſidered as a noun adjective, and ſignifying *free*; becauſe the prieſts were free from their function, and eaſed of all care, during the time of the liberalia: as the old women officiated in the ceremonies and ſacrifices of theſe feaſts.

LIBERIA, in Roman antiquity, a feſtival obſerved on the 16th of the kalends of April, at which time the youth laid aſide their juvenile habit for the toga virilis, or habit peculiar to grown men. See the article TOGA.

LIBERTINES, LIBERTINI, in eccleſiaſtical hiſtory, a religious ſect, which aroſe in the year 1525, whoſe principal tenets were, that the Deity was the ſole operating cauſe in the mind of man, and the immediate author of all human actions; that, conſequently, the diſtinctions of good and evil, which had been eſtabliſhed with regard to thoſe actions, were falſe and groundleſs, and that men could not, properly ſpeaking, commit ſin; that religion conſiſted in the union of the ſpirit or rational ſoul with the Supreme Being; that all thoſe who had attained this happy union, by ſublime contemplation and elevation of mind, were then allowed to indulge, without exception or reſtraint, their appetites or paſſions; that all their actions and purſuits were then perfectly innocent; and that, after the death of the body, they were to be united to the Deity. They likewiſe ſaid that Jeſus Chriſt was nothing but a mere *je ne ſcai quoi*, compoſed of the ſpirit of God, and of the opinion of men. Theſe maxims occaſioned their being called *Libertines*; and the word has been uſed in an ill ſenſe ever ſince.

The *Libertini* ſpread principally in Holland and Brabant. Their leaders were one Quintin, a Picard, Pockeſius, Ruffus, and another called Chopin, who joined with Quintin, and became his diſciple. This ſect obtained a certain footing in France through the favour and protection of Margaret, queen of Navarre, and ſiſter to Francis I. and found patrons in ſeveral of the reformed churches. This ſect was probably a remnant of the more ancient Beguards or Brethren of the Free Spirit.

LIBERTINES *of Geneva*, were a cabal of rakes rather than of fanatics; for they made no pretences to any religious ſyſtem, but pleaded only for the liberty of leading voluptuous and immoral lives. This cabal was compoſed of a certain number of licentious citizens, who could not bear the ſevere diſcipline of Calvin, who puniſhed with rigour not only diſſolute manners, but alſo whatever bore the aſpect of irreligion and impiety. In this turbulent cabal there were ſeveral perſons who were not only notorious for their diſſolute and ſcandalous manner of living, but alſo for their atheiſtical impiety, and contempt of all religion. To this odious claſs belonged one Gruet, who denied the divinity of the Chriſtian religion, the immortality of the ſoul, the difference between moral good and evil, and rejected with diſdain the doctrines that are held moſt ſacred among Chriſtians; for which impieties he was at laſt brought before the civil tribunal, in the year 1550, and condemned to death. The Genevan ſpirit of reformation, improperly directed by the violence and zeal of Calvin, did at this time operate to a degree which has marked the character of this great reformer with reproach. For in 1544, Sebaſtian Caſtalio, maſter of the public ſchool at Geneva, who was a man of probity, and diſtinguiſhed by his learning and taſte, was, nevertheleſs, depoſed from his office and baniſhed the city, becauſe he diſapproved ſome of the meaſures that were purſued and ſome of the opinions entertained by Calvin and his colleagues, and particularly that of abſolute and unconditional predeſtination. Jerome Bolſec alſo, a man of genius and learning, who became a convert to the Proteſtant religion and fled to Geneva for protection, was caſt into priſon, and ſoon after ſent into baniſhment, becauſe, in 1551, he imprudently and indecently declaimed, in full congregation and at the cloſe of public worſhip, againſt the doctrine of abſolute decrees.

LIBERTUS, or LIBERTINUS, among the Romans, a freedman, or a perſon ſet free from a legal ſervitude. Theſe ſtill retained ſome mark of their ancient ſtate: he who made a ſlave free having a right of patronage over the *libertus*; ſo that if the latter failed of ſhowing due reſpect to his patron, he was reſtored to his ſervitude; and if the *libertus* died without children, his patron was his heir. See SLAVE. In the beginning of the republic, *libertinus* denoted the ſon of a *libertus* or freedman; but afterwards, before the time of Cicero, and under the emperors, the terms *libertus* and *libertinus*, as Suetonius has remarked, were uſed as ſynonymous.

LIBERTY, denotes a ſtate of freedom, in contradiſtinction to *ſlavery* or *reſtraint*; and may be conſidered as either *natural* or *civil*. The abſolute rights of man, conſidered as a free agent, endowed with diſcernment to know good from evil, and with power of chooſing thoſe meaſures which appear to him to be moſt deſirable, are uſually ſummed up in one general appellation, and denominated the *natural liberty of mankind*. This natural liberty conſiſts properly in a power of acting as one thinks fit, without any reſtraint or controul, unleſs by the law of nature; being a right inherent in us by birth, and one of the gifts of God to man at his creation, when he endued him with the faculty of free-will. But every man, when he enters into ſociety, gives up a part of his natural liberty, as the price of ſo valuable a purchaſe; and, in conſideration of receiving the advantages of mutual commerce, obliges himſelf to conform to thoſe laws which the community has thought proper to eſtabliſh. And this ſpecies of legal obedience and conformity is infinitely more deſirable than that wild and ſavage liberty which is ſacrificed to obtain it. For no man, that conſiders a moment, would wiſh to retain the abſolute and uncontrouled power of doing whatever he pleaſes: the conſequence of which is, that every other man would alſo have the ſame power; and then there would be no ſecurity to individuals in any of the enjoyments of life.

Political, therefore, or *civil*, liberty, which is that of a member of ſociety, is no other than natural liberty ſo far reſtrained by human laws (and no farther) as is neceſſary and expedient for the general advantage of the public. Hence we may collect, that the law, which reſtrains a man from doing miſchief to his fellow-citizens, though it diminiſhes the na-

tural, increaſes the civil liberty of mankind: but every wanton and cauſeleſs reſtraint of the will of the ſubject, whether practiſed by a monarch, a nobility, or a popular aſſembly, is a degree of tyranny. Nay, that even laws themſelves, whether made with or without our conſent, if they regulate and conſtrain our conduct in matters of mere indifference, without any good end in view, are laws deſtructive of liberty: whereas, if any public advantage can ariſe from obſerving ſuch precepts, the controul of our private inclinations, in one or two particular points, will conduce to preſerve our general freedom in others of more importance, by ſupporting that ſtate of ſociety which alone can ſecure our independence. Thus the ſtatute of king Edward IV. which forbade the fine gentlemen of thoſe times (under the degree of a lord) to wear pikes upon their ſhoes or boots of more than two inches in length, was a law that favoured of oppreſſion; becauſe, however ridiculous the faſhion then in uſe might appear, the reſtraining it by pecuniary penalties could ſerve no purpoſe of common utility. But the ſtatute of king Charles II. which preſcribes a thing ſeemingly as indifferent, *viz.* a dreſs for the dead, who were all ordered to be buried in woollen, is a law conſiſtent with public liberty; for it encourages the ſtaple trade, on which in great meaſure depends the univerſal good of the nation. So that laws, when prudently framed, are by no means ſubverſive, but rather introductive, of liberty; for (as Mr. Locke has well obſerved) where there is no law there is no freedom. But then, on the other hand, that conſtitution or frame of government, that ſyſtem of laws, is alone calculated to maintain civil liberty, which leaves the ſubject entire maſter of his own conduct, except in thoſe points wherein the public good requires ſome direction or reſtraint.

The idea and practice of this political or civil liberty flouriſh in their higheſt vigour in theſe kingdoms, where it falls little ſhort of perfection, and can only be loſt or deſtroyed by the folly or demerits of its owner; the legiſlature, and of courſe the laws of Britain, being peculiarly adapted to the preſervation of this ineſtimable bleſſing even in the meaneſt ſubject. Very different from the modern conſtitutions of other ſtates on the continent of Europe, and from the genius of the imperial law; which in general are calculated to veſt an arbitrary and deſpotic power, of controuling the actions of the ſubject, in the prince, or in a few grandees. And this ſpirit of liberty is ſo deeply implanted in our conſtitution, and rooted even in our very ſoil, that a ſlave or a negro, the moment he lands in Britain, falls under the protection of the laws, and ſo far becomes a freeman; though the maſter's right to his ſervice may poſſibly ſtill continue.

The abſolute rights of every Briton (which, taken in a political and extenſive ſenſe, are uſually called their *liberties*), as they are founded on nature and reaſon, ſo they are coeval with our form of government; though ſubject at times to fluctuate and change, their eſtabliſhment (excellent as it is) being ſtill human. At ſome times we have ſeen them depreſſed by overbearing and tyrannical princes; at others, ſo luxuriant as even to tend to anarchy, a worſe ſtate than tyranny itſelf, as any government is better than none at all. But the vigour of our free conſtitution has always delivered the nation from theſe embarraſſments: and, as ſoon as the convulſions conſequent on the ſtruggle have been over, the balance of our rights and liberties has ſettled to its proper level; and their fundamental articles have been from time to time aſſerted in parliament, as often as they were thought to be in danger:

Firſt, by the great charter of liberties, which was obtained, ſword in hand, from king John, and afterwards, with ſome alterations, confirmed in parliament by king Henry III. his ſon. Which charter contained very few new grants; but, as Sir Edward Coke obſerves, was for the moſt part declaratory of the principal grounds of the fundamental laws of England. Afterwards, by the ſtatute called *confirmatio cartarum*, whereby the great charter is directed to be allowed as the common law; all judgments contrary to it are declared void; copies of it are ordered to be ſent to all cathedral churches, and read twice a-year to the people; and ſentence of excommunication is directed to be as conſtantly denounced againſt all thoſe that by word, deed, or counſel, act contrary thereto, or in any degree infringe it. Next by a multitude of ſubſequent corroborating ſtatutes (Sir Edward Coke reckons 32), from the firſt Edward to Henry IV. Then, after a long interval, by *the petition of right*; which was a parliamentary declaration of the liberties of the people, aſſented to by king Charles I. in the beginning of his reign. Which was cloſely followed by the ſtill more ample conceſſions made by that unhappy prince to his parliament, before the fatal rupture between them; and by the many ſalutary laws, particularly the *habeas corpus* act, paſſed under Charles II. To theſe ſucceeded *the bill of rights*, or declaration delivered by the lords and commons to the prince and princeſs of Orange, 13th February 1688; and afterwards enacted in parliament, when they became king and queen: which declaration concludes in theſe remarkable words: "and they do claim, demand, and inſiſt upon, all and ſingular the premiſes, as their undoubted rights and liberties. And the act of parliament itſelf recogniſes all and ſingular the rights and liberties aſſerted and claimed in the ſaid declaration to be the true, ancient, and indubitable rights of the people of this kingdom." Laſtly, theſe liberties were again aſſerted at the commencement of the preſent century, in the *act of ſettlement*, whereby the crown was limited to his preſent majeſty's illuſtrious houſe: and ſome new proviſions were added, at the ſame fortunate era, for better ſecuring our religion, laws, and liberties; which the ſtatute declares to be "the birthright of the people of England," according to the ancient doctrine of the common law.

Thus much for the *declaration* of our rights and liberties. The rights themſelves, thus defined by theſe ſeveral ſtatutes, conſiſt in a number of private immunities; which will appear, from what has been premiſed, to be indeed no other, than either that *reſiduum* of natural liberty, which is not required by the laws of ſociety to be ſacrificed to public convenience; or elſe thoſe civil privileges, which ſociety hath engaged to provide, in lieu of the natural liberties ſo given up by individuals. Theſe therefore were formerly, either by inheritance or purchaſe, the rights of all mankind; but, in moſt other countries of the world, being now more or leſs debaſed and deſtroyed, they at preſent may be ſaid to remain, in a peculiar and emphatical manner, the rights of the people of Britain. And theſe may be reduced to three principal or primary articles; the right of perſonal ſecurity, the right of perſonal liberty, and the right of private property: becauſe, as there is no other known method of compulſion, or of abridging man's natural free-will, but by an infringement or diminution of one or other of theſe important rights, the preſervation of theſe inviolate may juſtly be ſaid to include the preſervation of our civil immunities in their largeſt and moſt extenſive ſenſe. See the article RIGHTS.

In vain, however, would theſe rights be declared, aſcertained, and protected by the dead letter of the laws, if the conſtitution had provided no other method to ſecure their actual enjoyment. It has therefore eſtabliſhed certain other auxiliary ſubordinate rights of the ſubject, which ſerve principally as barriers to protect and maintain inviolate the three great and primary rights, of perſonal ſecurity, perſonal liberty, and private property. Theſe are,

1. The conſtitution, powers, and privileges of parliament; for which ſee PARLIAMENT.

2. The limitation of the king's prerogative, by bounds ſo certain and notorious, that it is impoſſible he ſhould exceed them without the conſent of the people: as to which, ſee PREROGATIVE. The former of theſe keeps the legiſlative power in due health and vigour, ſo as to make it improbable that laws ſhould be enacted deſtructive of general liberty: the latter is a guard upon the executive power, by reſtraining it from acting either beyond or in contradiction to the laws that are framed and eſtabliſhed by the other.

3. A third ſubordinate right of every Briton is that of applying to the courts of juſtice for redreſs of injuries. Since the law is, in this realm, the ſupreme arbiter of every man's life, liberty, and property, courts of juſtice muſt at all times be open to the ſubject, and the law be duly adminiſtered therein. The emphatical words of *magna charta*, ſpoken in the perſon of the king, who in judgment of law (ſays Sir Edward Coke) is ever preſent and repeating them in all his courts, are theſe: *Nulli vendemus, nulli negabimus, aut differemus rectum vel juſtitiam*; "and therefore every ſubject (continues the ſame learned author), for injury done to him *in bonis, in terris, vel perſona*, by any other ſubject, be he eccleſiaſtical or temporal, without any exception, may take his remedy by the courſe of the law, and have juſtice and right for the injury done to him, freely without ſale, fully without any denial, and ſpeedily without delay." It were endleſs to enumerate all the *affirmative* acts of parliament, wherein juſtice is directed to be done according to the law of the land: and what that law is, every ſubject knows; or may know if he pleaſes: for it depends not upon the arbitrary will of any judge; but is permanent, fixed, and unchangeable, unleſs by authority of parliament. We ſhall however juſt mention a few *negative* ſtatutes, whereby abuſes, perverſions, or delays of juſtice eſpecially by the prerogative, are reſtrained. It is ordained by *magna charta*, that no freeman ſhall be outlawed, that is, put out of the protection and benefit of the laws, but according to the law of the land. By 2 Edw. III c. 8. and 11 Ric. II. c. 10. it is enacted, that no commands or letters ſhall be ſent under the great ſeal, or the little ſeal, the ſignet or privy ſeal, in diſturbance of the law; or to diſturb or delay common right: and, though ſuch commandments ſhould come, the judges ſhall not ceaſe to do right: which is alſo made a part of their oath by ſtatute 18 Edw. III. ſt. 4. And by 1 W. & M. ſt. 2. c. 2. it is declared, that the pretended power of ſuſpending or diſpenſing with laws, or the execution of laws, by regal authority without conſent of parliament, is illegal.

Not only the ſubſtantial part, or judicial deciſions, of the law, but alſo the formal part, or method of proceeding, cannot be altered but by parliament; for, if once thoſe outworks were demoliſhed, there would be an inlet to all manner of innovation in the body of the law itſelf. The king, it is true, may erect new courts of juſtice; but then they muſt proceed according to the old eſtabliſhed forms of the common law. For which reaſon it is declared in the ſtatute 16 Car. I. c. 10. upon the diſſolution of the court of ſtar-chamber, that neither his majeſty, nor his privy-council, have any juriſdiction, power, or authority, by Engliſh bill, petition, articles, libel (which were the courſe of proceeding in the ſtar-chamber, borrowed from the civil law), or by any other arbitrary way whatſoever, to examine, or draw into queſtion, determine, or diſpoſe of the lands or goods of any ſubjects of this kingdom; but that the ſame ought to be tried and determined in the ordinary courts of juſtice, and by *courſe of law*.

4. If there ſhould happen any uncommon injury, or infringement of the rights before mentioned, which the ordinary courſe of law is too defective to reach, there ſtill remains a fourth ſubordinate right, appertaining to every individual, namely, the right of petitioning the king, or either houſe of parliament, for the redreſs of grievances. In Ruſſia we are told, that the Czar Peter eſtabliſhed a law, that no ſubject might petition the throne till he had firſt petitioned two different miniſters of ſtate. In caſe he obtained juſtice from neither, he might then preſent a third petition to the prince; but upon pain of death, if found to be in the wrong. The conſequence of which was, that no one dared to offer ſuch third petition; and grievances ſeldom falling under the notice of the ſovereign, he had little opportunity to redreſs them. The reſtrictions, for ſome there are, which are laid upon petitioning in Britain, are of a nature extremely different; and while they promote the ſpirit of peace, they are no check upon that of liberty. Care only muſt be taken, leſt, under the pretence of petitioning, the ſubject be guilty of any riot or tumult; as happened in the opening of the memorable parliament in 1640: and, to prevent this, it is provided by the ſtatute 13 Car. II. ſt. 1. c. 5. that no petition to the king, or either houſe of parliament, for any alteration in church or ſtate, ſhall be ſigned by above 20 perſons, unleſs the matter thereof be approved by three juſtices of the peace, or the major part of the grand jury, in the country; and in London, by the lord mayor, aldermen, and common-council: nor ſhall any petition be preſented by more than 10 perſons at a time. But, under theſe regulations, it is declared by the ſtatute 1 W. & M. ſt. 2. c. 2. that the ſubject hath a right to petition; and that all commitments and proſecutions for ſuch petitioning are illegal.

5. The fifth and laſt auxiliary right of the ſubject, that we ſhall at preſent mention, is that of having arms for their defence, ſuitable to their condition and degree, and ſuch as are allowed by law. Which is alſo declared by the ſame ſtatute 1 W. & M. ſt. 2 c. 2. and is indeed a public allowance, under due reſtrictions, of the natural right of reſiſtance and ſelf preſervation, when the ſanctions of ſociety and laws are found inſufficient to reſtrain the violence of oppreſſion.

In theſe ſeveral articles conſiſt the rights, or, as they are frequently termed, *the liberties of Britons*: liberties more generally talked of, than thoroughly underſtood; and yet highly neceſſary to be perfectly known and conſidered by every man of rank or property, leſt his ignorance of the points whereon they are founded ſhould hurry him into faction and licentiouſneſs on the one hand, or a puſillanimous indifference and criminal ſubmiſſion on the other. And we have ſeen that theſe rights conſiſt, primarily, in the free enjoyment of perſonal ſecurity, of perſonal liberty, and of private property. So long as theſe remain inviolate, the ſubject is perfectly free; for every ſpecies of compulſive tyranny and oppreſſion muſt act in oppoſition to one or other of theſe rights, having no other object upon which it can poſſibly be employed. To preſerve theſe from violation, it is neceſſary that the conſtitution of parliaments be ſupported in its full vigour; and limits, certainly known, be ſet to the royal prerogative. And, laſtly, to vindicate theſe rights, when actually violated or attacked, the ſubjects of Britain are entitled, in the firſt place, to the regular adminiſtration and free courſe of juſtice in the courts of law; next, to the right of petitioning the king and parliament for redreſs of grievances; and, laſtly, to the right of having and uſing arms for ſelf-preſervation and defence. And all theſe rights and liberties it is our birthright to enjoy entire; unleſs where the laws of our country have laid them under neceſſary reſtraints;—reſtraints in themſelves ſo gentle and moderate, as will appear upon farther inquiry, that no man of ſenſe or probity would wiſh to ſee them ſlackened. For all of us have it in our choice to do every thing that a good man would deſire to do; and are reſtrained from nothing, but what would be pernicious either to ourſelves or our fellow-citizens. So that this review of our ſituation may fully juſtify the obſervation of a learned French author, who indeed generally both thought

and wrote in the ſpirit of genuine freedom; and who hath not ſcrupled to profeſs, even in the very boſom of his native country, that the Britiſh is the only nation in the world where political or civil liberty is the direct end of its conſtitution. Recommending therefore to the ſtudent in our laws a farther and more accurate ſearch into this extenſive and important title, we ſhall cloſe our remarks upon it with the expiring wiſh of the famous Father Paul to his country, "ESTO PERPETUA!"

LIBERTY *and Neceſſity*. See METAPHYSICS.

LIBERTY *of the Preſs*. The art of printing, ſoon after its introduction, was looked upon in England, as well as in other countries, as merely a matter of ſtate, and ſubject to the coercion of the crown. It was therefore regulated with us by the king's proclamations, prohibitions, charters of privilege and licence, and finally by the decrees of the court of ſtar-chamber, which limited the number of printers, and of preſſes which each ſhould employ, and prohibited new publications unleſs previouſly approved by proper licenſers. On the demolition of this odious juriſdiction in 1641, the long parliament of Charles I. after their rupture with that prince, aſſumed the ſame powers as the ſtar-chamber had exerciſed with reſpect to the licenſing of books: and in 1643, 1647, 1649, and 1652 (Scobell. i. 44, 134. ii. 88, 210.) iſſued their ordinances for that purpoſe, founded principally on the ſtar-chamber decree of 1637. In 1662 was paſſed the ſtatute 13 & 14 Car. II. c. 33. which, with ſome few alterations, was copied from the parliamentary ordinances. This act expired in 1679; but was revived by ſtatute 1 Jac. II. c. 17. and continued till 1692. It was then continued for two years longer by ſtatute 4 W. & M. c. 24. but though frequent attempts were made by the government to revive it in the ſubſequent part of that reign, (Com. Journ. 11 Feb. 1694. 26 Nov. 1695. 22 Oct. 1696. 9 Feb. 1697. 31 Jan. 1695.) yet the parliament reſiſted it ſo ſtrongly, that it finally expired, and the preſs became properly free in 1694, and has continued ſo ever ſince.

The liberty of the preſs, however, ſo eſſential to the nature of a free ſtate, conſiſts not in freedom from cenſure for any criminal matter that may be publiſhed, but in laying no previous reſtraints upon publications. Every freeman has undoubtedly a right to lay what ſentiments he pleaſes before the public; to forbid this, is to deſtroy the freedom of the preſs: but if he publiſhes what is improper, miſchievous, or illegal, he muſt take the conſequence of his own temerity. (See LIBEL.) To ſubject the preſs to the reſtrictive power of a licenſer in the manner above mentioned, is to ſubject all freedom of ſentiment to the prejudices of one man, and make him the arbitrary and infallible judge of all controverted points in learning, religion, and government. But to puniſh (as the law does at preſent) any dangerous or offenſive writings which, when publiſhed, ſhall, on a fair and impartial trial, be adjudged of a pernicious tendency, is neceſſary for the preſervation of peace and good order, of government and religion, the only ſolid foundations of civil liberty. Thus the will of individuals is ſtill left free; the abuſe only of that free-will is the object of legal puniſhment. Neither is any reſtraint hereby laid upon freedom of thought or inquiry; liberty of private ſentiment is ſtill left; the diſſeminating or making public of bad ſentiments, deſtructive of the ends of ſociety, is the crime which ſociety corrects. A man (ſays a fine writer on this ſubject) may be allowed to keep poiſons in his cloſet, but not publicly to vend them as cordials. And to this we may add, that the only plauſible argument heretofore uſed for reſtraining the juſt freedom of the preſs, "that it was neceſſary to prevent the daily abuſe of it," will entirely loſe its force, when it is ſhown (by a ſeaſonable exertion of the laws) that the preſs cannot be abuſed to any bad purpoſe without incurring a ſuitable puniſhment: whereas, it can never be uſed to any good one when under the controul of an inſpector. So true will it be found, that to cenſure the licentiouſneſs is to maintain the liberty of the preſs.

LIBERTY, in mythology, was a goddeſs both among the Greeks and Romans. Among the former ſhe was invoked under the title *Eleutheria*; and by the latter ſhe was called *Libertas*, and held in ſingular veneration; temples, altars, and ſtatues, were erected in honour of this deity. A very magnificent temple was conſecrated to her on mount Aventin, by Tiberius Gracchus, before which was a ſpacious court, called *atrium libertatis*. The Romans alſo erected a new temple in honour of Liberty, when Julius Cæſar eſtabliſhed his empire over them, as if their liberty had been ſecured by an event which proved fatal to it. In a medal of Brutus, liberty is exhibited under the figure of a woman, holding in one hand a cap, the ſymbol of Liberty, and two poignards in the other, with the inſcription IDIBVS MARTIIS.

LIBETHRA (anc. geog.), the fountain of ſong, was ſituated in Magneſia, a diſtrict of Macedonia annexed to Theſſaly; diſtinct from the town of Libethra, which ſtood on the mount Olympus, where it verges towards Macedonia: hence the Muſes are called *Libethrides*, (Virgil.) Strabo places on Helicon, not only Hippocrene, and the temple of the Muſes, but alſo the cave of the nymphs Libethrides.

LIBETHRIUS MONS (anc. geog.), a mountain of Bœotia, diſtant from Coronea 40 ſtadia; where ſtood the ſtatues of the Muſes, and of the nymphs, ſurnamed *Libethrides*. A mountain probably conjoined with, or at leaſt very near to, Helicon.

LIBITINA, in the Roman mythology, a goddeſs which preſided over funerals. This goddeſs was the ſame with the *Venus infera* or *Epitkymbia* of the Greeks. She had a temple at Rome, where was lodged a certain piece of money for every perſon who died, whoſe name was recorded in a regiſter called *Libitinæ ratio*. This practice was eſtabliſhed by Servius Tullius, in order to obtain an account of the number of annual deaths in the city of Rome, and conſequently the rate of increaſe or decreaſe of its inhabitants.

LIBITINARII, were undertakers whoſe office it was to take care of funerals, prepare all things neceſſary upon the ſolemn occaſion, and furniſh every article required.—They got their livelihood by this gloomy buſineſs, and kept a number of ſervants to perform the working part of the profeſſion, ſuch as the *pollinctores*, *veſpillones*, &c. The name *Libitinarii* is derived from *Libitina*, the goddeſs of funerals, in whoſe temple were ſold all things relating to funerals. See FUNERAL.

LIBNA (anc. geog.), a ſacerdotal city in the tribe of Judah, a place of ſtrength, as appears from Sennacherib's laying ſiege to it, 2 Kings xix. Iſaiah xxxvii. In Jerome's time, a village, called *Lobna*, in the territory of Eleutheropolis.

LIBOURNE, a populous town of France, in the department of Gironde and late province of Guienne. It is one of the ſtaples of the commerce of Bourdeaux, and is ſeated on the Dordogne, 20 miles north-eaſt of Bourdeaux, and 205 ſouth by weſt of Paris. W. lon. 0. 12. N. lat. 44. 54.

LIBRA, or BALANCE, one of the mechanical powers. See BALANCE.

LIBRA, in aſtronomy, one of the 12 ſigns of the zodiac, and exactly oppoſite to Aries; ſo called becauſe, when the ſun is in this ſign at the autumnal equinox, the days and nights are equal, as if weighed in a balance.—The ſtars in this conſtellation according to Ptolemy are 17, Tycho 10, Hevelius 20, and Flamſtead 51.

LIBRA alſo denotes the ancient Roman pound, borrowed from the Sicilians, who called it *litra*. The libra was divided into 12 *unciæ* or ounces, and the ounce into 24 ſcruples. The diviſions of the libra were, the *uncia*, one twelfth; the *ſextans*, one ſixth; the *quadrans*, one fourth; the *trions*, one third; the *quincunx*, five ounces; the *ſemis*, ſix; the *ſeptunx*, ſeven; the *bes*, eight; the *dodrans*, nine; the *dextrans*, ten; the

deunx, eleven; laſtly, the *as* weighed twelve ounces or one libra.

The Roman libra was uſed in France for the proportions of their coin till the time of Charlemagne, or perhaps till that of Philip I. in 1093, their ſols being ſo proportioned, as that 20 of them were equal to the libra. By degrees it became a term of account; and every thing of the value of twenty ſols was called a *livre*.

LIBRA *penſa*, in our law-books, denotes a pound of money in weight. It was uſual in former days not only to tell the money but to weigh it: becauſe many cities, lords, and biſhops, having their mints, coined money, and often very bad too; for which reaſon, though the pound conſiſted of 20 ſhillings, they always weighed it.

LIBRARII, among the ancients, were a ſort of copyiſts, who tranſcribed, in beautiful or at leaſt legible characters, what had been written by the notarii in notes and abbreviatures.

LIBRARY, an edifice or apartment deſtined for holding a conſiderable number of books placed regularly on ſhelves, or the books themſelves lodged in it. Some authors refer the origin of libraries to the Hebrews; and obſerve, that the care theſe took for the preſervation of their ſacred books, and the memory of what concerned the actions of their anceſtors, became an example to other nations, particularly to the Egyptians. Oſmanduas, king of Egypt, is ſaid to have taken the hint firſt; who, according to Diodorus, had a library built in his palace, with this inſcription over the door, ΨΥΧΗΣ ΙΑΤΡΕΙΟΝ. Nor were the Ptolemies, who reigned in the ſame country, leſs curious and magnificent in books.

The ſcripture alſo ſpeaks of a library of the kings of Perſia, Ezra v. 17. vi. 1. which ſome imagine to have conſiſted of the hiſtorians of that nation, and of memoirs of the affairs of ſtate; but, in effect, it appears rather to have been a depoſitory of laws, charters, and ordinances of the kings. The Hebrew text calls it the *houſe of treaſures*, and afterwards the *houſe of the rolls*, where the treaſures were laid up. We may, with more juſtice, call that a *library*, mentioned in the ſecond of Eſdras to have been built by Nehemiah, and in which were preſerved the books of the prophets, and of David, and the letters of their kings.

The firſt who erected a library at Athens was the tyrant Piſiſtratus: and yet Strabo refers the honour of it to Ariſtotle. That of Piſiſtratus was tranſported by Xerxes into Perſia, and was afterwards brought back by Seleucus Nicanor to Athens. Long after, it was plundered by Sylla, and re-eſtabliſhed by Hadrian. Plutarch ſays, that under Eumenes there was a library at Pergamus, containing 200,000 books. Tyrannian, a celebrated grammarian, contemporary with Pompey, had a library of 30,000 volumes. That of Ptolemy Philadelphus, according to A. Gellius, contained 700,000, all in rolls, burnt by Cæſar's ſoldiers.

Conſtantine, and his ſucceſſors, erected a magnificent one at Conſtantinople; which in the eighth century contained 300,000 volumes, all burnt by order of Leo Iſaurus; and, among the reſt, one wherein the Iliad and Odyſſey were written in letters of gold, on the guts of a ſerpent.

The moſt celebrated libraries of ancient Rome, were the Ulpian, and the Palatine. They alſo boaſt much of the libraries of Paulus Æmilius, who conquered Perſeus; of Lucilius Lucullus, of Aſinius Pollio, Atticus, Julius Severus, Domitius Serenus, Pamphilius Martyr, and the emperors Gordian and Trajan.

Anciently, every large church had its library; as appears by the writings of St. Jerome, Anaſtaſius, and others. Pope Nicholas laid the firſt foundation of that of the Vatican, in 1450. It was deſtroyed by the conſtable Bourbon, in the ſacking of Rome, and reſtored by Pope Sixtus V. and has been conſiderably enriched with the ruins of that of Heidelberg, plundered by Count Tilly in 1622. One of the moſt complete libraries in Europe was ſaid to be that erected at Florence by Coſmo de Medicis, over the gate whereof is written, LABOR ABSQUE LABORE; though it was afterwards exceeded by that of the French king, begun by Francis I. augmented by Cardinal Richelieu, and completed by M. Colbert.

The emperor's library at Vienna, according to Lambecius, conſiſts of 80,000 volumes, and 15,940 curious medals.

The Bodleian library at Oxford, built on the foundation of that of Duke Humphry, exceeds that of any univerſity in Europe, and even thoſe of all the ſovereigns of Europe, except the emperor's and French king's, which are each of them older by a hundred years. It was firſt opened in 1602, and has ſince found a great number of benefactors; particularly Sir Robert Cotton, Sir H. Savil, Archbiſhop Laud, Sir Kenelm Digby, Mr. Allen, Dr. Pococke, Mr. Selden, and others. The Vatican, the Medicean, that of Beſſarion at Venice, and thoſe juſt mentioned, exceed the Bodleian in Greek manuſcripts; which yet outdoes them all in Oriental manuſcripts.

As to printed books, the Ambroſian at Milan, and that of Wolfenbuttle, are two of the moſt famous, and yet both inferior to the Bodleian.

King's LIBRARY, at St. James's, was founded by Henry, eldeſt ſon of James I. and made up partly of books, and partly of manuſcripts, with many other curioſities for the advancement of learning. It has received many additions from the libraries of Iſaac Caſaubon and others.

Cottonian LIBRARY, originally conſiſted of 958 volumes of original charters, grants, inſtruments, letters of ſovereign princes, tranſactions between this and other kingdoms and ſtates, genealogies, hiſtories, regiſters of monaſteries, remains of Saxon laws, the book of Geneſis, thought to be the moſt ancient Greek copy extant, and ſaid to have been written by Origen in the ſecond century, and the curious Alexandrian copy or manuſcript in Greek capitals. This library is kept in the Britiſh Muſeum, with the large and valuable library of Sir Hans Sloane, amounting to upwards of 42,000 volumes, &c. There are many public libraries belonging to the ſeveral colleges at Oxford and Cambridge, and the univerſities in North Britain. The principal public libraries in London, beſide that of the Muſeum, are thoſe of the College of Heralds, of the College of Phyſicians, of Doctors Commons, to which every biſhop, at the time of his conſecration, gives at leaſt 20l. ſometimes 50l. for the purchaſe of books; thoſe of Gray's Inn, Lincoln's Inn, Inner Temple, and Middle Temple; that of Lambeth, founded by archbiſhop Bancroft in 1610, for the uſe of ſucceeding archbiſhops of Canterbury, and increaſed by the benefactions of archbiſhops Abbot, Sheldon, and Tenniſon, and ſaid to conſiſt of at leaſt 15,000 printed books, and 617 volumes in manuſcript; that of Red-Croſs ſtreet, founded by Dr. Daniel Williams, a Preſbyterian divine, and ſince enriched by many private benefactions; that of the Royal Society, called the *Arundelian* or *Norfolk library*, becauſe the principal part of the collection formerly belonged to the family of Arundel, and was given to the ſociety by Henry Howard, afterwards duke of Norfolk, in 1666, which library has been increaſed by the valuable collection of Francis Aſton, Eſq. in 1715, and is continually increaſing by the numerous benefactions of the works of its learned members, and others: that of St. Paul's, of Sion college; the Queen's library, erected by Queen Caroline in 1737; and the Surgeons' library, formerly kept in their hall in the Old Bailey, &c.

LIBRATION, in aſtronomy, an apparent irregularity of the moon's motions, whereby ſhe ſeems to librate about her axis, ſometimes from the eaſt to the weſt, and now and then from the weſt to the eaſt. See ASTRONOMY.

LIBURNIA (anc. geog.), a diſtrict of Illyricum, extending towards the Adriatic between Iſtria on the weſt, Dalmatia on the eaſt, and mount Albius on the north. *Liburni*, the people. The apparitors, who at the command of the magiſtrate ſummoned the people from the country, were called *Liburni*, becauſe generally men of *Liburnia*. — *Liburna*, or *Liburnica* (Horace), denoted a kind of light and ſwift ſkiff, uſed by the Liburnians in their ſea-rovings or piracies, for which they were noted. *Liburnum* (Juvenal) was a ſpecies of litter made in form of Liburnian ſkiffs, wherein the noblemen of Rome were carried, and where they ſat at their eaſe, either reading or writing.

LIBURNUS (anc. geog.), a mountain of Campania. Alſo a port of Tuſcany. Now *Livorno*, or *Leghorn*. E. long. 11. N. lat 43. 30.

LIBYA, in general, according to the Greeks, denoted Africa. An appellation derived from *lub*, "thirſt," being a dry and thirſty country.

In a more reſtrained ſenſe, the middle part of Africa, extending north and weſt (Pliny); between the Mediterranean to the north, and Ethiopia to the eaſt; and was two-fold, the *Hither* or *Exterior Libya*; and the *Farther* or *Interior*. The former lay between the Mediterranean on the north, and the *Farther Libya* and Ethiopia beyond Egypt on the ſouth (Ptolemy). The *Farther* or *Interior Libya* was a vaſt country, lying between the *Hither Libya* on the north, the Atlantic ocean on the weſt, the Ethiopic on the ſouth, and Ethiopia beyond Egypt on the eaſt (Ptolemy).

In a ſtill more reſtrained ſenſe, it was called, for diſtinction's ſake, *Libya Propria*, was a northern diſtrict of Africa, and a part of the *Hither Libya*; ſituated between Egypt to the eaſt, the Mediterranean to the north, the Syrtis Major and the Regio Tripolitana to the weſt, the Garamantes and Ethiopia beyond Egypt to the ſouth. Now the kingdom and deſert of *Barca*. This Libya was again ſubdivided into *Libya* taken in the ſtricteſt ſenſe of all, and into Marmarica and Cyrenaica. *Libya* in the ſtricteſt ſenſe, otherwiſe the *Exterior*, was the moſt eaſtern part of *Libya Propria*, next to Egypt, with Marmarica on the weſt, the Mediterranean on the north, and the Nubi, now called *Nubia*, to the ſouth (Ptolemy).

LICENCE, in law, an authority given to a perſon to do ſome lawful act.

LICENTIATE, one who has obtained the degree of a licence.—The greateſt number of the officers of juſtice in Spain are diſtinguiſhed by no other title than that of *licentiate*. In order to paſs *licentiate* in common law, civil law, and phyſic, they muſt have ſtudied ſeven years, and in divinity ten. Among us a *licentiate* uſually means a phyſician who has a licence to practiſe, granted by the college of phyſicians.

LICETUS, a celebrated phyſician of Italy, was born at Rappollo, in the ſtate of Genoa, 1577. He came, it ſeems, into the world before his mother had completed the ſeventh month of her pregnancy; but his father, being an ingenious phyſician, wrapped him up in cotton, and nurtured him ſo, that he lived to be 77 years of age. He was trained with great care, and became a very diſtinguiſhed man in his profeſſion; and was the author of a great number of works: his book *De Monſtris* every body muſt have heard of. He was profeſſor of philoſophy and phyſic at Padua, where he died in 1655.

LICHEN, LIVERWORT, in botany; a genus of the natural order of algæ, belonging to the cryptogamia claſs of plants. The male receptacle is roundiſh, ſomewhat plain and ſhining. In the female the leaves have a farina or mealy ſubſtance ſcattered over them. There are about 130 ſpecies, all found in Britain. Among the moſt remarkable are the following:

1. The *geographicus*; it is frequent in rocks, and may be readily diſtinguiſhed at a diſtance. The cruſt or ground is of a bright greeniſh-yellow colour, ſprinkled over with numerous plain black tubercles; which frequently run into one another, and form lines reſembling the rivers in a map, from which laſt circumſtance it takes its name.

2. The *calcarious*, or black-nobbed dyer's lichen, is frequent on calcarious rocks; and hath a hard, ſmooth, white, ſtoney, or tartareous cruſt, cracked or teſſelated on the ſurface, with black tubercles. Dillenius relates, that this ſpecies is uſed in dyeing, in the ſame manner as the *tartareus* after mentioned.

3. The *ventoſus*, or red ſpangled tartareous lichen, hath a hard tartareous cruſt, cracked and teſſelated on the ſurface, of a pale yellow colour when freſh, and a light olive when dry. The tubercles are of a blood-red colour at top, their margin and baſe of the ſame colour as the cruſt. The texture and appearance of this (according to Mr. Lightfoot) indicate that it would anſwer the purpoſes of dyeing as well as ſome others of this tribe, if proper experiments were made.

4. The *candelarius*, or yellow farinaceous lichen, is common upon walls, rocks, boards, and old pales. There are two varieties. The firſt has a farinaceous cruſt of no regular figure, covered with numerous ſmall greeniſh-yellow or olive ſhields, and grows commonly upon old boards. The other has a ſmooth, hard, circular cruſt, wrinkled and lobed at the circumference, which adheres cloſely to rocks and ſtones. In the centre are numerous ſhields of a deeper yellow or orange colour, which, as they grow old, ſwell in the middle, and aſſume the figure of tubercles. The inhabitants of Smaland in Sweden ſcrape this lichen from the rocks, and mix it with their tallow, to make golden candles to burn on feſtival days.

5. The *tartarius*, or large yellow-faucered dyer's lichen, is frequent on rocks, both in the Highlands and Lowlands of Scotland. The cruſt is thick and tough, either white or greeniſh-white, and has a rough warted ſurface. The ſhields are yellow or buff-coloured, of various ſizes, from that of a pin's head to the diameter of a ſilver-penny. Their margins are of the ſame colour as the cruſt. This lichen is much uſed by the Highlanders for dyeing a fine claret or pompadour colour. For this purpoſe, after ſcraping it from the rocks, and cleaning it, they ſteep it in urine for a quarter of a year. Then taking it out, they make it into cakes, and hang them up in bags to dry. Theſe cakes are afterwards pulveriſed, and the powder is uſed to impart the colour with an addition of alum.

6. The *parellus*, or crawfiſh-eye lichen, grows upon walls and rocks, but is not very common. The cruſts ſpread cloſely upon the place where they grow, and cover them to a conſiderable extent. They are rough, tartareous and aſh-coloured, of a tough coriaceous ſubſtance. The ſhields are numerous and crowded, having white or aſh-coloured, ſhallow, plain diſcs, with obtuſe margins. This is uſed by the French for dyeing a red colour.

7. The *ſaxatilis*, or grey-blue pitted lichen, is very common upon trunks of trees, rocks, tiles, and old wood. It forms a circle two or three inches diameter. The upper ſurface is of a blue-grey and ſometimes of a whitiſh aſh-colour, uneven, and full of numerous ſmall pits or cavities; the under ſide is black, and covered all over, even to the edges, with ſhort ſimple hairs or radicles. A variety ſometimes occurs with leaves tinged of a red or purple colour. This is uſed by finches and other ſmall birds in conſtructing the outſide of their curiouſly formed neſts.

8. The *omphalodes*, or dark-coloured dyer's lichen, is frequent upon rocks. It forms a thick widely expanded cruſt of no regular figure, compoſed of numerous imbricated leaves of a brown or dark-purple colour, divided into ſmall ſegments.

The margins of the ſhields are a little criſped and turned inwards, and their outſide aſh-coloured. The lichen is much uſed by the Highlanders in dyeing a reddiſh brown colour. They ſteep it in urine for a conſiderable time, till it becomes ſoft and like a paſte; then, forming the paſte into cakes, they dry them in the ſun, and preſerve them for uſe in the manner already related of the tartarius.

9. The *parietinus*, or common yellow wall-lichen, is very common upon walls, rocks, tiles of houſes, and trunks of trees. It generally ſpreads itſelf in circles of two or three inches diameter, and is ſaid to dye a good yellow or orange colour with alum.

10. The *iſlandicus*, or eatable Iceland lichen, grows on many mountains both of the Highlands and Lowlands of Scotland. It conſiſts of nearly erect leaves about two inches high, of a ſtiff ſubſtance when dry, but ſoft and pliant when moiſt, variouſly divided without order into broad diſtant ſegments, bifid or triſid at the extremities. The upper or interior ſurface of the leaves is concave, cheſnut colour, ſmooth, and ſhining, but red at the baſe; the under or exterior ſurface is ſmooth and whitiſh, a little pitted, and ſprinkled with very minute black warts. The margins of the leaves and all the ſegments from bottom to top are ciliated with ſmall, ſhort, ſtiff, hair-like ſpinules, of a dark cheſnut colour, turning towards the upper ſide. The ſhields are very rarely produced. For the uſes of this as an eſculent herb, ſee ICELAND. Made into broth or gruel, it is ſaid to be very ſerviceable in coughs and conſumptions; and, according to Haller and Scopoli, is much uſed in theſe complaints in Vienna.

11. The *pulmonarius*, or lung-wort lichen, grows in ſhady woods upon the trunks of old trees. The leaves are as broad as a man's hand, of a kind of leather-like ſubſtance, hanging looſe from the trunk on which it grows, and laciniated into wide angular ſegments. Their natural colour, when freſh, is green; but in drying, they turn firſt to a glaucous and afterwards to a fuſcous colour. It has an aſtringent, bitter taſte; and, according to Gmelin, is boiled in ale in Siberia, inſtead of hops. The ancients uſed it in coughs and aſthmas, &c. but it is not uſed in modern practice.

12. The *calicaris*, or beaked lichen, grows ſometimes upon trees, but more frequently upon rocks, eſpecially on the ſea-coaſts, but is not very common. It is ſmooth, gloſſy, and whitiſh, producing flat or convex ſhields, of the ſame colour as the leaves, very near the ſummits of the ſegments, which are acute and rigid, and, being often reflected from the perpendicular by the growth of the ſhields, appear from under their limbs like a hooked beak. This will dye a red colour; and promiſes, in that intention, to rival the famous *Lichen Rocolla* or *Argol*, which is brought from the Canary iſlands, and ſometimes ſold at the price of 80l. per ton. It was formerly uſed inſtead of ſtarch to make hair-powder.

13. The *prunaſtri*, or common ragged hoary lichen, grows upon all ſorts of trees; but it is generally moſt white and hoary on the ſloe and old palm trees, or upon old pales. This is the moſt variable of the whole tribe of lichens, appearing different in figure, magnitude, and colour, according to its age, place of growth, and ſex. The young plants are of a glaucous colour, ſlightly divided into ſmall acute crected ſegments. As they grow older, they are divided like a ſtag's horn, into more and deeper ſegments, ſomewhat broad, flat, ſoft, and pitted on both ſides, the upper ſurface of a glaucous colour, the under one white and hoary.—The *male* plants, as Linnæus terms them, are ſhort, ſeldom more than an inch high, not hoary on the under ſide; and have pale glaucous ſhields ſituated at the extremities of the ſegments, ſtanding on ſhort peduncles, which are only ſmall ſtiff portions of the leaf produced.—The female ſpecimens have numerous farinaceous tubercles both on the edges of their leaves, and the wrinkles of their ſurface.—The pulveriſed leaves have been uſed as a powder for the hair, and alſo in dyeing yarn of a red colour.

14. The *juniperinus*, or common yellow tree-lichen, is common upon the trunks and branches of elms and many other trees. Linnæus ſays it is very common upon the juniper. The Gothland Swedes dye their yarn of a yellow colour with it, and give it as a ſpecific in the jaundice.

15. The *caninus*, or aſh-coloured ground-liverwort, grows upon the ground among moſs, at the roots of trees in ſhady woods, and is frequent alſo in heaths and ſtony places. The leaves are large, gradually dilated towards the extremities, and divided into roundiſh elevated lobes. Their upper ſide, in dry weather, is aſh-coloured; in rainy weather, of a dull fuſcous green colour; their under-ſide white and hoary, having many thick downy nerves, from which deſcend numerous long, white, pencil like radicles. The peltæ, or ſhields, grow at the extremities of the elevated lobes, ſhaped like the human nail; of a roundiſh oval form, convex above, and concave beneath; of a chocolate colour on the upper ſide, and the ſame colour with the leaves on the under. There are two varieties, the one called *reddiſh*, and the other *many-fingered*, ground-liverwort. The former is more common than the other. This ſpecies has been rendered famous by the celebrated Dr. Mead, who aſſerted that it was an infallible preventative of the dreadful conſequences attending the bite of a mad dog. He directed half an ounce of the leaves dried and pulveriſed to be mixed with two drachms of powdered black pepper. This was to be divided into four doſes, one of which was to be taken by the patient every morning faſting, for four mornings ſucceſſively, in half a pint of warm cow's milk; after which he was to uſe the cold bath every morning for a month. It is much to be lamented, however, that the ſucceſs of this medicine, or indeed any other recommended for the ſame purpoſe, hath not always anſwered the expectation. There are inſtances where the application has not prevented the hydrophobia, and it is even uncertain whether it has ever been inſtrumental in keeping off that diſorder.

16. The *aphthoſus*, or green ground-liverwort with black warts, grows upon the ground at the roots of trees in woods, and other ſtoney and moſſy places. It differs very little from the foregoing, and according to ſome is only a variety of it. Linnæus informs us, that the country-people of Upland in Sweden give an infuſion of this lichen in milk to children that are troubled with the diſorder called the *thruſh* or *aphthæ*, which induced that ingenious naturaliſt to beſtow upon it the trivial name of *aphthoſus*. The ſame writer alſo tells us, that a decoction of it in water purges upwards and downwards, and will deſtroy worms.

17. The *cocciferus*, or ſcarlet-tipped cup-lichen, is frequent in moors and heaths. It has in the firſt ſtate a granulated cruſt for its ground, which is afterwards turned into ſmall laciniated leaves, green above, and hoary underneath. The plant aſſumes a very different aſpect, according to the age, ſituation, and other accidents of its growth; but may be in general readily diſtinguiſhed by its fructifications, which are fungous tubercles of a fine ſcarlet colour, placed on the rim of the cup, or on the top of the ſtalk. Theſe tubercles, ſteeped in an alcaline lixivium, are ſaid to dye a fine durable red colour.

18. The *rangiferinus*, or rein-deer lichen, is frequent in woods, heaths, and mountainous places. Its general height, when full grown, is about two inches. The ſtalk is hollow, and very much branched from bottom to top: the branches are divided and ſubdivided, and at laſt terminated by two, three, four, or five very fine, ſhort, nodding horns. The axillæ of the branches are often perforated. The whole plant is

of a hoary white or grey colour, covered with white farinaceous particles, light and brittle when dry, ſoft and elaſtic when moiſt. The fructifications are very minute, round, fuſcous, or reddiſh-brown tubercles, which grow on the very extremities of the fineſt branches; but theſe tubercles are very ſeldom found. The plant ſeems to have no foliaceous ground for the baſe, nor ſcarcely any viſible roots.—Linnæus tells us, that in Lapland this moſs grows ſo luxuriant that it is ſometimes found a foot high. There are many varieties of this ſpecies, of which the principal is the ſylvaticus, or brown-tipt rein-deer lichen. The moſt remarkable difference between them is, that the ſylvaticus turns fuſcous by age, while the other always continues white.

19. The *plicatus*, or officinal ſtringy lichen, grows on the branches of old trees, but is not very common. The ſtalks are a foot or more in length, cylindrical, rigid, and ſtring-ſhaped, very irregularly branched, the branches entangled together, of a cinereous or aſh-colour, brittle and ſtringy if doubled ſhort, otherwiſe tough and pliant, and hang pendent from the trees on which they grow. The ſhields grow generally at the extremities of the branches, are nearly flat, or ſlightly concave, thin, aſh coloured above, pale-brown underneath, and radiated with fine rigid fibres. As the plant grows old, the branches become covered with a white, rough, warty cruſt; but the young ones are deſtitute of it. It was formerly uſed in the ſhops as an aſtringent to ſtop hæmorrhagies, and to cure ruptures; but is out of the modern practice. Linnæus informs us, that the Laplanders apply it to their feet to relieve the excoriations occaſioned by much walking.

20. The *barbatus*, or bearded lichen, grows upon the branches of old trees in thick woods and pine-foreſts. The ſtalks or ſtrings are ſlightly branched and pendulous, from half a foot to two feet in length, little bigger than a taylor's common ſewing thread; cylindrically jointed towards the baſe; but ſurrounded every where elſe with numerous horizontal capillary fibres, either ſimple or ſlightly branched. Their colour is a whitiſh green. This has an aſtringent quality like the preceding. When ſteeped in water, it acquires an orange colour; and, according to Dillenius, is uſed in Pennſylvania for dyeing that colour.

21. The *vulpinus*, or gold wiry lichen, grows upon the trunks of old trees, but is not very common. It is produced in erect tufts, from half an inch to two inches in height, of a fine yellow or lemon-colour, which readily diſcovers it. The filaments which compoſe it are not cylindrical, but a little compreſſed and uneven in the ſurface, variouſly branched, the angles obtuſe, and the branches ſtraggling and entangled one with another. Linnæus informs us, that the inhabitants of Smaland in Sweden dye their yarn of a yellow colour with this lichen; and that the Norwegians deſtroy wolves by ſtuffing dead carcaſes with this moſs reduced to powder, and mixed with pounded glaſs, and ſo expoſing them in the winter-ſeaſon to be devoured by theſe animals.

LICHFIELD. See LITCHFIELD.

LICHTENBERG, a caſtle of France, in the department of Lower Rhine and late province of Alſace, ſeated on a rock, near the Voſges mountains, and conſidered as impregnable. It is 12 miles N.N.W. of Haguenau.

LICHTENBURG, a town of Germany, in the circle of Franconia, and margraviate of Cullembach. E. lon. 12. 0. N. lat. 0 26.

LICHTENFELS, a town of Germany, in the circle of Franconia, and biſhopric of Bamberg, ſeated on the river Mayne, in E. lon. 11. 10. N. lat. 50. 20.

LICHTENSTEIN, a town of Swiſſerland, in Tockerberg, ſeated on the river Thour. E. lon. 2. 15. N. lat. 47. 25.

LICHTSTALL, an handſome town of Swiſſerland, in the county of Baſle; ſeated on the river Ergetz. E. lon. 7. 57. N. lat. 47. 40.

LICINIUS STOLO, a famous Roman tribune ſtyled *Stolo* on account of a law he made, while tribune, that no Roman citizen ſhould poſſeſs more than 500 acres of land; alleging, that when they occupied more, they could not cultivate it with care, nor pull up the uſeleſs ſhoots *(ſtolones)* that grow from the roots of trees. He is memorable alſo for enacting, that one of the conſuls ſhould always be of a Plebeian family. He lived about 362 B. C.

LICNON, in the Dionyſian ſolemnities, the myſtical van of Bacchus; a thing ſo eſſential to all the ſolemnities of this god, that they could not be duly celebrated without it. See DIONYSIA.

LICNOPHORI, in the Dionyſian ſolemnity, thoſe who carried the licnon.

LICOLA, or LAGO-DI-LICOLA, a lake in the kingdom of Naples, formerly famous for plenty of excellent fiſh; but in the year 1538 an exploſion of a volcano changed one part of it into a mountain of aſhes, and the other into a moraſs. It was anciently known by the name of the Lucrine lake.

LICONIA, in botany: A genus of the digynia order, belonging to the pentandria claſs of plants. There are five petals inlaid in the pit of the nectarium at its baſe; the capſule is bilocular and ſeed-bearing.

LICTORS, among the Romans, were officers eſtabliſhed by Romulus, who always attended the chief magiſtrates when they appeared in public. The duty of their office conſiſted in the three following particulars: 1. *Submotio*, or clearing the way for the magiſtrate they attended: this they did by word of mouth; or, if there was occaſion, by uſing the rods they always carried along with them. 2. *Animadverſio*, or cauſing the people to pay the uſual reſpect to the magiſtrate, as to alight, if on horſeback or in a chariot; to riſe up, uncover, make way, and the like. 3. *Præitio*, or walking before the magiſtrates: this they did not confuſedly, or all together, nor by two or three abreaſt, but ſingly following one another in a ſtraight line.—They alſo preceded the triumphal car in public triumphs; and it was alſo part of their office to arreſt criminals, and to be public executioners in beheading, &c. Their enſigns were the FASCES and SECURIS. As to the number of lictors allowed each magiſtrate, a dictator had twenty-four, a maſter of the horſe ſix, a conſul twelve, a prætor ſix; and each veſtal virgin, when ſhe appeared abroad, had one.

LIDFORD, a village in the county of Devon, ſituated on the river Lid, two or three miles eaſt of Brent Tor, was formerly a famous town, with a caſtle, which was always committed to men of quality, and twice ſent burgeſſes to parliament. It was ſadly ſhattered by the Danes in 997; and though now a contemptible village, the pariſh may for lands and liberties compare with any in the kingdom, the whole foreſt of Dartmore being in the verge of it. The river here being pent up at the bridge with rocks, has made itſelf ſo deep a fall, by its continual working, that paſſengers only hear the noiſe of the water without ſeeing it.

LIDKOPING, a town of Weſt Gothland in Sweden, ſeated on the lake Wenar, in E. lon. 13. 40. N. lat. 58. 25.

LIDNEY, a town in the county of Glouceſter, 71 miles from London, is ſeated on the weſt bank of the river Severn, and has a market on Wedneſdays, with two fairs in the year. In the neighbourhood are the remains of a large Roman encampment, with foundations of many ancient buildings, among which are ruins of a Roman hypocauſt of an oval form, and Roman antiquities and coins are often found here in great number. Mr. Bathurſt has a fine ſeat here called Sydney-Park, with very extenſive woods adjoining.

LIE, in morals, denotes a criminal breach of veracity.—

Archdeacon Paley, in treating of this ſubject, obſerves, that there are falſehoods which are not lies; that is, which are not criminal: and there are lies which are not literally and directly falſe.

I. Caſes of the firſt claſs are thoſe, 1. Where no one is deceived: as for inſtance in parables, fables, novels, jeſts, tales to create mirth, or ludicrous embelliſhments of a ſtory, in which the declared deſign of the ſpeaker is not to inform, but to divert; compliments in the ſubſcription of a letter; a priſoner's pleading not guilty; an advocate aſſerting the juſtice, or his belief of the juſtice, of his client's cauſe. In ſuch inſtances no confidence is deſtroyed, becauſe none was repoſed; no promiſe to ſpeak the truth is violated, becauſe none was given or underſtood to be given. 2. Where the perſon you ſpeak to has no right to know the truth, or, more properly, where little or no inconveniency reſults from the want of confidence in ſuch caſes; as where you tell a falſehood to a madman for his own advantage; to a robber to conceal your property; to an aſſaſſin to defeat or to divert him from his purpoſe. It is upon this principle, that, by the laws of war, it is allowed to deceive an enemy by feints, falſe colours, ſpies, falſe intelligence, and the like: but by no means in treaties, truces, ſignals of capitulation, or ſurrender: and the difference is, that the former ſuppoſe hoſtilities to continue, the latter are calculated to terminate or ſuſpend them.

Many people indulge in ſerious diſcourſe a habit of fiction and exaggeration, in the accounts they give of themſelves, of their acquaintance, or of the extraordinary things which they have ſeen or heard; and ſo long as the facts they relate are indifferent, and their narratives though falſe are inoffenſive, it may ſeem a ſuperſtitious regard to truth to cenſure them merely for truth's ſake. Yet the practice ought to be checked; for, in the firſt place, it is almoſt impoſſible to pronounce beforehand, with certainty, concerning any lie, that it is inoffenſive; or to ſay what ill conſequences may reſult from a lie apparently inoffenſive: and, in the next place, the habit, when once formed, is eaſily extended to ſerve the deſigns of malice or intereſt; like all habits, it ſpreads indeed of itſelf. Pious frauds, as they are improperly enough called, pretended inſpirations, forged books, counterfeit miracles, are impoſitions of a more ſerious nature. It is poſſible that they may ſometimes, though ſeldom, have been ſet up and encouraged with a deſign to do good; but the good they aim at requires, that the belief of them ſhould be perpetual, which is hardly poſſible; and the detection of the fraud is ſure to diſparage the credit of all pretenſions of the ſame nature. Chriſtianity has ſuffered more injury from this cauſe than from all other cauſes put together.

II. As there may be falſehoods which are not lies, ſo there may be lies without literal or direct falſehood. An opening is always left for this ſpecies of prevarication, when the literal and grammatical ſignification of a ſentence is different from the popular and cuſtomary meaning. It is the wilful deceit that makes the lie; and we wilfully deceive when our expreſſions are not true, in the ſenſe in which we believe the hearer apprehends them. Beſides, it is abſurd to contend for any ſenſe of words, in oppoſition to uſage; for all ſenſes of all words are founded upon uſage, and upon nothing elſe. Or a man may act a lie; as by pointing his finger in a wrong direction, when a traveller inquires of him his road; or when a tradeſman ſhuts up his windows, to induce his creditors to believe that he is abroad: for to all moral purpoſes, and therefore as to veracity, ſpeech and action are the ſame; ſpeech being only a mode of action.

LIECHTENAU, a town of Germany, in the circle of Franconia and margravate of Anſpach, ſubject to Nurenburg. E. lon. 9. 5. N. lat. 48. 43.

LIEGE (Ligius), in law, properly ſignifies a vaſſal, who holds a kind of fee, that binds him in a cloſer obligation to his lord than other people. The term ſeems to be derived from the French *lier* "to bind;" on account of a ceremony uſed in rendering faith or homage; which was by locking the vaſſal's thumb or his hand in that of the lord, to ſhow that he was faſt bound by his oath of fidelity. Cujas, Vigenere, and Bignon, chooſe rather to derive the word from the ſame ſource with *leudis* or *leodi*, "loyal, faithful." But Du Cange falls in with the opinion of thoſe who derive it from *liti*, a kind of vaſſals, ſo firmly attached to their lord, on account of lands or fees held of him, that they were obliged to do him all manner of ſervice, as if they were his domeſtics. He adds, this was formerly called *litgium ſervitium*, and the perſon *litge*. In this ſenſe, the word is uſed, Leg. Edw. cap. 29. *Judæi ſub tutela regis ligea debent eſſe*; that is, wholly under his protection.

By liege homage, the vaſſal was obliged to ſerve his lord towards all, and againſt all, excepting his father. In which ſenſe the word was uſed in oppoſition to ſimple homage; which laſt only obliged the vaſſal to pay the rights and accuſtomed dues to his lord; and not to bear arms againſt the emperor, prince, or other ſuperior lord: ſo that a liege man was a perſon wholly devoted to his lord, and entirely under his command. *Omnibus &c. Reginaldus, rex Inſularum, ſalutem. Sciatis quod deveni homo ligeus domini regis Angliæ Johannis, contra omnes mortales, quamdiu vixero; & inde ei fidelitatem & ſacramentum præſtiti, &c.* MS. penes W. Dugdale.

But it muſt be obſerved, there were formerly two kinds of liege homage; the one by which the vaſſal was obliged to ſerve his lord againſt all, without exception even of his ſovereign; the other, by which he was to ſerve him againſt all, except ſuch other lords as he had formerly owed liege homage to.

In our old ſtatutes, lieges, and liege people, are terms peculiarly appropriated to the king's ſubjects; as being *liges*, *ligi*, or *ligati*, obliged to pay allegiance to him; 8 Henry VI. 14 Henry VIII. &c. though private perſons had their lieges too. *Reinaldus, Dei gratia, abbas Rameſiæ, præpoſito & hominibus de Branceſtre, & omnibus vicinis Francis & Anglis, ſalutem. Sciatis me dediſſe terram Ulfe, in depedene (hodie depedale) huic Boſelino, & uxori ejus Alfniæ—ea conditione quod effecti ſint homines leges.* Lib. Rameſ.

LIEGE, a biſhopric of Weſtphalia, bounded on the north by Brabant and Guelderland, on the eaſt by the duchies of Limburg and Juliers, on the ſouth by Luxemburg and the Ardennes, and on the weſt by Brabant and the county of Namur. It is fruitful in corn and fruits, and contains mines of iron, lead, and coal, beſides quarries of marble. The biſhop is elected by the chapter, compoſed of 60 canons; he is one of the moſt conſiderable eccleſiaſtical princes of Germany, and has an annual revenue of 300,000 ducats.

Liege, an ancient and populous city of Weſtphalia, capital of a biſhopric of the ſame name, with a caſtle. Here the river Maeſe is divided into three branches, which, after having paſſed through the city, under ſeveral bridges, unite again. Liege is four miles in circumference, and has 150 ſtreets, and 16 gates: it has alſo ten large ſuburbs, in which are a great number of religious houſes and churches; which laſt, with thoſe in the city, make 10 in all. The cathedral contains many relics; and the other public ſtructures are the biſhop's palace, the town houſe, and the arſenal: here is alſo a famous univerſity, and a convent of Engliſh nuns. At this place is made a great quantity of fire-arms, which are exported to different countries. It was bombarded in 1691, and delivered up to the French in 1701. The allies retook it in 1702, and the French beſieged it again in 1705, but were obliged to raiſe the ſiege, on the approach of the duke of Marlborough. In 1734 a fire happened here, which conſumed the biſhop's palace, with all the furniture and writings. In 1789, the inhabitants having complain-

ed of the oppreſſion which they experienced under the government of their biſhop, at laſt inſiſted upon a charter of privileges. As the biſhop and chapter did not comply with their demands, they had recourſe to arms; and the biſhop, apprehenſive for his ſafety, left the city, and appealed to the imperial chamber of Wetzlar. That chamber iſſued decrees in his favour: the king of Pruſſia, in 1790, ſeemed to act as a mediator for the citizens: the ſentences, however, iſſued by the imperial chamber againſt the inſurgents, were followed by requiſitorial letters, addreſſed to the government of the Auſtrian Netherlands, deſiring that his imperial majeſty's troops would aſſiſt thoſe of the electoral princes in enforcing their decrees; in conſequence of which, the Auſtrians entered Liege in 1791, reſtored the old magiſtracy that had been expelled, to their functions, and reinſtated the biſhop and chapter. In 1792 the French took the city, and effected another revolution; but being driven thence, in 1793, the citizens were once more obliged to ſubmit. Liege is 15 miles ſouth-weſt of Maeſtricht, and 62 ſouth-weſt of Cologne. E. lon. 5. 40. N. lat. 50. 37.

LIENTERY, a flux of the belly, in which the aliments are diſcharged as they are ſwallowed, or very little altered either in colour or ſubſtance.

LIEVENS (John or Jan), a celebrated painter, was born at Leyden in 1607. He diſcovered an early inclination for the arts; and was the diſciple firſt of Joris van Schooten, and afterwards of Peter Laſtman. He excelled principally in painting portraits; but he alſo executed ſeveral hiſtorical ſubjects with great ſucceſs. He came over into England, where he reſided three years, and painted the portraits of Charles I the queen, the prince of Wales, and ſeveral of the nobility; after which he returned to Antwerp, where he met with full employment for his pencil. We have ſeveral etchings by this maſter, which are performed in a ſlight but maſterly manner. The chiaro ſcuro is very ſkilfully managed in them, ſo as to produce a moſt powerful effect. His ſtyle of etching bears ſome reſemblance to that of Rembrandt; but it is coarſer in general, and leſs finiſhed.

LIEUTAUD (Dr. Joseph), counſellor of ſtate and firſt phyſician at the court of France, was born at Aix in Provence, and reſided principally there till he took the degree of doctor of medicine. After this he proſecuted his ſtudies for ſome years at Montpelier. He returned to Aix, where he ſoon acquired extenſive practice, and became eminent for literary abilities. He reſided there till the year 1750, when he was invited to act as phyſician to the royal infirmary at Verſailles. There he practiſed with ſuch reputation and ſucceſs, that he ſoon arrived at the head of his profeſſion; and in the year 1774, upon the death of M. Senac, he was appointed archiater. His extenſive engagements in practice did not prevent him from cultivating the ſcience of medicine in all its branches, and from freely communicating to others the reſult of his own ſtudies. He publiſhed many valuable works; amongſt which the following may be accounted the moſt remarkable: 1. *Elementa Phiſologiæ*. 2. *Precis de la Medicine*. 3. *Pratique Precis de la Matiere Medicale*. 4. *Eſſais Anatomiques*. 5. *Synopſis Univerſæ Praxeos Medicinæ*. 6 *Hiſteria Anatomico-Medica*. He died at Verſailles in 1780, aged 78 years.

LIEUTENANT, an officer who ſupplies the place and diſcharges the office of a ſuperior in his abſence. Of theſe ſome are civil, as the lords-lieutenants of kingdoms, and the lords-lieutenants of counties; and others are military, as the lieutenant-general, lieutenant-colonel, &c.

Lord Lieutenant *of Ireland*, is properly a viceroy; and has all the ſtate and grandeur of a king of England, except being ſerved upon the knee. He has the power of making war and peace, of beſtowing all the offices under the government, of dubbing knights, and of pardoning all crimes except high treaſon; he alſo calls and prorogues the parliament; but no bill can paſs without the royal aſſent. He is aſſiſted in his government by a privy-council; and, on his leaving the kingdom, he appoints the lords of the regency, who govern in his abſence.

Lords-Lieutenants *of Counties*, are officers, who, upon any invaſion or rebellion, have power to raiſe the militia, and to give commiſſions to colonels and other officers, to arm and form them into regiments, troops, and companies. Under the lords-lieutenants are deputy-lieutenants, who have the ſame power: theſe are choſen by the lords-lieutenants out of the principal gentlemen of each county, and preſented to the king for his approbation.

Lieutenant-*Colonel*. See Colonel.

Lieutenant *General*. See General.

Lieutenant, in the land-ſervice, is the ſecond commiſſioned officer in every company of both foot and horſe, and next to the captain, and who takes the command upon the death or abſence of the captain.

Lieutenant *of Artillery*. Each company of artillery hath four: 1 firſt and 3 ſecond lieutenants. The firſt lieutenant hath the ſame detail of duty with the captain; becauſe in his abſence he commands the company: he is to ſee that the ſoldiers are clean and neat; that their clothes, arms, and accoutrements are in good and ſerviceable order; and to watch over every thing elſe which may contribute to their health. He muſt give attention to their being taught the exerciſe, ſee them punctually paid, their meſſes regularly kept, and to viſit them in the hoſpitals when ſick. He muſt aſſiſt at all parades, &c. He ought to underſtand the doctrine of projectiles and the ſcience of artillery, with the various effects of gunpowder, however managed or directed; to enable him to conſtruct and diſpoſe his batteries to the beſt advantage; to plant his cannon, mortars, and howitzers, ſo as to produce the greateſt annoyance to an enemy. He is to be well ſkilled in the attack and defence of fortified places, and to be converſant in arithmetic, mathematics, mechanics, &c.

Second Lieutenant *in the Artillery*, is the ſame as an enſign in an infantry regiment, being the youngeſt commiſſioned officer in the company, and muſt aſſiſt the firſt lieutenant in the detail of the company's duty. His other qualifications ſhould be equal with thoſe of the firſt lieutenant.

Lieutenant *of a Ship of War*, the officer next in rank and power to the captain, in whoſe abſence he is accordingly charged with the command of the ſhip, as alſo the execution of whatever orders he may have received from the commander relating to the king's ſervice.

The lieutenant who commands the watch at ſea keeps a liſt of all the officers and men thereto belonging, in order to muſter them when he judges it expedient, and report to the captain the names of thoſe who are abſent from their duty. During the night-watch he occaſionally viſits the lower decks, or ſends thither a careful officer, to ſee that the proper ſentinels are at their duty, and that there is no diſorder amongſt the men; no tobacco ſmoked between decks, nor any fire or candles burning there, except the lights which are in lanthorns, under the care of a proper watch, on particular occaſions. He is expected to be always upon deck in his watch, as well to give the neceſſary orders with regard to trimming the ſails and ſuperintending the navigation, as to prevent any noiſe or confuſion; but he is never to change the ſhip's courſe without the captain's directions, unleſs to avoid an immediate danger.

The lieutenant, in time of battle, is particularly to ſee that all the men are preſent at their quarters, where they have been previouſly ſtationed according to the regulations made by the captain. He orders and exhorts them every where to perform their duty; and acquaints the captain at all other times of the

misbehaviour of any person in the ship, and of whatever else concerns the service or discipline.

The youngest lieutenant in the ship, who is also styled *lieutenant at arms*, besides his common duty, is particularly ordered, by his instructions, to train the seamen to the use of small arms, and frequently to exercise and discipline them therein. Accordingly, his office, in time of battle, is chiefly to direct and attend them; and at all other times to have a due regard to the preservation of the small arms, that they be not lost or embezzled, and that they are kept clean and in good condition for service.

Lieutenant-*Reformed*, he whose company or troop is broke or disbanded, but continued in whole or half-pay, and still preserves his right of seniority and rank in the army.

LIGAMENT, in its general sense, denotes any thing that ties or binds one part to another. The term in anatomy denotes a strong compact substance, serving to join two bones together. See Anatomy.

LIGARIUS (Quintus), a Roman proconsul in Africa, 49 B.C. Taking part with Pompey, he was forbid by Julius Cæsar to return to Rome: to obtain his pardon, Cicero made that admired oration in his defence which has immortalised the memory of the client with that of his celebrated advocate.

LIGATURE, in surgery, is a cord, band, or string; or the binding any part of the body with a cord, band, fillet, &c. whether of leather, linen, or any other matter. Ligatures are used to extend or replace bones that are broken or dislocated; to tie the patients down in lithotomy and amputations; to tie above the vein in phlebotomy, on the arteries in amputations, or in large wounds; to secure the splints that are applied to fractures; to tie up the spermatic vessels in castration; and, lastly, in taking off warts or other excrescences by ligature.

Ligature, is also used to signify a kind of bandage or fillet tied round the neck, arm, leg, or other part of the bodies of men or beast, to divert or drive off some disease, accident, &c.

Ligature, in the Italian music, signifies a tying or binding together of notes. Hence syncopes are often called *ligatures*, because they are made by the ligature of many notes. There is another sort of ligatures for breves, when there are many of these on different lines, or on different spaces, to be sung to one syllable.

Ligatures, among printers, are types consisting of two letters or characters joined together; as *ct*, *&*, *ff*, *fl*, *fi*. The old editions of Greek authors are extremely full of ligatures; the ligatures of Stephens are by much the most beautiful. Some editions have been lately printed without any ligatures at all; and there was a design to explode them quite out of printing. Had this succeeded, the finest ancient editions would in time have grown useless; and the reading of old manuscripts would have been rendered almost impracticable to the learned themselves.

LIGHT, in the most common acceptation of the word, signifies that invisible ethereal matter which makes objects perceptible to our sense of seeing. Figuratively, it is also used for whatever conveys instruction to our minds, and likewise for that instruction itself.

The nature of light hath been a subject of speculation from the earliest ages of philosophy. Some of those first distinguished by the appellation of philosophers even doubted whether objects became visible by means of any thing proceeding from them, or from the eye of the spectator. The fallacy of this notion must very soon have been apparent, because, in that case, we ought to have seen as well in the night as in the day. The opinion was therefore qualified by Empedocles and Plato; who maintained, that vision was occasioned by particles continually flying off from the surfaces of bodies, which met with others proceeding from the eye; but Pythagoras ascribed it solely to the particles proceeding from the external objects and entering the pupil of the eye.

Among the modern philosophers there have been two celebrated opinions, *viz.* the Cartesian and Newtonian. According to the former, light is an invisible fluid present at all times and in all places, but which requires to be set in motion by an ignited or otherwise properly qualified body in order to make objects visible to us.—The Newtonians maintain, that light is not a fluid *per se*, but consists of a vast number of exceedingly small particles shaken off in all directions from the luminous body with inconceivable velocity by a repulsive power; and which most probably never return again to the body from which they were emitted. These particles are also said to be emitted in right lines by the body from whence they proceed: and this rectilinear direction they preserve until they are turned out of their original path by the attraction of some other body near which they pass, and which is called *inflection*; by passing through a medium of different density, which is called *refraction*, or by being thrown obliquely or directly forward by some body which opposes their passage, and which is called *reflection*; or, lastly, till they are totally stopped by the substance of any body into which they penetrate, and which is called their *extinction*. A succession of these particles following one another in an exactly straight line is called a *ray of light*; and this ray, in whatever manner it hath its direction changed, whether by refraction, reflection, or inflection, always preserves its rectilinear course; neither is it possible by any art whatever to make it pass on in the segment of a circle, ellipsis, or other curve. From some observations on the eclipses of Jupiter's satellites, and also on the aberration of the fixed stars, it appears that the particles of light move at the rate of little less than 200,000 miles in a second of time. See Astronomy.

To this doctrine concerning the nature of light several objections have been made; the most considerable of which is, That in this case, as rays of light are continually passing in different directions from every visible point, they must necessarily interfere with and destroy each other in such a manner as entirely to confound all distinct perception of objects, if not to destroy the sense of seeing altogether: not to mention the continual waste of substance which a constant emission of particles must occasion in the luminous body, and which since the creation ought to have greatly diminished the sun and stars, as well as increased the bulk of the earth and planets by the vast quantity of particles of light absorbed by them in such a long period of time.

In answer to this objection, Mr. Melville gives some ingenious illustrations concerning the extreme subtilty of light, or the smallness of the particles of which it consists, and of which few persons, even of those who admit the hypothesis, have any idea. He observes, that there is probably no physical point in the visible horizon that does not send rays to every other point, unless where opaque bodies interpose. Light, in its passage from one system to another, often passes through torrents of light issuing from other suns and systems, without ever interfering or being diverted in its course, either by it, or by the particles of that elastic medium which some phenomena give us reason to suppose are diffused through all the mundane space. To account for this fact and others similar to it, he concludes, that the particles of which light consists must be incomparably rare, even when they are the most dense; that is, that the semidiameters of the two nearest particles, in the same or in different beams, soon after their emission, are incomparably less than their distance from one another. This difficulty concerning the non-interference of the particles of light is not solved,

as he obſerves, by ſuppoſing with Mr. Boſcovich and others, that each particle is endued with an infuperable impulſive force; becauſe, in that caſe, their ſpheres of impulſion would even be more liable to interfere, and they would on that account be more likely to diſturb one another.

The difficulty, according to Mr. Canton, will nearly vaniſh, if a very ſmall portion of time be allowed between the emiſſion of every particle and the next that follows in the ſame direction. Suppoſe, for inſtance, that one lucid point of the ſun's ſurface emits 150 particles in a ſecond, which are more than ſufficient to give continual light to the eye without the leaſt appearance of intermiſſion; yet ſtill the particles of which it conſiſts, will on account of their great velocity be more than 1000 miles behind each other, and thereby leave room enough for others to paſs in all directions.

In order to determine whether light really conſiſts of particles emitted from the luminous body, or only in the vibrations of a ſubtile fluid, it has been attempted to find out its momentum, or the force with which it moves. The firſt who ſet about this matter with any tolerable pretenſions to accuracy was M. Mairan. Others indeed, particularly Hartſocker and Homberg, had pretended, that in certain caſes this momentum was very perceptible; but M. Mairan proved, that the effects mentioned by them were owing to currents of heated air produced by the burning-glaſſes uſed in their experiments, or to ſome other cauſes overlooked by theſe philoſophers. To decide the matter therefore, if poſſible, he began with trying the effects of rays collected by lenſes of four and ſix inches diameter, and thrown upon the needle of a compaſs; but the reſult was nothing more than ſome tremulous motion from whence he could draw no concluſion. After this, he and Mr. du Fay conſtructed a kind of mill of copper, which moved with an exceeding ſlight impulſe; but though they threw upon it the focus of a lens of ſeven or eight inches diameter, they were ſtill unable to draw any concluſions from the reſult.

M. Mairan afterwards procured a horizontal wheel of iron three inches in diameter, having ſix radii, at the extremity of each of which was a ſmall wing fixed obliquely. The axis of the wheel, which was alſo of iron, was ſuſpended by a magnet. The wheel and the axis together did not weigh more than 30 grains; but though a motion was given to this wheel when the focus of the burning-glaſs was thrown upon the extremities of the radii, yet it was ſo irregular, that he could not but conclude that it was occaſioned by the motion of the heated air. He then intended to have made his experiment *in vacuo*, but he concluded that it was unneceſſary. For, beſides the difficulty of making a vacuum, he was perſuaded that there was in our atmoſphere a thinner medium which freely penetrates even glaſs itſelf, the exiſtence of which he imagined that he had ſufficiently proved in his treatiſe on the aurora borealis. See AURORA *Borealis*.

Mr. Michell ſome years ago endeavoured to aſcertain the momentum of light in a manner ſtill more accurate. The inſtrument he made uſe of for this purpoſe conſiſted of a very thin plate of copper, a little more than an inch ſquare, which was faſtened to one end of a ſlender harpſichord-wire about ten inches long. To the middle of this was fixed an agate cap, ſuch as is commonly uſed for ſmall mariner's-compaſſes, after the manner of which it was intended to turn; and at the other end of the wire was a middling-ſized ſhot-corn, as a counterpoiſe to the copperplate. The inſtrument had alſo fixed to it in the middle, at right angles to the length of the wire, and in an horizontal direction, a ſmall bit of a very ſlender ſewing-needle, about one-third or perhaps half an inch long, which was made magnetical: In this ſtate the whole inſtrument might weigh about 10 grains. It was placed on a very ſharp-pointed needle, on which the agate cap turned extremely freely; and to prevent its being diſturbed by any motion of the air, it was included in a box, the lid and front of which were of glaſs. This box was about 12 inches long, ſix or ſeven inches deep, and about as much in width; the needle ſtanding upright in the middle. At the time of making the experiment, the box was placed in ſuch a manner that a line drawn from the ſun paſſed at right angles to the length of it; and the inſtrument was brought to range in the ſame direction with the box, by means of the magnetical bit of needle above mentioned, and a magnet properly placed on the outſide, which would retain it, though with extremely little force, in any ſituation. The rays of the ſun were now thrown upon the copperplate above mentioned from a concave mirror of about two feet diameter, which, paſſing through the front-glaſs of the box, were collected into the focus of the mirror upon the copperplate. In conſequence of this the plate began to move, with a ſlow motion of about an inch in a ſecond of time, till it had moved through a ſpace of about two inches and a half, when it ſtruck againſt the back of the box. The mirror being removed, the inſtrument returned to its former ſituation by means of the little needle and magnet; and the rays of the ſun being then again thrown upon it, it again began to move, and ſtruck againſt the back of the box as before; and this was repeated three or four times with the ſame ſucceſs.—The inſtrument was then placed the contrary way in the box to that in which it had been placed before, ſo that the end to which the copperplate was affixed, and which had lain, in the former experiment, towards the right hand, now lay towards the left; and the rays of the ſun being again thrown upon it, it began to move with a ſlow motion, and ſtruck againſt the back of the box as before; and this was repeated once or twice with the ſame ſucceſs. But by this time the copperplate began to be ſo much altered in its form, by the extreme heat which it underwent in each experiment, and which brought it nearly into a ſtate of fuſion, that it became very much bent, and the more ſo as it had been unwarily ſupported by the middle, half of it lying above and half below the wire to which it was faſtened. By this means it now varied ſo much from the vertical poſition, that it began to act in the ſame manner as the ſail of a wind-mill, being impelled by the ſtream of heated air which moved upwards, with a force ſufficient to drive it in oppoſition to the impulſe of the rays of light.

"If we impute (ſays Dr. Prieſtley) the motion produced in the above experiment to the impulſe of the rays of light, and ſuppoſe that the inſtrument weighed ten grains, and acquired a velocity of one inch in a ſecond, we ſhall find that the quantity of matter contained in the rays falling upon the inſtrument in that time amounted to no more than one twelve-hundred-millionth part of a grain, the velocity of light exceeding the velocity of one inch in a ſecond in the proportion of about 12,000,000,000 to 1. Now the light in the above experiment was collected from a ſurface of about three ſquare feet, which reflecting only about half what falls upon it, the quantity of matter contained in the rays of the ſun incident upon a ſquare foot and an half of ſurface in one ſecond of time, ought to be no more than the twelve hundred millionth part of a grain, or, upon one ſquare foot only, the eighteen hundred-millionth part of a grain. But the denſity of the rays of light at the ſurface of the ſun is greater than at the earth in the proportion of 45,000 to 1: there ought, therefore, to iſſue from one ſquare foot of the ſun's ſurface in one ſecond of time, in order to ſupply the waſte by light, one forty-thouſandth part of a grain of matter; that is, a little more than two grains in a day, or about 4,752,000 grains, or 970 pounds avoirdupois nearly, in 6000 years; a quantity which would have ſhortened the ſun's ſemi-diameter no more than about ten feet, if it was formed of the denſity of water only."

The Newtonians, beſides the anſwer juſt now given to the

moſt formidable objections of their opponents, have endeavoured to prove the impoſſibility of light being a vibration in any fluid. Sir Iſaac, in his Principia, demonſtrates, that no rectilinear motion can be propagated among the particles of any fluid, unleſs theſe particles lie in right lines; and he hath alſo ſhown, that all motion propagated through a fluid diverges from a rectilinear progreſs into the unmoved ſpaces. Hence he concludes, "a preſſure on a fluid medium (i. e. a motion propagated by ſuch a medium beyond any obſtacle, which impedes any part of its motion) cannot be propagated in right lines, but will be always inflecting and diffuſing itſelf every way, to the quieſcent medium beyond that obſtacle. The power of gravity tends downwards; but the preſſure of water riſing from it tends every way with an equable force, and is propagated with equal eaſe, and equal ſtrength, in curves, as in ſtraight lines. Waves, on the ſurface of the water, gliding by the extremes of any very large obſtacle, inflect and dilate themſelves, ſtill diffuſing gradually, into the quieſcent water beyond that obſtacle. The waves, pulſes, or vibrations of the air, wherein ſound conſiſts, are manifeſtly inflected, though not ſo conſiderably as the waves of water; and ſounds are propagated with equal eaſe, through crooked tubes and through ſtraight lines; but light was never known to move in any curve, nor to inflect itſelf *ad umbram*."

To this Mr. Rowning adds another proof: "The Carteſian notion of light (ſays he) was not, that it is propagated from luminous bodies by the emiſſion of ſmall particles, but that it was communicated to the organ of ſight by their preſſure upon the *materia ſubtilis*, with which they ſuppoſed the univerſe to be full. But, according to this hypotheſis, it could never be dark; becauſe, when a fluid ſuſtains any preſſure, if that fluid fills all the ſpace it takes up, abſolutely, without leaving any pores, which is the caſe of the ſuppoſed *materia ſubtilis*, then that preſſure muſt neceſſarily be communicated *equally* and *inſtantaneouſly* to every part. And therefore, whether the ſun were above or below the horizon, the preſſure communicated, and conſequently the light, would be the ſame. And farther, as the preſſure would be inſtantaneous, ſo would the light, which is contrary to what is collected from the eclipſes of Jupiter's ſatellites."

It is obvious, however, that whatever ſide we take concerning the nature of light, many, indeed almoſt all the circumſtances concerning it, are incomprehenſible, and beyond the reach of human underſtanding.

Moſt of the diſcous flowers, by ſome power unknown to us, follow the ſun in his courſe. They attend him to his evening retreat, and meet his riſing luſtre in the morning with the ſame unerring law. If a plant alſo is ſhut up in a dark room, and a ſmall hole is afterwards opened by which the light of the ſun may enter, the plant will turn towards that hole, and even alter its own ſhape in order to get near it; ſo that though it was ſtraight before, it will in time become crooked, that it may get near the light. It is not the *heat*, but the *light* of the ſun, which it thus covets; for, though a fire be kept in the room, capable of giving a much ſtronger heat than the ſun, the plant will turn away from the fire in order to enjoy the ſun's light.—The green colour of plants alſo depends on the ſun's light being allowed to ſhine upon them; for without this they are always white.—From this laſt circumſtance, and likewiſe the property which the ſolar light has of blackening precipitates of ſilver from the nitrous acid, it has been thought that light either contains the *phlogiſton* in very conſiderable quantity, or is itſelf a modification of that unknown ſubſtance. But that this cannot be the caſe, we have now a proof little ſhort of demonſtration, from the experiments of Dr. Prieſtley concerning the production of pure dephlogiſticated air from pump-water, by means of the ſolar light. If light either were the phlogiſton itſelf, or contained it in very conſiderable quantity, it is impoſſible the air produced by its means could be pure and dephlogiſticated.—For the properties of light acting as the medium of our perceptions by the ſenſe of ſight, ſee the article Optics.

In the Philoſophical Tranſactions for 1776, Dr. Fordyce gives an account of ſome experiments upon the light produced by inflammation. They were made to determine, whether there was any light produced by the inflammation itſelf, independent of ignition. Subſtances, he obſerves, begin to be luminous in the dark when heated to between 6 and 700 degrees of Fahrenheit's thermometer. If the ſubſtances be colourleſs, they firſt emit a red light; then a red mixed with yellow; and laſtly, with a great degree of heat, a pure white. This whiteneſs, however, ſeems to depend greatly upon the denſity of the body; for the vapour at the end of the flame urged by a blow-pipe is not viſibly luminous, though its heat be ſufficiently great to give a white heat to glaſs. The colour of the ignited matter, according to our author, has an effect upon the colour of the light emitted. Thus, during the calcination of zinc, the calx of which is white, a light is produced ſcarce inferior in beauty to that of the ſun himſelf. A beautiful green is communicated by the green calx of copper to the flame of a fire into which it is thrown; and the yellow empyreumatic oil into which tallow or any common oil is converted in burning, communicates a part of its own colour to the flame, which very much alters the appearance of bodies ſeen by candle-light from what it is by day-light. It does not, however, appear that this always holds good; for the flame of burning iron is intenſely white; and yet neither the metal itſelf nor any of its calces are of that colour.

Light produced by the decompoſition of bodies by inflammation without ignition is always blue, and produces very little heat. Thus phoſphorus of urine is decompoſed by mere expoſure to the air, and gives but very little heat, though a conſiderable light is emitted. The following proof is adduced by our author that this emiſſion of light is a true inflammation: "Take a receiver of white glaſs, capable of holding ſix or eight gallons; put into it a drachm of phoſphorus finely powdered, and half an ounce of water; cork the mouth of the receiver, and tie it over with a bladder, ſo as to exclude the external air: incline the receiver to all ſides gently, and afterwards ſet it to reſt; the powder will adhere to the ſides, and the water will drain from it. As ſoon as the water is ſufficiently drained off, the particles of the phoſphorus will become luminous, and emit a thick ſmoke: this will continue for ſome days; but at laſt no more light or vapour will appear. Open the receiver, and you will find that the air will have contracted, as it does from the inflammation of a candle in Van Helmont's experiment; that is, about a twentieth part. It is become unfit for inflammation; for, if a lighted candle be immerſed in it, it will be extinguiſhed as well as the phoſphorus, and an animal will be ſuffocated by it. The air then has ſuffered the ſame change as that which has ſerved for the inflammation of other bodies: and the phoſphorus is partly decompoſed, the water in the receiver being impregnated with its acid, and the air ſaturated with its phlogiſton. Blow freſh air into the receiver, and the light and ſmoke will immediately reappear. In like manner it is known that ſulphur will burn and give light without heat ſufficient for ignition. Take a piece of iron heated nearly red-hot, and throw a little gun-powder upon it. If the heat be of a proper degree, the ſulphur will burn off with a blue flame, without heat ſufficient for ignition; for, if ſuch heat had been produced, the gun-powder would certainly have taken fire. It is the inflammation and decompoſition of the ſulphur, and not its evaporation, which produces the light; for, if we ſublime ſulphur in veſſels of the moſt tranſparent glaſs, no light will be viſible except at the very beginning,

when a ſmall portion of it burns till the air in the veſſel be ſaturated, and rendered unfit for inflammation."

Our author is of opinion, that the light produced by inflammation is of a blue colour, from whatever body it is derived. This he endeavours to prove from an obſervation on the flame of a candle, the lower part of which, where the inflammation is, always appears of a blue colour. "Or, (ſays he) take a candle which has burned for ſome time; extinguiſh it by applying tallow to the wick, and let it ſtand to cool; afterwards ſet it on fire by the flame of another candle; at firſt no more vapour will ariſe than can be acted upon by the air at once; inflammation, therefore, will go on in the whole ſmall flame, and it will be blue. When a candle burns, the following proceſs takes place. The tallow boils in the wick; and is converted into empyreumatic oil, riſing from it in the form of vapour. As it riſes from every part of the wick, the volume is increaſed till it comes to the top, and gives to the lower part of the flame the form of the fruſtum of an inverted cone. The air is applied to the outer ſurface of the column of vapour; and there decompoſing the empyreumatic oil, produces heat and blue light: the ſtratum of vapour, within the outer burning ſurface, is heated white-hot; the heat diminiſhes towards the centre, which, if the flame be large, is ſcarcely red-hot; as the column riſes, decompoſition taking place conſtantly on its ſurface, it neceſſarily diminiſhes, and the upper part of the flame is conical. That the tallow boils in the wick can be ſeen: that it is converted into empyreumatic oil, is proved by drawing the vapour, riſing in the middle of the flame, where it does not burn, into a glaſs-tube: the empyreumatic oil condenſes: this alſo ſhows that the flame does not burn in the middle. That the heat is produced on the outer ſurface appears, if we take a ſmall rod of glaſs, and put the end of it in the blue flame on the ſurface; it will be heated white-hot, and melt. Immerſe the rod into the flame, ſo that the point ſhall be in the centre: it will melt and bend where it is in the blue flame on the ſurface; whereas, if the flame be large, the point which is in the centre will hardly be heated red-hot. That the empyreumatic oil is decompoſed, is proved by burning a candle with a very ſmall wick in diſtilling veſſels; no condenſation of empyreumatic oil takes place."

In the 75th volume of the Tranſactions, Mr. Morgan treats the ſubject of light at ſome length. As a foundation for his reaſoning he aſſumes the following data: 1. That light is a body, and, like all others, ſubject to the laws of attraction. 2. That light is an heterogeneous body; and that the ſame attractive power operates with different degrees of force on its different parts. 3. That the light which eſcapes from combuſtibles when decompoſed by heat, or by any other means, was, previous to its eſcape, a component part of theſe ſubſtances. Hence he concludes, that when the attractive force by which the ſeveral rays of light are attached to a body is weakened, ſome of thoſe rays will eſcape ſooner than others; it being evident that thoſe which are detained by the ſmalleſt power will ſooneſt go off when the general attractive force is weakened. This he illuſtrates by the example of a mixture of ſpirit of wine, water, and other more fixed ſubſtances. The application of a gentle heat will carry off the ſpirit of wine only; a heat not much greater will evaporate the ſpirits and water mixed together; and a ſtill greater degree will carry off a mixture of all the particles together. "In like manner (ſays he), when the ſurface of a combuſtible is in a ſtate of decompoſition, thoſe parts of it which are the leaſt fixed, or which are united with the leaſt force, will be ſeparated firſt. Amongſt theſe the indigo rays of light will make the earlieſt appearance. By increaſing the heat, we ſhall mix the violet with the indigo: by increaſing it ſtill more, we ſhall add the blue and the green to the mixture, till at length we reach that intenſity of heat which will cauſe all the rays to eſcape at the ſame inſtant, and make the flame of a combuſtible perfectly white. By examining the flame of a common candle, we may obſerve, that its loweſt extremities, or the part in which the black colour of the wick terminates, diſcharges the leaſt heat; and that, as the vertex of the flame is approached, a ſucceſſive order of parts is paſſed through, in which the loweſt is continually adding to the heat of that which is juſt above it, till we come to the top of the flame, near which all the heat is collected into a focus. At the loweſt extremity, however, where the heat is inconſiderable, a blue colour may always be obſerved; and from this appearance, amongſt others, I think it may be concluded, that the blue rays are ſome of thoſe which eſcape from combuſtibles in an early period of their decompoſition; and that if the decompoſition could be examined in a period ſtill more early, the colour of the flame would be violet. By an *à priori* deduction of this kind, I was led to obſerve, that to the external boundary of the flame of a common candle is annexed a filament of light; which, if proper care be taken to prevent the eſcape of too much ſmoke, will appear moſt beautifully coloured with the violet and indigo rays. If ſulphur or ether be burned, or any other combuſtible whoſe vapour is kindled in a ſmall degree of heat, a blue flame will appear; which, if examined by the priſm, will be found to conſiſt of the violet, the indigo, the blue, and ſometimes a ſmall quantity of the green rays. The beſt mode, however, of ſhowing the eſcape of ſome rays by that degree of heat which will not ſeparate others till increaſed, is the following: Give a piece of brown paper a ſpherical form, by preſſing it upon any hard globular ſubſtance. Gradually bring the paper thus formed to that diſtance from the candle at which it will begin to take fire. In this caſe a beautiful blue flame may be ſeen hanging, as it were, by the paper till a hole is made in it; when the flame, owing to the increaſed action of the air upon all parts of it, becomes white, though the edges ſtill continue of a blue or violet colour. As a confirmation of this, it may be obſerved, that the very flame, which when expoſed to a certain degree of heat emits only the moſt refrangible rays, will, if expoſed to one conſiderably greater, emit alſo thoſe which are leſs ſo. The flames of ſulphur and ſpirit of wine, if ſuddenly expoſed to the heat of a reverberatory, will change their blue colour for one that is perfectly white."

To obtain a more perfect knowledge of this matter, our author examined the light proceeding from combuſtible bodies by Mr. Melville's method. Having darkened the room, he interpoſed betwixt the eye and combuſtible a ſheet of paſteboard, in which was a very ſmall hole for tranſmitting the light. Viewing the light which paſſed through this hole with a priſm, he obſerved, that the blue and violet rays were in greater abundance than any of the reſt, though all the different kinds paſſed through it when ſpirit of wine only was made uſe of. When the combuſtion of the ſpirit of wine was checked by throwing in ſal ammoniac, the red rays diſappeared, but made their appearance again as ſoon as the ſalt became heated to ſuch a degree as to increaſe rather than diminiſh the combuſtion of the ſpirits. On examining the different parts of the flame ſeparately, it was always found that the colours varied according to the degree of heat. At the baſe of the flame, or where the heat was leaſt, the indigo, violet, and blue always appeared in greateſt quantity; but as the vertex was approached, the other rays appeared, and at the very top they were all viſible through a priſm.

From theſe facts Mr. Morgan concludes, 1. That light, as an heterogeneous body, is gradually decompoſed during combuſtion; that the indigo rays eſcape with the leaſt heat, and the red with the greateſt; and from this again he explains the reaſon why flames aſſume different colours. "If a piece of

paper (ſays he), impregnated with a ſolution of copper in nitrous acid, be ſet on fire, the bottom and ſides of the flame are always tinged green. Now this flame is evidently in that weak ſtate of decompoſition in which the moſt refrangible rays eſcape in the greateſt abundance; but of theſe the green rays eſcape moſt plentifully through the unignited vapour and that portion of the atmoſphere which is interpoſed betwixt the eye and the flame. This peculiarity may be obſerved in greateſt perfection in braſs-founderies. Here the heat, though very ſtrong, is ſcarcely ſufficient to decompoſe the metallic vapour which eſcapes from the melted braſs; whence the flame has a very ſingular appearance, the edges being green, and the body of ſuch an appearance as to give ſubſtances viewed by it a pallid and ghaſtly appearance, owing to the want of a ſufficient quantity of red rays to make a perfect white."

2. Mr. Morgan explains the red appearance of bodies in their laſt ſtate of ignition, from the previous eſcape of the more refrangible rays, ſo that only the red ones remain. "Again, (ſays he), we may conſider the external ſurface of the combuſtible body as annexed to an inner ſurface, which may be partly, but not ſo perfectly decompoſed as itſelf: for the violence of the heat will be found to leſſen in its effects the nearer it approaches to the centre of the ſubſtance which is expoſed to it. Hence we are to conſider the parts which are juſt covered by the external ſurface as having loſt leſs of their component light than the external ſurface itſelf; or the former may retain the green rays, when the latter has loſt both indigo, violet, blue, and green.

3. "Thoſe parts which are nearer the centre of the body than any of the preceding, muſt, as they are farther from the greateſt violence of the heat, have loſt proportionably fewer of their rays; or while the external parts may have loſt all but the red, theſe may have loſt only the indigo and violet.

4. "The moſt central parts may be unaffected by the heat; and whenever the fire does reach theſe parts, they will immediately diſcharge their indigo rays, and be decompoſed in the gradual manner already mentioned. A piece of rotten wood, while burning, will exemplify and confirm the preceding illuſtration. When influenced by the external air only, if examined through a priſm, no rays will be found to eſcape but the orange and the red. By blowing upon the burning wood with a pair of bellows, the combuſtion being increaſed, will affect thoſe internal parts of the body which were not acted upon before. Theſe parts therefore will begin to loſe their light, and a priſm will ſhow the green, blue, violet, and indigo, all appearing in ſucceſſion. Appearances ſimilar to the preceding may be obſerved in a common kitchen fire. When it is ſainteſt, its colour is moſt red, the other rays having been emitted, and the combuſtion at a ſtand: but by blowing upon it in this ſtate, its brightneſs will be increaſed, and more and more of the rays which are yielded by the internal parts of the body will come to the eye, till at length, by continuing to blow, the combuſtion will be made ſo complete as to yield all the rays, or to make it appear perfectly white."

Our author concludes the ſubject with a criticiſm upon Sir Iſaac Newton's definition of flame, viz. that it is a vapour heated red-hot. In his opinion, flame is an inſtance of combuſtion whoſe colour will be determined by the degree of decompoſition which takes place. When very imperfect, only the moſt refrangible rays will appear. If it be very perfect, all the rays will appear, and its flame will be brilliant in proportion. But there are flames which conſiſt of burning particles, the rays of which have partly eſcaped before they aſcended in form of vapour. "Such (ſays he) would be the flame of a red-hot coal, if expoſed to ſuch a heat as would gradually convert it into vapour. When the fire is very low under the furnace of an iron foundery, at the upper orifice of the chimney a red flame of this kind may be ſeen, which is different from the flame that appears immediately after freſh coals have been thrown upon the fire; for in conſequence of adding ſuch a ſupply to the burning fuel, a vaſt column of ſmoke aſcends, and forms a medium ſo thick as to abſorb moſt of the rays excepting the red."

Thus we have a moſt elaborate theory for the ſolving of phenomena which ſeem not eaſily to admit of any ſolution. It is obvious, however, that the data upon which he builds his ſyſtem are altogether unfounded and hypothetical. That light is ſubject to the laws of attraction, cannot be proved unleſs we could examine it independently of any other ſubſtance whatever; that is to ſay, in a perfect vacuum; and even in the moſt perfect vacuum that can be formed, we are far from being certain that no other matter is preſent. Light is inflected and turned out of its courſe in many different ways when acting in the common atmoſphere; but we have no reaſon to ſuppoſe that it would be the ſame in a perfect vacuum; at leaſt we have not a right to lay it down as a principle to argue from unleſs it were verified by experience. Even the heterogeneous nature of light ſeems far from being abſolutely eſtabliſhed. The refraction into different colours by the priſm ſeems inſufficient to do ſo; for though, by a quick revolution of theſe colours when painted upon any ſubſtance, we may produce a kind of white colour, it is by no means perfect, but looks as if ſome black had got amongſt it. The opinion of thoſe who maintain that the priſmatic colours are no other than different mixtures of light and ſhade, ſeems therefore equally probable with the other. His third poſition, that the light emitted by combuſtible bodies formed part of their ſubſtance before combuſtion, ſeems ſtill worſe founded: for, inſtead of being fixed in ſolid ſubſtances, all the light and heat proceeding from combuſtion ſeem entirely to come from the air. By means of heat originally applied, the ſubſtance, or part of it, is rarefied into vapour; and this vapour, we have every reaſon to ſuppoſe, conſiſts of elementary fire united with the ſolid ſubſtance. It is this fire, heat, or light, which is afterwards thrown out from the vapour in combuſtion; and new ſupplies of it perpetually come from the atmoſphere, as is ſhown under the articles COMBUSTION, FIRE, FLAME, &c. We cannot therefore think it either inconſiſtent, or very improbable, that in the beginning of combuſtion, when the *white* light is clouded with a great quantity of vapour, it ſhould appear of a blue or violet colour; and that in proportion as this vapour is diſſipated, it ſhould appear green, yellow, red, or perfectly white: for it is obſervable, that in dephlogiſticated air, even thoſe flames which in the common atmoſphere always appear blue, ſuch as ſulphur and ſpirit of wine, are then changed to a dazzling white. The pure light of the ſun alſo ſeen through ſmoke, or even through a great quantity of aqueous vapour, appears red: and there is not the leaſt doubt, that if we were to view the ſun while he thus appears red through any blue medium, he would appear purple: and in like manner, were we to view a blue flame through a yellow medium, it would appear of a green colour.

In the ſame paper Mr. Morgan has ſome curious obſervations upon the electric light. There is neither fluid nor ſolid, he ſays, through which the electric fluid in its paſſage will not appear luminous, if we do not make the quantity, through which it has to paſs, too great. In his experiments on fluids, he puts them into a tube about three quarters of an inch diameter, and four inches long. The orifices are then ſtopped up with two corks, through which two pointed wires are thruſt, ſo that the points may approach within one eighth part of an inch of each other; and in this caſe the electric matter which paſſes through the fluid is always luminous, provided a ſufficient force be uſed. The experiment, however, is danger-

ous, unleſs great care be taken; and the tube, unleſs it be very ſtrong, will be broken by a very ſlight diſcharge. With acids the experiment ſucceeds more difficultly; they muſt be put into capillary tubes, and the wires placed very near to each other. A ſtripe of gold leaf one eighth of an inch diameter and a yard long, becomes quite luminous by diſcharging a battery over it; and our author cannot aſcertain the length to which it might be made luminous. The experiment will alſo ſucceed with Dutch metal or ſilver leaf. If the gold or ſilver leaf be put upon a glaſs, and that laid in water, the whole will appear moſt beautifully luminous on diſcharging a battery through it.

The better a conductor that any ſubſtance is, the greater is the difficulty of making the electric ſpark viſible in it. Hence it requires a much greater power of electricity to make a ſpark viſible in boiling than in cold water; the former being a much better conductor than the latter. In like manner, the mineral acids are much better conductors than common water; and, of conſequence, the ſpark is made to appear in them with much more difficulty than in water. This appears from what has been already mentioned; and our author likewiſe obſerves, that if a few drops of acid be poured into the tube containing the water employed for this purpoſe, it will ſcarcely be poſſible to make the ſpark luminous in it by any force.

The rarity of any body greatly increaſes the eaſe with which the electric ſpark is made viſible in it; as appears from diſcharging a vial through rarefied air, the vapour of ether, ſpirit of wine, or water.

In the proſecution of his experiments upon this ſubject, our author cemented a ball of iron into the orifice of a tube 48 inches long, and two thirds of an inch diameter, ſo that it could bear the weight of the quickſilver with which the tube was filled all to a ſmall ſpace at the open end, which contained a few drops of water. Having inverted the tube, and plunged the open end of it into a baſon of mercury, that in the tube ſtood nearly half an inch lower than in a barometer with which it was compared at the ſame time, owing to the vapour which was formed by the water; but the ſpark paſſed as brilliant through the rarefied water as it does through rarefied air. If ſpirit of wine be employed inſtead of water in this experiment, the ſpark will not be ſo luminous. In the vapour of ether a great force is requiſite to make the ſpark luminous, but good ether will preſs the mercury down as far as 16 or 17 inches. By rareſying the vapour, however, the ſpark will paſs through it with more eaſe.

On examining the mineral acids *in vacuo*, Mr. Morgan could not find that any vapour eſcaped from them. To give them the requiſite degree of tenuity, therefore, he traced a line upon glaſs about an eighth part of an inch broad, with a camel's hair pencil dipped in the acids: the line extended ſometimes to the length of 27 inches; in which caſe, the electric ſpark would paſs over the whole with great brilliancy. If by widening the line, however, or putting on a drop of acid in any particular part, the quantity was increaſed, the ſpark never appeared in that part.

The brightneſs of the electric light is always in proportion to its condenſation. Thus, if a ſpark taken from a powerful electrical machine divides itſelf into bruſhes, or throws out ſparks from the ſides, by which the light is diffuſed over a larger ſurface, it thus becomes leſs brilliant; and in all caſes in which any diffuſion of light, whether electric or not, takes place, the caſe will be the ſame.

In ſome caſes, Mr. Morgan is of opinion, that, even with the electric fluid, only the more refrangible rays of light make their eſcape. Thus, the electrical bruſh is always of a purpliſh or blueiſh colour; and if you convey a ſpark through a Torricellian vacuum not very perfectly made, it will be of an indigo colour. This, however, does not ſeem to ariſe from any other cauſe than the mere weakneſs of the light, which, in paſſing through the vapours of the atmoſphere, or perhaps through the humours of the eye itſelf, affects our organs of ſight in that manner.

Our author next proceeds to examine the influence of media upon electric light; which, he ſays, is ſimilar to their influence upon ſolar light, and ſerves to explain ſeveral phenomena. "Let a pointed wire (ſays he), having a metallic ball fixed to one of its extremities, be forced obliquely into a piece of wood, ſo as to make a ſmall angle with its ſurface, and to make the point lie about one eighth of an inch below it. Let another pointed wire, which communicates with the ground, be forced in the ſame manner into the ſame wood, ſo that its point may in like manner be about one eighth of an inch below the ſurface, and about two inches diſtant from the point of the firſt wire. Let the wood be inſulated, and a ſtrong ſpark, which ſtrikes on the metallic ball, will force its way through the interval of wood which lies between the points, and appear as red as blood. To prove that this appearance depends on the wood's abſorption of all the rays but the red, I would obſerve, that the greater the depth of the points is below the ſurface, the leſs mixed are the rays. When they are deepeſt below the ſurface, only the red come to the eye through a priſm; when raiſed a little nearer the ſurface, the red and orange appeared; when nearer ſtill, the yellow; and ſo on, till, by making the ſpark paſs through the wood very near its ſurface, all the rays were at length able to reach the eye. If the points be only one eighth of an inch below the ſurface of ſoft deal wood, the red, the orange, and the yellow rays will appear as the ſpark paſſes through it. But when the points are at an equal depth in a piece of harder wood, box for inſtance, the yellow, and perhaps the orange, will diſappear. As a farther proof of this abſorption of the rays, it may be obſerved, when the ſpark ſtrikes very bright upon one ſide of the piece of deal, it will appear quite red on the other. In like manner, a red appearance may be given to a ſpark which ſtrikes bright over the inſide of a tube, merely by ſpreading ſome pitch very thinly over the outſide of the ſame tube."

Mr. Morgan now proceeds to mention ſome experiments which ſeem to militate againſt the doctrine he has been endeavouring to eſtabliſh, rather than to ſupport it: viz. 1. If into a Torricellian vacuum of any length a few drops of ether are conveyed, and both ends of the vacuum ſtopped up with metallic conductors, ſo that a ſpark may paſs through it, the ſpark in its paſſage will make the following appearances: When the eye is placed cloſe to the tube, the ſpark will appear perfectly white; if the eye is removed to the diſtance of two yards, it will appear green; but at the diſtance of ſix or ſeven yards, it will appear reddiſh. "Theſe changes evidently depend (ſays our author) on the quantity of medium through which the light paſſes; and the red light more particularly, which we ſee at the greateſt diſtance from the tube, is accounted for on the ſame principle as the red light of the beclouded ſun, or a lighted candle."

2. Dr. Prieſtley long ago obſerved the red appearance of the electric ſpark, when paſſing through inflammable air. But this appearance is very much diverſified according to the quantity of medium through which the ſpark is beheld. At a very conſiderable diſtance the red comes unmixed to the eye; but if the eye be placed cloſe to the tube, the ſpark appears white and brilliant. By increaſing, however, the quantity of fluid conveyed through any portion of inflammable air, or by condenſing that air, the ſpark may be made perfectly white. It may further be obſerved, that all weak explooions and ſparks, when viewed at a diſtance, make a reddiſh appearance.

The reaſon of theſe appearances ſeems to be, that the weaker the ſpark or exploſion is, the more it is diſpoſed to aſſume a red colour when viewed at a diſtance. This ſeems to confirm what has already been mentioned as a probable hypotheſis, that the different colours of light are entirely owing to the medium through which they are viewed.

On phoſphoric light Mr. Morgan makes ſome curious obſervations; but ſtill argues on the ſame principles we have already mentioned. "Some ſhells (ſays he), prepared according to Mr. Wilſon's directions, (ſee PHOSPHORUS,) after being expoſed to the ſun, or to the flaſh of a battery, emit a purple, others a green, and others a reddiſh light. If, with Mr. Wilſon, we ſuppoſe that theſe ſhells are in a ſtate of ſlow combuſtion, may we not conclude that ſome are juſt beginning to burn, and therefore emitting the moſt refrangible rays; while others are in a more advanced ſtate of combuſtion, and therefore emitting the leaſt refrangible? If this concluſion be right, the ſhells which are emitting the purple or the green, muſt ſtill retain the yellow, the orange, and the red, which will alſo make their appearance as ſoon as the combuſtion is ſufficiently increaſed." In confirmation of this, Mr. Morgan adduces the following experiment; viz. that if a ſhell, while emitting its green rays, be placed upon a warm ſhovel, the colour will ſoon be changed into a yellow mixed with red.—To the theory of ſlow combuſtion Mr. Morgan makes the following objections:

1. If phoſphoric ſhells owe their light to this cauſe, we muſt conſider the word combuſtion, when applied to them, as implying all thoſe circumſtances which uſually attend a body when on fire. On this ſuppoſition there ought to be an increaſe of the heat as well as of the decompoſition of the combuſtible. But neither of theſe are found to take place in fact; for a phoſphoric body never fails to loſe its light entirely in a certain degree of heat, without loſing the power of becoming phoſphoric again when it has been ſufficiently cooled. While very hot, the charge of the ſtrongeſt battery conveyed over it has no effect.

2. When bodies are waſted by combuſtion, they can never be made to reaſſume the appearances which they previouſly diſplayed. "No power (ſays our author) can give to aſhes the phenomena of a burning coal. But phoſphoric bodies are very different in this reſpect; for a phoſphoric ſhell may be made to loſe all its light by expoſure to heat, and again may be made as luminous as ever by expoſure to the ſun."

3. It is remarkable that ſome bodies which are moſt beautifully phoſphoric, are at the ſame time the moſt obſtinate in reſiſting fire. "Let us now ſee (ſays Mr. Morgan) the conſequence of admitting the common hypotheſis, that the detention of thoſe rays which fall upon phoſphori is owing to ſome force which prevents their immediate reflection, but is not adequate to their entire abſorption. This force, whatever it be, cannot well be ſuppoſed to operate with equal power on all theſe rays. If this be not the caſe, we cannot well avoid concluding, that phoſphoric ſhells will aſſume different colours, owing to the earlier and later eſcape of the different rays of light. This concluſion is juſtified by an experiment already mentioned; viz. that when the force is ſuch as to admit the eſcape of the purple, blue, and green, we have only to leſſen that force by warming the body, and the yellow, the orange, and red eſcape. Beccaria has proved, that there is ſcarcely any body which is not phoſphoric, or may not become ſo by heat. But as the phoſphoric force is moſt powerful when the purple rays only eſcape, ſo we are to conclude, that it is weakeſt when it is able to retain the red rays only. This is agreeable to ſeveral facts. Chalk, oyſter ſhells, together with thoſe phoſphoric bodies whoſe goodneſs has been very much impaired by long keeping, when finely powdered, and placed within the circuit of an electrical battery, will exhibit, by their ſcattered particles, a ſhower of light; but theſe particles will appear reddiſh, or their phoſphoric power will be ſufficient only to detain the yellow, orange, and red rays. When ſpirit of wine is in a ſimilar manner brought within the circuit of a battery, a ſimilar effect may be diſcovered: its particles diverge in ſeveral directions, diſplaying a moſt beautiful golden appearance. The metallic calces are rendered phoſphoric with the greateſt difficulty; but even theſe may be ſcattered into a ſhower of red luminous particles by the electric ſtroke."

In a poſtſcript to this paper, by Dr. Price, it is obſerved, that by *phoſphoric force*, Mr. Morgan ſeems to mean, not the force with which a phoſphoric body *emits*, but that with which it *abſorbs* and *retains*, the light. This laſt force is proportioned to the degree of attraction between the phoſphoric body and light; and therefore muſt, according to Mr. Morgan's theory, be weakeſt when it ſo freely emits the light it has imbibed as not to retain thoſe rays which adhere to it moſt ſtrongly. According to Mr. Morgan's theory, theſe are the rays which are the leaſt refrangible. "It is, however (ſays Dr. Price), an objection to it, that the leſs refrangibility of rays ſeems to imply a leſs force of attraction between them and the ſubſtances which refract them; but it ſhould be conſidered, that, poſſibly, the force of coheſion, which unites the rays of light to bodies, may be a different power from that which refracts them."

LIGHT *independent of Heat*. In general, a very conſiderable degree of heat is requiſite to the emiſſion of light from any body; but there are ſeveral exceptions to this, eſpecially in light proceeding from putreſcent ſubſtances and phoſphorus, together with that of luminous animals, and other ſimilar appearances. Light proceeding from putreſcent animal and vegetable ſubſtances, as well as from glow-worms, is mentioned by Ariſtotle. Thomas Bartholin (*De luce animal.* p. 183. 206.) mentions four kinds of luminous inſects, two with wings, and two without; but in hot climates travellers ſay they are found in much greater numbers, and of different ſpecies. Columna, an induſtrious naturaliſt, obſerves, that their light is not extinguiſhed immediately upon the death of the animal.

The firſt diſtinct account that we meet with of light proceeding from putreſcent animal-fleſh is that which is given by Fabricius ab Aquapendente, (De Viſione, p. 45.) who ſays, that when three Roman youths, reſiding at Padua, had bought a lamb, and had eaten part of it on Eaſter-day 1592, ſeveral pieces of the remainder, which they kept till the day following, ſhone like ſo many candles when they were caſually viewed in the dark. Part of this luminous fleſh was immediately ſent to Aquapendente, who was profeſſor of anatomy in that city. He obſerved, that both the lean and the fat of this meat ſhone with a whitiſh kind of light; and alſo took notice, that ſome pieces of kid's fleſh, which had happened to have lain in contact with it, were luminous, as well as the fingers and other parts of the bodies of thoſe perſons who touched it. Thoſe parts, he obſerved, ſhone the moſt which were ſoft to the touch, and ſeemed to be tranſparent in candle-light: but where the fleſh was thick and ſolid, or where a bone was near the outſide, it did not ſhine.

After this appearance, we find no account of any other ſimilar to it, before that which was obſerved by Bartholin, and of which he gives a very pompous deſcription in his ingenious treatiſe already quoted. This happened at Montpelier in 1641, when a poor old woman had bought a piece of fleſh in the market, intending to make uſe of it the day following. But happening not to be able to ſleep well that night, and her bed and pantry being in the ſame room, ſhe obſerved

ſo much light come from the fleſh, as to illuminate all the place where it hung. A part of this luminous fleſh was carried as a curioſity to Henry Bourbon, duke of Condé, the governor of the place, who viewed it for ſeveral hours with the greateſt aſtoniſhment.

This light was obſerved to be whitiſh; and not to cover the whole ſurface of the fleſh, but certain parts only, as if gems of unequal ſplendour had been ſcattered over it. This fleſh was kept till it began to putrify, when the light vaniſhed; which, as ſome religious people fancied, it did in the form of a croſs.

It is natural to expect, that the almoſt univerſal experimental philoſopher Mr. Boyle ſhould try the effect of his air-pump upon theſe luminous ſubſtances. Accordingly we find that he did not fail to do it; when he preſently found that the light of rotten wood was extinguiſhed *in vacuo*, and revived again on the admiſſion of the air, even after a long continuance *in vacuo*; but the extinguiſhing of this light was not ſo complete immediately upon exhauſting the receiver, as ſome little time afterwards. He could not perceive, however, that the light of rotten wood was increaſed in condenſed air; but this, he imagined, might ariſe from his not being able to judge very well of the degree of light, through ſo thick and cloudy a glaſs-veſſel as he then made uſe of; but we find that the light of a ſhining fiſh, which was put into a condenſing engine before the Royal Society, in 1668, was rendered more vivid by that means. The principal of Mr. Boyle's experiments were made in October 1667.

This philoſopher attended to a great variety of circumſtances relating to this curious phenomenon. Among other things he obſerved, that change of air was not neceſſary to the maintenance of this light; for it continued a long time when a piece of the wood was put into a very ſmall glaſs hermetically ſealed, and it made no difference when this tube which contained the wood was put into an exhauſted receiver. This he alſo obſerved with reſpect to a luminous fiſh, which he put into water, and placed in the ſame circumſtances. He alſo found, that the light of ſhining fiſhes had other properties in common with that of ſhining wood; but the latter, he ſays, was preſently quenched with water, ſpirit of wine, a great variety of ſaline mixtures, and other fluids. Water, however, did not quench all the light of ſome ſhining veal on which he tried it, though ſpirit of wine deſtroyed its virtue preſently.

Mr. Boyle's obſervation of light proceeding from fleſh-meat was quite caſual. On the 15th of February 1662, one of his ſervants was greatly alarmed with the ſhining of ſome veal, which had been kept a few days, but had no bad ſmell, and was in a ſtate very proper for uſe. The ſervant immediately made his maſter acquainted with this extraordinary appearance; and though he was then in bed, he ordered it to be immediately brought to him, and he examined it with the greateſt attention. Suſpecting that the ſtate of the atmoſphere had ſome ſhare in the production of this phenomenon, he takes notice, after deſcribing the appearance, that the wind was ſouth-weſt and bluſtering, the air hot for the ſeaſon, the moon was paſt its laſt quarter, and the mercury in the barometer was at $29\frac{3}{16}$ inches.

Mr. Boyle was often diſappointed in his experiments on ſhining fiſhes; finding that they did not always ſhine in the very ſame circumſtances, as far as he could judge, with others which had ſhined before. At one time that they failed to ſhine, according to his expectations, he obſerved that the weather was variable, and not without ſome days of froſt and ſnow. In general he made uſe of whitings, finding them the fitteſt for his purpoſe. In a diſcourſe, however, upon this ſubject at the Royal Society in 1681, it was aſſerted, that, of all fiſhy ſubſtances, the eggs of lobſters, after they had been boiled, ſhone the brighteſt. Olig. Jacobæus obſerves, (*Act. Hafn.* vol. v. p. 282.) that, upon opening a ſea-polypus, it was ſo luminous as to ſtartle ſeveral perſons who ſaw it; and he ſays, that the more putrid the fiſh was, the more luminous it grew. The nails alſo, and the fingers of the perſons who touched it, became luminous; and the black liquor which iſſued from the animal, and which is its bile, ſhone alſo, but with a very faint light.

Mr. Boyle draws a minute compariſon between the light of burning coals and that of ſhining wood or fiſh, ſhowing in what particulars they agree, and in what they differ. Among other things he obſerves, that extreme cold extinguiſhes the light of ſhining wood, as appeared when a piece of it was put into a glaſs tube, and held in a frigorific mixture. He alſo found that rotten wood did not waſte itſelf by ſhining, and that the application of a thermometer to it did not diſcover the leaſt degree of heat.

There is a remarkable ſhell-fiſh called PHOLAS, which forms for itſelf holes in various kinds of ſtone, &c. That this fiſh is luminous was noticed by Pliny; who obſerves, that it ſhines in the mouth of the perſon who eats it, and, if it touch his hands or clothes, makes them luminous. He alſo ſays, that the light depends upon its moiſture. The light of this fiſh has furniſhed matter for various obſervations and experiments to M. Reaumur, and the Bolognian academicians, eſpecially Beccarius, who took ſo much pains with the ſubject of phoſphoreal light.

M. Reaumur obſerves, that, whereas other fiſhes give light when they tend to putreſcence, this is more luminous in proportion to its being freſh; that when they are dried, their light will revive if they be moiſtened either with freſh or ſalt water, but that brandy immediately extinguiſhes it. He endeavoured to make this light permanent, but none of his ſchemes ſucceeded.

The attention of the Bolognian academicians was engaged to this ſubject by M. F. Marſilius, in 1724, who brought a number of theſe fiſhes, and the ſtones in which they were incloſed, to Bologna, on purpoſe for their examination.

Beccarius obſerved, that though this fiſh ceaſed to ſhine when it became putrid; yet that in its moſt putrid ſtate, it would ſhine, and make the water in which it was immerſed luminous, when they were agitated. Galeatius and Montius found, that wine or vinegar extinguiſhed this light: that in common oil it continued ſome days; but in rectified ſpirit of wine or urine, hardly a minute.

In order to obſerve in what manner this light was affected by different degrees of heat, they made uſe of a Reaumur's thermometer, and found that water rendered luminous by theſe fiſhes increaſed in light till the heat arrived to 45 degrees; but that it then became ſuddenly extinct, and could not be revived.

In the experiments of Beccarius, a ſolution of ſea ſalt increaſed the light of the luminous water, a ſolution of nitre did not increaſe it quite ſo much: ſal ammoniac diminiſhed it a little: oil of tartar *per deliquium* nearly extinguiſhed it: and the acids entirely. This water poured upon freſh calcined gypſum, rock cryſtal, ceruſs, or ſugar, became more luminous. He alſo tried the effects of it when poured upon various other ſubſtances, but there was nothing very remarkable in them. Afterwards, uſing luminous milk, he found that oil of vitriol extinguiſhed the light, but that oil of tartar increaſed it.

This gentleman had the curioſity to try how differently coloured ſubſtances were affected by this kind of light; and having, for this purpoſe, dipped ſeveral ribbons in it, the white came out the brighteſt, next to this was the yellow, and then the green; the other colours could hardly be perceived.

It was not, however, any particular colour, but only light that was perceived in this caſe. He then dipped boards painted with the different colours, and alſo glaſs tubes, filled with ſubſtances of different colours, in water rendered luminous by the fiſhes. In both theſe caſes the red was hardly viſible, the yellow was the brighteſt, and the violet the dulleſt. But on the boards the blue was nearly equal to the yellow, and the green more languid; whereas in the glaſſes, the blue was inferior to the green.

Of all the liquors into which he put the pholades, milk was rendered the moſt luminous. A ſingle pholas made ſeven ounces of milk ſo luminous, that the faces of perſons might be diſtinguiſhed by it, and it looked as if it was tranſparent.

Air appeared to be neceſſary to this light; for when Beccarius put the luminous milk into glaſs tubes, no agitation would make it ſhine, unleſs bubbles of air were mixed with it. Alſo Montius and Galeatius found, that, in an exhauſted receiver, the pholas loſt its light, but the water was ſometimes made more luminous; which they aſcribed to the riſing of bubbles of air through it.

Beccarius, as well as Reaumur, had many ſchemes to render the light of theſe pholades permanent. For this purpoſe he kneaded the juice into a kind of paſte, with flour, and found that it would give light when it was immerſed in warm water; but it anſwered beſt to preſerve the fiſh in honey. In any other method of preſervation, the property of becoming luminous would not continue longer than ſix months, but in honey it had laſted above a year; and then it would, when plunged in warm water, give as much light as ever it had done.

Similar, in ſome reſpects, to thoſe obſervations on the light of the pholas, was that which was obſerved to proceed from wood which was moiſt, but not in a putrid ſtate, which was very conſpicuous in the dark.

That the ſea is ſometimes luminous, eſpecially when it is put in motion by the daſhing of oars or the beating of it againſt a ſhip, has been obſerved with admiration by a great number of perſons. Mr. Boyle, after reciting all the circumſtances of this appearance, as far as he could collect them from the accounts of navigators; as its being extended as far as the eye could reach, and at other times being viſible only when the water was daſhed againſt ſome other body; that, in ſome ſeas, this phenomenon is accompanied by ſome particular winds, but not in others; and that ſometimes one part of the ſea will be luminous, when another part, not far from it, will not be ſo; concludes with ſaying, that he could not help ſuſpecting that theſe odd phenomena, belonging to great maſſes of water, were in ſome meaſure owing to ſome coſmical law or cuſtom of the terreſtrial globe, or at leaſt of the planetary vortex.

Some curious obſervations on the ſhining of ſome fiſhes, and the pickle in which they were immerſed, were made by Dr. Beal, in May 1665, and, had they been properly attended to and purſued, might have led to the diſcovery of the cauſe of this appearance. Having put ſome boiled mackarel into water, together with ſalt and ſweet herbs; when the cook was ſome time after ſtirring it, in order to take out ſome of the fiſhes, ſhe obſerved, that, at the firſt motion, the water was very luminous; and that the fiſh ſhining through the water added much to the light which the water yielded. The water was of itſelf thick and blackiſh, rather than of any other colour; and yet it ſhined on being ſtirred, and at the ſame time the fiſhes appeared more luminous than the water. Wherever the drops of this water, after it had been ſtirred, fell to the ground, they ſhined; and the children in the family diverted themſelves with taking the drops, which were as broad as a penny, and running with them about the houſe. The cook obſerved, that when ſhe turned up that ſide of the fiſh that was loweſt, no light came from it; and that, when the water had ſettled for ſome time, it did not ſhine at all. The day following, the water gave but little light, and only after a brisk agitation, though the fiſhes continued to ſhine as well from the inſide as the outſide, and eſpecially about the throat, and ſuch places as ſeemed to have been a little broken in the boiling.

When, in the light of the ſun, he examined, with a microſcope, a ſmall piece of a fiſh which had ſhined very much the night before, he found nothing remarkable on its ſurface, except that he thought he perceived what he calls a *ſteam*, rather dark than luminous, ariſing like a very ſmall duſt from the fiſh, and here and there a very ſmall and almoſt imperceptible ſparkle. Of the ſparkles he had no doubt; but he thought it poſſible that the ſteam might be a deception of the ſight, or ſome duſt in the air.

Finding the fiſh to be quite dry, he moiſtened it with his ſpittle; and then obſerved that it gave a little light, though but for a ſhort time. The fiſh at that time was not fetid, nor yet inſipid to the beſt diſcerning palate. Two of the fiſhes he kept two or three days longer for farther trial; but the weather being very hot, they became fetid; and, contrary to his expectations, there was no more light produced either by the agitation of the water or in the fiſh.

Father Bourzes, in his voyage to the Indies in 1704, took particular notice of the luminous appearance of the ſea. The light was ſometimes ſo great, that he could eaſily read the title of a book by it, though he was nine or ten feet from the ſurface of the water. Sometimes he could eaſily diſtinguiſh, in the wake of the ſhip, the particles that were luminous from thoſe that were not; and they appeared not to be all of the ſame figure. Some of them were like points of light, and others ſuch as ſtars appear to the naked eye. Some of them were like globes, of a line or two in diameter; and others as big as one's head. Sometimes they formed themſelves into ſquares of three or four inches long, and one or two broad. Sometimes all theſe different figures were viſible at the ſame time; and ſometimes there were what he calls *vortices* of light, which at one particular time appeared and diſappeared immediately like flaſhes of lightning.

Nor did only the wake of the ſhip produce this light, but fiſhes alſo, in ſwimming, left ſo luminous a track behind them, that both their ſize and ſpecies might be diſtinguiſhed by it. When he took ſome of the water out of the ſea, and ſtirred it ever ſo little with his hand, in the dark, he always ſaw in it an infinite number of bright particles; and he had the ſame appearance whenever he dipped a piece of linen in the ſea, and wrung it in a dark place, even though it was half dry; and he obſerved, that when the ſparkles fell upon any thing that was ſolid, it would continue ſhining for ſome hours together.

After mentioning ſeveral circumſtances which did not contribute to this appearance, this Father obſerves, that it depends very much upon the *quality of the water*; and he was pretty ſure that this light is the greateſt when the water is fatteſt, and fulleſt of foam. For in the main ſea, he ſays, the water is not every where equally pure; and that ſometimes, if linen be dipped in the ſea, it is clammy when it is drawn up again: and he often obſerved, that when the wake of the ſhip was the brighteſt, the water was the moſt fat and glutinous, and that linen moiſtened with it produced a great deal of light, if it was ſtirred or moved briſkly. Beſides, in ſome parts of the ſea, he ſaw a ſubſtance like ſaw-duſt, ſometimes red and ſometimes yellow; and when he drew up the water in thoſe places, it was always viſcous and glutinous. The ſailors told him, that it was the ſpawn of whales; that there are great quantities of it in the north, and that ſometimes, in the night, they appeared all over of a bright light, without being put in motion by any veſſel or fiſh paſſing by them.

As a confirmation of this conjecture, that the more gluti-

nous the ſea water is, the more it is diſpoſed to become luminous, he obſerves, that one day they took a fiſh that was called a *bonite*, the inſide of the mouth of which was ſo luminous, that, without any other light, he could read the ſame characters which he had before read by the light in the wake of the ſhip; and the mouth of this fiſh was full of a viſcous matter, which, when it was rubbed upon a piece of wood, made it immediately all over luminous; though, when the moiſture was dried up, the light was extinguiſhed.

The abbé Nollet was much ſtruck with the luminouſneſs of the ſea when he was at Venice in 1749; and after taking a great deal of pains to aſcertain the circumſtances of it, concluded that it was occaſioned by a ſhining inſect; and having examined the water very often, he at length did find a ſmall inſect, which he particularly deſcribes, and to which he attributes the light. The ſame hypotheſis had alſo occurred to M. Vianelli, profeſſor of medicine in Chioggia near Venice; and both he and M. Grizellini, a phyſician in Venice, have given drawings of the inſects from which they imagined this light to proceed.

The abbé was the more confirmed in his hypotheſis, by obſerving, ſome time after, the motion of ſome luminous particles in the ſea. For, going into the water, and keeping his head juſt above the ſurface, he ſaw them dart from the bottom, which was covered with weeds, to the top, in a manner which he thought very much reſembled the motions of inſects; though, when he endeavoured to catch them, he only found ſome luminous ſpots upon his handkerchief, which were enlarged when he preſſed them with his finger.

M. Le Roi, making a voyage on the Mediterranean, preſently after the abbé Nollet made his obſervations at Venice, took notice, that in the day-time, the prow of the ſhip in motion threw up many ſmall particles, which, falling upon the water, rolled upon the ſurface of the ſea for a few ſeconds before they mixed with it; and in the night the ſame particles, as he concluded, had the appearance of fire. Taking a quantity of the water, the ſame ſmall ſparks appeared whenever it was agitated; but, as was obſerved with reſpect to Dr. Beal's experiments, every ſucceſſive agitation produced a leſs effect than the preceding, except after being ſuffered to reſt a while; for then a freſh agitation would make it almoſt as luminous as the firſt. This water, he obſerved, would retain its property of ſhining by agitation a day or two; but it diſappeared immediately on being ſet on the fire, though it was not made to boil.

This gentleman, after giving much attention to this phenomenon, concludes, that it is not occaſioned by any ſhining inſects, as the abbé Nollet imagined; eſpecially as, after carefully examining ſome of the luminous points, which he caught upon an handkerchief, he found them to be round like large pins' heads, but with nothing of the appearance of any animal, though he viewed them with a microſcope. He alſo found, that the mixture of a little ſpirit of wine with water juſt drawn from the ſea, would give the appearance of a great number of little ſparks, which would continue viſible longer than thoſe in the ocean. All the acids, and various other liquors, produced the ſame effect, though not quite ſo conſpicuouſly; but no freſh agitation would make them luminous again. M. Le Roi is far from aſſerting that there are no luminous inſects in the ſea. He even ſuppoſes that the abbé Nollet and M. Vianelli had found them. But he was ſatisfied that the ſea is luminous chiefly on ſome other account, though he does not ſo much as advance a conjecture about what it is.

M. Ant. Martin made many experiments on the light of fiſhes, with a view to diſcover the cauſe of the light of the ſea. He thought that he had reaſon to conclude, from a great variety of experiments, that all ſea-fiſhes have this property; but that it is not to be found in any that are produced in freſh water. Nothing depended upon the *colour* of the fiſhes, except that he thought that the white ones, and eſpecially thoſe that had white ſcales, were a little more luminous than others. This light, he found, was increaſed by a ſmall quantity of ſalt; and alſo by a ſmall degree of warmth, though a greater degree extinguiſhed it. This agrees with another obſervation of his, that it depends entirely upon a kind of moiſture which they had about them, and which a ſmall degree of heat would expel, when an oilineſs remained which did not give this light, but would burn in the fire. Light from the fleſh of birds or beaſts is not ſo bright, he ſays, as that which proceeds from fiſh. Human bodies, he ſays, have ſometimes emitted light about the time that they began to putrefy, and the walls and roof of a place in which dead bodies had often been expoſed, had a kind of dew or clamminеſs upon it, which was ſometimes luminous; and he imagined that the lights which are ſaid to be ſeen in burying-grounds may be owing to this cauſe.

From ſome experiments made by Mr. Canton, he concludes, that the luminouſneſs of ſea-water is owing to the ſlimy and other putreſcent ſubſtances it contains. On the evening of the 14th of June 1768, he put a ſmall freſh whiting into a gallon of ſea-water, in a pan which was about fourteen inches in diameter, and took notice that neither the whiting nor the water, when agitated, gave any light. A Fahrenheit's thermometer, in the cellar where the pan was placed, ſtood at 54°. The 15th, at night, that part of the fiſh which was even with the ſurface of the water was luminous, but the water itſelf was dark. He drew the end of a ſtick through it, from one ſide of the pan to the other, and the water appeared luminous behind the ſtick all the way, but gave light only where it was diſturbed. When all the water was ſtirred, the whole became luminous, and appeared like milk, giving a conſiderable degree of light to the ſides of the pan; and it continued to do ſo for ſome time after it was at reſt. The water was moſt luminous when the fiſh had been in it about 28 hours; but would not give any light by being ſtirred, after it had been in it three days.

He then put a gallon of freſh water into one pan, and an equal quantity of ſea-water into another, and into each pan he put a freſh herring of about three ounces. The next night the whole ſurface of the ſea-water was luminous, without being ſtirred; but it was much more ſo when it was put in motion; and the upper part of the herring, which was conſiderably below the ſurface of the water, was alſo very bright; while at the ſame time the freſh water, and the fiſh that was in it, were quite dark. There were ſeveral very bright luminous ſpots on different parts of the ſurface of the ſea-water; and the whole, when viewed by the light of a candle, ſeemed covered with a greaſy ſcum. The third night, the light of the ſea-water, while at reſt, was very little, if at all, leſs than before; but when ſtirred, its light was ſo great as to diſcover the time by a watch, and the fiſh in it appeared as a dark ſubſtance. After this, its light was evidently decreaſing, but was not quite gone before the 7th night. The freſh water and the fiſh in it were perfectly dark during the whole time. The thermometer was generally above 60°.

The preceding experiments were made with ſea-water: but he now made uſe of other water, into which he put common or ſea-ſalt, till he found, by an hydrometer, that it was of the ſame ſpecific gravity with the ſea-water; and, at the ſame time, in another gallon of water, he diſſolved two pounds of ſalt; and into each of theſe waters he put a ſmall freſh herring. The next evening the whole ſurface of the artificial ſea-water was luminous without being ſtirred; but gave much more light when it was diſturbed. It appeared exactly like the real ſea-water in the preceding experiment; its light laſted about the ſame time, and went off in the ſame manner: while the other water, which was almoſt as ſalt as it could be made, never gave any light. The herring which was taken out of it the ſeventh

night, and washed from its salt, was found firm and sweet; but the other herring was very soft and putrid, much more so than that which had been kept as long in fresh water. If a herring, in warm weather, be put into 10 gallons of artificial sea-water, instead of one, the water, he says, will still become luminous, but its light will not be so strong.

It appeared by some of the first observations on this subject, that *heat* extinguishes the light of putrescent substances. Mr. Canton also attended to this circumstance; and observes, that though the greatest summer heat is well known to promote putrefaction, yet 20 degrees more than that of the human blood seems to hinder it. For putting a small piece of a luminous fish into a thin glass ball, he found, that water of the heat of 118 degrees would extinguish its light in less than half a minute; but that, on taking it out of the water, it would begin to recover its light in about 10 seconds; but it was never afterwards so bright as before.

Mr. Canton made the same observation that Mr. Ant. Martin had done, *viz.* that several kinds of river fish could not be made to give light, in the same circumstances in which any sea-fish became luminous. He says, however, that a piece of carp made the water very luminous, though the outside, or scaly part of it, did not shine at all.

For the sake of those persons who may choose to repeat his experiments, he observes, that artificial sea-water may be made without the use of an hydrometer, by the proportion of four ounces avoirdupois of salt to seven pints of water, wine-measure.

From undoubted observations, however, it appears, that in many places of the ocean it is covered with luminous insects to a very considerable extent. Mr. Dagelet, a French astronomer who returned from the Terra Australis in the year 1774, brought with him several kinds of worms which shine in water when it is set in motion; and M. Rigaud, in a paper inserted (if we are not mistaken) in the Journal des Sçavans for the month of March 1770, affirms, that the luminous surface of the sea, from the port of Brest to the Antilles, contains an immense quantity of little, round, shining polypuses of about a quarter of a line in a diameter. Other learned men, who acknowledge the existence of these luminous animals, cannot, however, be persuaded to consider them as the cause of all that light and scintillation that appear on the surface of the ocean: they think that some substance of the phosphorous kind, arising from putrefaction, must be admitted as one of the causes of this phenomenon. M. Godehoue has published curious observations on a kind of fish called in French *bonite*, already mentioned; and though he has observed, and accurately described, several of the luminous insects that are found in sea-water, he is, nevertheless, of opinion, that the scintillation and flaming light of the sea proceed from the oily and greasy substances with which it is impregnated.

The abbé Nollet was long of opinion, that the light of the sea proceeded from electricity, though he afterwards seemed inclined to think, that this phenomenon was caused by small animals, either by their luminous aspect, or at least by some liquor or effluvia which they emitted. He did not, however, exclude other causes; among these, the spawn or fry of fish deserves to be noticed. M. Dagelet, sailing into the bay of Antongil, in the island of Madagascar, observed a prodigious quantity of fry, which covered the surface of the sea above a mile in length, and which he at first took for banks of sand on account of their colour; they exhaled a disagreeable odour, and the sea had appeared with uncommon splendor some days before. The same accurate observer, perceiving the sea remarkably luminous in the road of the Cape of Good Hope during a perfect calm, remarked, that the oars of the canoes produced a whitish and pearly kind of lustre; when he took in his hand the water which contained this phosphorus, he discerned in it, for some minutes, globules of light as large as the heads of pins. When he pressed these globules, they appeared to his touch like a soft and thin pulp; and some days after the sea was covered near the coasts with whole banks of these little fish in innumerable multitudes.

To putrefaction, also, some are willing to attribute that luminous appearance which goes by the name of *ignis fatuus*. It is most frequently observed in boggy places and near rivers, though sometimes also in dry places. By its appearance benighted travellers are said to have been sometimes misled into marshy places, taking the light which they saw before them for a candle at a distance; from which seemingly mischievous property it has been thought by the vulgar to be a spirit of a malignant nature, and been named accordingly *Will with a wisp*, or *Jack with a lanthorn*; for the same reason also it probably had its Latin name *ignis fatuus*.

This kind of light is said to be frequent about burying places and dung-hills. Some countries are also remarkable for it, as about Bologna in Italy, and some parts of Spain and Ethiopia. A very remarkable account of an *ignis fatuus* is given by Dr. Shaw in his Travels to the Holy Land. It appeared in the valleys of mount Ephraim, and attended him and his company for more than an hour. Sometimes it would appear globular, or in the shape of the flame of a candle; at others it would spread to such a degree as to involve the whole company in a pale inoffensive light, then contract itself, and suddenly disappear; but in less than a minute would appear again; sometimes running swiftly along, it would expand itself at certain intervals over more than two or three acres of the adjacent mountains. The atmosphere from the beginning of the evening had been remarkably thick and hazy; and the dew, as they felt it on the bridles of their horses, was very clammy and unctuous.

Lights resembling the *ignis fatuus* are sometimes observed at sea, skipping about the masts and rigging of ships; and Dr. Shaw informs us, that he has seen these in such weather as that just mentioned when he saw the *ignis fatuus* in Palestine. Similar appearances have been observed in various other situations; and we are told of one which appeared about the bed of a woman in Milan, surrounding it as well as her body entirely. This light fled from the hand which approached it; but was at length entirely dispersed by the motion of the air.

We have a strong proof that electricity is concerned, or indeed the principal agent, in producing the *ignis fatuus*, from an experiment related by Dr. Priestley of a flame of this kind being artificially produced. A gentleman, who had been making many electrical experiments for a whole afternoon in a small room, on going out of it, observed a flame following him at some little distance. This, we have no reason to doubt, was a true *ignis fatuus*, and the circumstances necessary to produce it were then present, viz. an atmosphere impregnated with animal vapour, and likewise strongly electrified. Both these circumstances undoubtedly must have taken place in the present case; for the quantity of perspiration emitted by a human body is by no means inconsiderable; and it as well as the electricity would be collected by reason of the smallness of the room. In this case, however, there seems to have been a considerable difference between the artificial *ignis fatuus* and those commonly met with; for this flame *followed* the gentleman as he went out of the room; but the natural ones commonly fly from those who approach them. This may be accounted for, from a difference between the electricity of the atmosphere in the one room and the other; in which case the flame would naturally be attracted towards that place where the electricity was either different in quality or in quantity; but

in the natural way, where all bodies may be ſuppoſed equally electrified for a great way round, a repulſion will as naturally take place. Still, however, this does not ſeem to be always the caſe. In thoſe inſtances where travellers have been attended by an *ignis fatuus*, we cannot ſuppoſe it to have been influenced by any other power than what we call *attraction*, and which electricity is very capable of producing. Its keeping at ſome diſtance is likewiſe eaſily accounted for; as we know that bodies poſſeſſed of different quantities of electricity may be made to attract one another for a certain ſpace, and then repel without having ever come into contact. On this principle may we account for the light which ſurrounded the woman at Milan, but fled from the hand of any other perſon. On the ſame principle may we account for thoſe miſchievous vapours which ſet fire to the hay and corn ſtacks, but were driven away by preſenting to them a pointed iron inſtrument, or by making a noiſe. Both theſe are known to have a great effect upon the electric matter; and by means of either, even lightning may occaſionally be made to fall upon or to avoid particular places, according to the circumſtances by which the general maſs happens to be affected at that time.

On the whole, therefore, it ſeems moſt probable, that the *ignis fatuus* is a collection of vapour of the putreſcent kind, very much affected by electricity; according to the degree of which, it will either give a weak or ſtrong light, or even ſet fire to certain ſubſtances diſpoſed to receive its operation. This opinion ſeems greatly to be confirmed from ſome luminous appearances obſerved in privies, where the putrid vapours have even collected themſelves into balls, and exploded violently on the approach of a candle. This laſt effect, however, we cannot ſo well aſcribe to the electricity, as to the accenſion of the inflammable air which frequently abounds in ſuch places.

In the appendix to Dr. Prieſtley's third volume of experiments and obſervations on air, Mr. Warltire gives an account of ſome very remarkable *ignes fatui*, which he obſerved on the road to Bromſgrove, about five miles from Birmingham. The time of obſervation was the 12th of December 1776, before day-light. A great many of theſe lights were playing in an adjacent field, in different directions; from ſome of which there ſuddenly ſprung up bright branches of light, ſomething reſembling the exploſion of a rocket that contained many brilliant ſtars, if the diſcharge was upwards, inſtead of the uſual direction, and the hedge and trees on each ſide of the hedge were illuminated. This appearance continued but a few ſeconds, and then the jack-a-lanterns played as before. Mr. Warltire was not near enough to obſerve if the apparent exploſions were attended with any report.

Cronſtedt gives it as his opinion, that *ignis fatuus*, as well as the meteors called *falling ſtars*, are owing to collections of inflammable air raiſed to a great height in the atmoſphere. But, with regard to the latter, the vaſt height at which they move evidently ſhows that they cannot be the effect of any *gravitating* vapour whatever; for the lighteſt inflammable air is one-twelfth of that of the common atmoſphere: and we have no reaſon to believe, that at the diſtance of 40 or 50 miles from the earth, the latter has near $\frac{1}{12}$ of its weight at the ſurface. From the account given by Mr. Warltire, we ſhould be apt to conclude, that there is a ſtrong affinity betwixt the *ignes fatui* and fire-balls, inſomuch that the one might be very eaſily converted into the other. From this then we muſt aſcribe an electrical origin to the one as well as the other. Electricity, we know, can aſſume both theſe appearances, as is evident in the caſe of points; or even when the atmoſphere is violently electrified, as around the ſtring of an electrical kite, which always will appear to be ſurrounded with a blue flame in the night, if the electricity be very ſtrong.

On the whole, it appears that electricity acting upon a ſmall quantity of atmoſpherical air with a certain degree of vigour, will produce an appearance reſembling an *ignis fatuus*; with a ſuperior force it will produce a fire-ball; and a ſudden increaſe of electrical power might produce thoſe ſparks and apparent exploſions obſerved by Mr. Warltire. The only difficulty therefore is, Why does electricity exert its power upon one portion of the atmoſphere rather than another, ſeeing it has an opportunity of diffuſing itſelf equally through the whole? To this it ſeems impoſſible to give any other reaſon than that we ſee the fact is ſo; and that in all caſes where there is a quantity of electrified air or vapour, there will be an accumulation in one part rather than another. Thus, in the experiment already related, where the gentleman perceived a blue flame following him, the whole air of the room was electrified, but the greateſt power of the fluid was exerted on that which gave the luminous appearance.

With regard to the uſes of the *ignes fatui* in the ſyſtem of nature, we can only ſay, that they ſeem to be accidental appearances reſulting from the motion of the electric fluid, and are, no doubt, like other meteors, ſubſervient to the preſervation of its equilibrium, and thus are uſeful in preventing thoſe dreadful commotions which enſue when a proper medium for ſo doing is deficient.

A light in ſome reſpects ſimilar to thoſe above mentioned, has been found to proceed from that celebrated chemical production called *phoſphorus*, which always tends to decompoſe itſelf, ſo as to take fire by the acceſs of *air* only. Phoſphorus, therefore, when it emits light, is properly a body ignited; though when a very ſmall quantity of it is uſed, as what is left after drawing it over paper, or what may be diſſolved in eſſential oil, the heat is not ſenſible. But perhaps the matter which emits the light in what we call *putreſcent ſubſtances* may be ſimilar to it, though it be generated by a different proceſs, and burn with a leſs degree of heat. Putreſcence does not ſeem to be neceſſary to the light of glow-worms, or of the pholades; and yet their light is ſufficiently ſimilar to that of ſhining wood or fleſh. Electric light is unqueſtionably ſimilar to that of phoſphorus, though the ſource of it is apparently very different.

Kunckel formed his phoſphorus into a kind of pills about the ſize of peas, which being moiſtened a little, and ſcraped in the dark, yielded a very conſiderable light, but not without ſmoke. The light was much more pleaſing, when eight or ten of theſe pills were put into a glaſs of water; for, being ſhaken in the dark, the whole glaſs ſeemed to be filled with light. Kunckel alſo reduced his phoſphorus into the form of larger ſtones; which being warmed by a perſon's hand, and rubbed upon paper, would deſcribe letters that were very legible in the dark.

The greateſt variety of experiments with the light of phoſphorus was made by Dr. Slare; who ſays, that the liquid phoſphorus (which is nothing more than the ſolid phoſphorus diſſolved in any of the eſſential oils) would not hurt even a lady's hand; or that, when the hands or face were waſhed with it, it would not only make them viſible to other perſons in the dark, but that the light was ſo conſiderable as to make other neighbouring objects viſible.

When the ſolid phoſphorus is quite immerſed in water, he obſerves that it ceaſes to ſhine; but that if any part of it chance to emerge, or get into the air, it will ſhine though the glaſs be hermetically ſealed. In a large glaſs he kept it without water for ſeveral days; and yet it continued ſhining, with very little diminution of its light or weight. If the letters that were written with this phoſphorus were warmed by the fire, they preſently became dark lines, which continued upon the paper, like ink. To try how much light was given by a

ſmall quantity of this phoſphorus, he obſerved that it continued to flame in the open air for ſeven or eight days; the light being viſible whenever he ſhut his window.

As air was generally thought to contain the *pabulum* of flame, Dr. Slare was determined to try this with reſpect to phoſphorus; and for this purpoſe he placed a large piece of it in a receiver; but upon exhauſting it, he perceived that it became more luminous, and that, upon admitting the air, it returned to its former ſtate. This property of the light of phoſphorus, which is the very reverſe of that of ſhining wood and fiſhes, was alſo aſcertained by ſeveral very accurate experiments of Mr. Haukſbee's.

Endeavouring to blow the phoſphorus into a flame with a pair of bellows, Dr. Slare found that it was preſently blown out, and that it was a conſiderable time before the light revived again. All liquors would extinguiſh this light when the phoſphorus was put into them; nor would it ſhine or burn, though it was even boiled in the moſt inflammable liquors, as oil of olives, ſpirit of turpentine, or even ſpirit of wine.

In order to keep his phoſphorus from conſuming, he uſed to put it in a glaſs of water; and ſometimes he has ſeen it, when thus immerſed in water, make ſuch bright and vigorous coruſcations in the air, as, he ſays, would ſurpriſe and frighten thoſe who are not uſed to the phenomenon. This fiery meteor, he ſays, is contracted in its paſſage through the water, but expands as ſoon as it gets above it. If any perſon would make this experiment to advantage, he informs them that the glaſs muſt be deep and cylindrical, and not above three quarters filled with water. This effect he perceived in warm weather only, and never in cold.

The phoſphorus of which we have been treating is prepared from urine; but in ſome caſes the ſweat, which is ſimilar to urine, has been obſerved to be phoſphoraceous, without any preparation. This once happened to a perſon who uſed to eat great quantities of ſalt, and who was a little ſubject to the gout, after ſweating with violent exerciſe. Stripping himſelf in the dark, his ſhirt ſeemed to be all on fire, which ſurpriſed him very much. Upon examination, red ſpots were found upon his ſhirt; and the phyſician who was preſent perceived an urinous ſmell, though it had nothing in it of volatile alkali, but of the muriatic acid; the ſame, he ſays, that iſſues from cabbage much ſalted, and ſtrongly fermented.

The eaſieſt method of accounting for all theſe kinds of lights, perhaps, is from electricity. If light conſiſts in a certain vibration of the electric fluid, then it follows, that in whatever ſubſtances ſuch a vibration takes place, there light muſt appear, whether in putreſcent animal ſubſtances, ſea-water, phoſphorus, or any thing elſe. We know that the electric matter pervades all terreſtrial ſubſtances, and is very liable to be ſet in motion from cauſes of which we are ignorant. The action of the air, by which putrefaction is produced, may be one of theſe cauſes; and it can by no means appear ſurpriſing that the electric matter ſhould act in the bodies of living animals in ſuch a manner as to produce a permanent light, when we certainly know it acts in ſome of them ſo powerfully as to produce a ſhock ſimilar to that of a charged vial.—On this ſubject we ſhall only obſerve farther, that when this vibration becomes ſo powerful as to penetrate the ſolid ſubſtance of the body itſelf, the luminous body then becomes tranſparent, as in the milk mentioned in the former part of this article; but, when it is only ſuperficial, the body, though it emits light, is itſelf opaque.

Light *from Diamonds*. Among luminous bodies the diamond is to be reckoned; as ſome diamonds are known to ſhine in the dark. But on account of the feebleneſs of their ſplendor, it is neceſſary for the perſon who is to obſerve them, previouſly to ſtay in the dark at leaſt a quarter of an hour; that the pupil of the eye may be dilated and enlarged, and ſo rendered capable of receiving a larger quantity of the rays of light. M. du Fay has alſo obſerved, that the eyes ought to be ſhut for this time, or at leaſt one of them; and that, in that caſe, the light of the diamond is afterwards only ſeen by that eye which has been ſhut. Before the diamond is brought into the dark room, it muſt be expoſed to the ſun-ſhine, or at leaſt to the open day-light, to imbibe a ſufficient quantity of rays; and this is done in one minute, or even leſs; eight or ten ſeconds having been found to furniſh as much light as a ſtone is capable of receiving; and when brought into the dark, its light continues about twelve or thirteen minutes, weakening all the while by inſenſible degrees. It is very remarkable, that in bodies ſo extremely ſimilar to each other as diamonds are, ſome ſhould have this property of imbibing the ſun's rays, and ſhining in the dark, and that others ſhould not; yet ſo it is found to be by experiment, and the moſt nearly reſembling ſtones ſhall be found one to have this property, and another to be deſtitute of it; while many of the moſt diſſimilar have the property in common. There ſeems to be no rule, nor even the leaſt traces of any imperfect rule of judging, which diamonds have, and which have not this property; their natural brightneſs, their purity, their ſize, or their ſhape, contribute nothing to it; and all that has been yet diſcovered of the leaſt regularity among them, is, that all the yellow diamonds have this property. This may probably ariſe from their having more ſulphur in their compoſition, and therefore illuminating more readily, or emitting a more viſible flame.

The burning of diamonds is a term uſed among the jewellers, for putting them into a fierce fire, as they frequently do, when they are fouled with brown, or yellow, or the like; this always diveſts them of their colour, without doing them the leaſt ſenſible injury. M. du Fay, having been informed of this common practice, formed a conjecture, that the difference of diamonds in their ſhining, or not ſhining in the dark, was owing to it; and that either all thoſe which had been burnt, or all thoſe which had not, were thoſe which alone ſhone in the dark. But this was found an erroneous conjecture; for two diamonds, one lucid in the dark, the other not, were both burnt, and afterwards both were found to retain the ſame properties they had before. It is not only the open ſunſhine, or open day-light, which gives to theſe diamonds the power of ſhining in the dark; they receive it in the ſame manner, even if laid under a glaſs, or plunged in water or in milk.

M. du Fay tried whether it was poſſible to make the diamond retain, for any longer time, the light it naturally parts with ſo ſoon; and found, that if the diamond, after being expoſed to the light, be covered with black wax, it will ſhine in the dark, as well ſix hours afterwards, as at the time it was firſt impregnated with the light.

The imbibing light, in this manner, being ſo nice a property as not to be found in ſeveral diamonds, it was not to be ſuppoſed that it would be found in any other ſtones: accordingly, on trial, the ruby, the ſapphire, and the topaz, were found wholly deſtitute of it; and among a large number of rough emeralds, one only was found to poſſeſs it. Such is the ſtrange uncertainty of theſe accidents.

All the other leſs precious ſtones were tried, and found not to poſſeſs this property of imbibing light from the day-light or ſun-ſhine, but they all became luminous by the different means of heating or friction; with this difference, that ſome acquired it by one of theſe methods, and others by the other; each being unaffected by that which gave the property to the other. The diamond becomes luminous by all theſe ways.

Beccarius alſo diſcovered, that diamonds have the property of the Bolognian phoſphorus, about the ſame time that it occurred to M. du Fay. *Com. Bonon.* vol. ii. p. 276. M. du

Fay likewiſe obſerved, that the common topaz, when calcined, had all the properties of this phoſphorus; and purſuing the diſcovery, he found the ſame property, in a great degree, in the belemnites, gypſum, lime-ſtone, and marble: though he was obliged to diſſolve ſome very hard ſubſtances of this kind in acids, before calcination could produce this change in them; and with ſome ſubſtances he could not ſucceed even thus; eſpecially with flint-ſtones, river-ſand, jaſpers, agates, and rock-cryſtal.

LIGHT *from Plants.* In Sweden a very curious phenomenon has been obſerved on certain flowers by M. Haggern, lecturer in natural hiſtory. One evening he perceived a faint flaſh of light repeatedly dart from a marigold. Surpriſed at ſuch an uncommon appearance, he reſolved to examine it with attention; and, to be aſſured it was no deception of the eye, he placed a man near him, with orders to make a ſignal at the moment when he obſerved the light. They both ſaw it conſtantly at the ſame moment. The light was moſt brilliant on marigolds of an orange or flame colour; but ſcarcely viſible on pale ones. The flaſh was frequently ſeen on the ſame flower two or three times in quick ſucceſſion; but more commonly at intervals of ſeveral minutes: and when ſeveral flowers in the ſame place emitted their light together, it could be obſerved at a conſiderable diſtance.

This phenomenon was remarked in the months of July and Auguſt at ſun-ſet, and for half an hour, when the atmoſphere was clear; but after a rainy day, or when the air was loaded with vapours, nothing of it was ſeen.

The following flowers emitted flaſhes, more or leſs vivid, in this order:—1. The marigold, *galendula officinalis*. 2. Monk's-hood, *tropælum majus*. 3. The orange-lily, *lilium bulbiferum*. 4. The Indian pink, *tagetes patula & erecta*. To diſcover whether ſome little inſects or phoſphoric worms might not be the cauſe of it, the ſhowers were carefully examined, even with a microſcope, without any ſuch being found.

From the rapidity of the flaſh, and other circumſtances, it may be conjectured that there is ſomething of electricity in this phenomenon. It is well known, that when the piſtil of a flower is impregnated, the pollen burſts away by its elaſticity, with which electricity may be combined. But M. Haggern, after having obſerved the flaſh from the orange lily, the antheræ of which are a conſiderable ſpace diſtant from the petals, found that the light proceeded from the petals only; whence he concludes, that this electric light is cauſed by the pollen, which, in flying off, is ſcattered on the petals. Whatever be the cauſe, the effect is ſingular and highly curious.

LIGHTS, in painting, are thoſe parts of a piece which are illuminated, or that lie open to the luminary, by which the piece is ſuppoſed to be enlightened; and which, for this reaſon, are painted in bright vivid colours. In this ſenſe, light is oppoſed to ſhadow.

Different lights have very different effects on a picture, and occaſion a difference in the management of every part. A great deal therefore depends on the painter's chooſing a proper light for his piece to be illuminated by; and a great deal more, in the conduct of the lights and ſhadows, when the luminary is pitched upon. The ſtrength and relievo of a figure, as well as its graceſulneſs, depend entirely on the management of the lights, and the joining of thoſe to the ſhadows. The light a figure receives is either direct or reflected; to each of which ſpecial regard muſt be had. The doctrine of lights and ſhadows makes that part of painting called *clair obſcure*.

LIGHT-*Horſe*, an ancient term in our Engliſh cuſtoms, ſignifying an ordinary cavalier or horſeman lightly armed, and ſo as to enter a corps or regiment; in oppoſition to the men at arms, who were heavily accoutred, and armed at all points. See *Light*-HORSE.

LIGHT-*Houſe*, a building erected upon a cape or promontory on the ſea-coaſt, or upon ſome rock in the ſea, and having on its top in the night-time a great fire, or light formed by candles, which is conſtantly attended by ſome careful perſon, ſo as to be ſeen at a great diſtance from the land. It is uſed to direct the ſhipping on the coaſt, that might otherwiſe run aſhore, or ſteer an improper courſe when the darkneſs of the night and the uncertainty of currents, &c. might render their ſituation with regard to the ſhore extremely doubtful. Lamp-lights are, on many accounts, preferable to coal-fires or candles; and the effect of theſe may be increaſed by placing them either behind glaſs-hemiſpheres, or before properly diſpoſed glaſs or metal reflectors, which laſt method is now very generally adopted. See BEACONS.

LIGHT-ROOM a ſmall apartment, incloſed with glaſs windows, near the magazine of a ſhip of war. It is uſed to contain the lights by which the gunner and his aſſiſtants are enabled to fill cartridges with powder to be ready for action.

LIGHTER, a large, open, flat-bottomed veſſel, generally managed with oars, and employed to carry goods to or from a ſhip when ſhe is to be laden or delivered. There are alſo ſome lighters furniſhed with a deck throughout their whole length, in order to contain thoſe merchandiſes which would be damaged by rainy weather: theſe are uſually called *cloſe lighters*.

LIGHTNING, a large bright flame, darting ſwiftly through the air, and extending every way to a conſiderable diſtance, of momentary duration, and commonly attended with THUNDER. Some have accounted for this phenomenon by ſuppoſing, that, from the particles of ſulphur, nitre, and other combuſtible matter, which are exhaled from the earth, and carried into the higher regions of the atmoſphere, is formed an inflammable ſubſtance, which, when a ſufficient quantity of fiery particles is ſeparated from the vapour buoyed up into the air, with theſe particles adhering to them by the colliſion of two clouds or otherwiſe, take fire, and ſhoots out into a train of light, larger or leſs, according to the ſtrength and quantity of the materials. Others have explained *lightning* by the fermentation of ſulphureous ſubſtances with nitrous acids. See THUNDER and ELECTRICITY. But in the preſent advanced ſtate of the ſcience of *electricity*, this is univerſally allowed to be an electrical phenomenon. Philoſophers had not proceeded far in their experiments and enquiries on this ſubject, before they were ſtruck with the obvious analogy between *lightning* and electricity, and they produced many arguments, *à prieri*, to aſcertain their ſimilarity. But the method of verifying this hypotheſis was firſt propoſed by Dr. Franklin, who, towards the cloſe of the year 1749, conceived the practicability of drawing *lightning* from the clouds: Having found, by previous experiments, that the electric fluid is attracted by points, he apprehended, that *lightning* might likewiſe poſſeſs the ſame property; though the effect of the latter muſt, in an aſtoniſhing degree, ſurpaſs thoſe of the former. The other circumſtances of reſemblance between *lightning* and electricity remarked by this ingenious philoſopher, and abundantly confirmed by later diſcoveries, are the following: Flaſhes of *lightning*, he obſerved, are generally ſeen crooked and waving in the air; and the electric ſpark drawn from an irregular body at ſome diſtance, and when it is drawn by an irregular body, or through a ſpace in which the beſt conductors are diſpoſed in an irregular manner, always exhibits the ſame appearance.

Lightning ſtrikes the higheſt and moſt pointed objects in its way, preferable to others, as high hills, trees, ſpires, maſts of ſhips, &c. and all pointed conductors receive and throw off the electric fluid more readily than thoſe which are terminated by flat ſurfaces. *Lightning* is obſerved to take the readieſt and beſt conductor; and this is the caſe with electricity in the diſcharge of the LEYDEN *phial*; whence the doctor infers, that in

a thunder ſtorm, it would be ſafer to have one's clothes wet than dry. *Lightning* burns, diſſolves metals, rends ſome bodies, has been often known to ſtrike people blind, deſtroys animal life, deprives magnets of their virtue, and reverſes their poles; and theſe are well-known properties of electricity.

Lightning not only gives polarity to the magnetic needle, but to all bodies that have any thing of iron in them, as brick, &c. and by obſerving which way the poles of theſe bodies lie, it may be known, with the utmoſt certainty, in what direction the ſtroke paſſed. Signior Beccaria ſuppoſes, that perſons are ſometimes killed by *lightning*, without being really touched by it; a vacuum of air only being ſuddenly made near them, and the air ruſhing out of their lungs to ſupply it; and with ſo much violence that they could never recover their breath. In proof of this opinion he alleges, that the lungs of ſuch perſons are found flaccid; whereas, when they are properly killed by the electrical ſhock, the lungs are found inflated: but this hypotheſis is controverted by Dr. Prieſtley. In order to demonſtrate the identity of the electric fluid with the matter of *lightning*, by actual experiment, Dr. Franklin contrived to bring lightning from the heavens, by means of an electric kite, which he raiſed, when a ſtorm of thunder was perceived to be coming on; and with the electricity thus obtained, he charged phials, kindled ſpirits, and performed all other electrical experiments, which are uſually exhibited by an excited globe or tube. This happened in June 1752, a month after the electricians in France, of whom the moſt active were Meſſrs. Dalibard and Delor, followed by Mr. Mazeas and M. Monnier, purſued the method which he had propoſed, had verified the ſame theory; but without any knowledge of what they had done. In April and June 1753 he diſcovered that the air was ſometimes electrified poſitively, and ſometimes negatively; and found that the clouds would change from poſitive to negative electricity ſeveral times in the courſe of one thunder guſt. He ſoon perceived that this important diſcovery was capable of being applied to practical uſe, and propoſed a method which he ſoon accompliſhed, of ſecuring buildings from being damaged by *lightning*, by means of CONDUCTORS. The Engliſh philoſophers had not been leſs attentive to this ſubject than their neighbours on the continent; but for want of proper opportunities for trying the neceſſary experiments, and from ſome incidental circumſtances that were unfavourable, they had failed of ſucceſs. However, in July 1752, Mr. Canton ſucceeded: and in the following month Mr. Wilſon and Dr. Bevis obſerved nearly the ſame appearances which Mr. Canton had obſerved before. Mr. Canton alſo ſoon after obſerved, in a number of experiments, that ſome clouds were in a poſitive, and ſome in a negative ſtate of electricity, and that the electricity of his conductor would ſometimes change from one ſtate to the other, five or ſix times in leſs than half an hour. This variable ſtate of thunder-clouds was diſcovered by S. Beccaria, before he heard of its having been obſerved by Dr. Franklin or any other perſon; and he has given a very exact and circumſtantial account of the external appearances of theſe clouds. From his obſervations of the *lightning* abroad, and of his apparatus within doors, he inferred, that the quantity of electric matter, in an uſual ſtorm of thunder, is almoſt inconceivably great, conſidering how many pointed bodies, as trees, ſpires, &c. are perpetually drawing it off, and what a prodigious quantity is repeatedly diſcharged to or from the earth. This quantity is ſo great, that he thinks it impoſſible for any cloud or number of clouds to contain it all, ſo as either to diſcharge or receive it. Beſides, he obſerves, that, during the progreſs and increaſe of the ſtorm, though the *lightning* frequently ſtruck to the earth, the ſame clouds were the next moment ready to make a ſtill greater diſcharge, and his apparatus continued to be as much affected as ever; and, therefore, the clouds muſt have received at one place, in the ſame moment when a diſcharge was made from them in another: and, upon the whole, he infers, that the clouds ſerve as conductors to convey the electric fluid from thoſe places of the earth that are overloaded with it, to thoſe which are exhauſted of it. This electric matter, the riſe of which, from the earth into the higher regions of the atmoſphere, is aſcertained by the great quantities of ſand, aſhes, and other light ſubſtances, carried up with it, and ſcattered uniformly over a large tract of country, wherever it iſſues, attracts to it, and bears up with it the watery particles that are diſperſed in the atmoſphere. It aſcends into the higher regions of the atmoſphere, being ſolicited by the leſs reſiſtance it finds there than in the common maſs of the earth, which, at theſe times, is generally very dry, and conſequently highly electric. The ſame cauſe which firſt raiſed a cloud, from vapours diſperſed in the atmoſphere, draws to it thoſe that are already formed, and continues to form new ones, till the whole collected maſs extends ſo far as to reach a part of the earth where there is a deficiency of the electric fluid. Thither too, will thoſe clouds, replete with electricity, be ſtrongly attracted, and there will the electric matter diſcharge itſelf upon the earth: a channel of communication being, in this manner, formed, a freſh ſupply of electric matter will be raiſed from the overloaded part, and will continue to be conveyed by the medium of the clouds, till the equilibrium of the fluid between the two places of the earth be reſtored. When the clouds are attracted in their paſſage by thoſe parts of the earth, where there is a deficiency of the fluid, thoſe detached fragments are formed, and alſo thoſe uniform deſcending protuberances, which are, in ſome caſes, the cauſe of WATER-*ſpouts* and HURRICANES.

That the electric matter, which forms and animates the thunder-clouds, iſſues from places far below the ſurface of the earth, and that it buries itſelf there, is probable from the deep holes that have in many places been made by *lightning*, and from the flaſhes that have been ſeen to ariſe from ſubterraneous cavities and from wells; as well as from the inundations accompanying thunder-ſtorms, and occaſioned by water burſting out of the bowels of the earth. The greateſt difficulty attending this theory of the origin of thunder-ſtorms relates to the collection and inſulation of electric matter within the body of the earth. With reſpect to the former, this ingenious philoſopher has nothing to ſay: ſome operations in nature are certainly attended with a loſs of the equilibrium in the electric fluid, but no perſon has yet aſſigned a more probable cauſe of the redundancy of the electric matter, which, in fact, often abounds in the clouds, than what we may ſuppoſe poſſible to take place in the bowels of the earth: and ſuppoſing the loſs of the equilibrium poſſible, the ſame cauſe that produced the effect, would prevent the reſtoring of it; ſo that not being able to force a way, at leaſt one ſufficiently ready, through the body of the earth, it would iſſue at the ſame convenient vent into the higher regions of the air, as the better paſſage. S. Beccaria obſerves, that a wind always blows from the place from which the thunder-cloud proceeds; and it is certain, that the ſudden congregation of ſuch a prodigious quantity of vapours muſt diſplace the air, and repel it on all ſides. A great number of obſervations relating to the deſcent of *lightning*, confirm his theory of the manner of its aſcent: for, in many caſes, it throws before it the parts of conducting bodies, and diſtributes them along the reſiſting medium, through which it muſt force its paſſage. Upon this principle, the longeſt flaſhes of *lightning* ſeem to be made, by its forcing into its way part of the vapours in the air. One of the principal reaſons why thoſe flaſhes make ſo long a rumbling, is their being occaſioned by the vaſt length of a vacuum, made by the paſſage of the electric matter. For although the air collapſes the moment after it

has paſſed, and the vibration, on which the ſound depends, commences at the ſame moment; yet, if the flaſh was directed towards the perſon who hears the report, the vibrations excited at the nearer end of the track will reach his ear much ſooner than thoſe excited at the more remote end; and the ſound will, without any repercuſſion or echo, continue till all the vibrations have ſucceſſively reached him. Mr. Lullin, in order to account for the production of electricity in the clouds, made a long inſulated pole to project from one ſide of the Alps, and obſerved, that when ſmall clouds of vapour, raiſed by the heat of the ſun, roſe near the foot of the mountain, and aſcended along the ſide of it; if they touched the extremity of the pole only, it was electrified; but if the whole pole, and conſequently part of the hill on which it ſtood, was likewiſe involved, it was not electrified. Whence he concludes, that the electricity of the clouds is produced by their paſſing through the air while the ſun ſhines upon them. But to which of theſe two circumſtances, namely, the motion through the air, or the action of the ſun's rays, this was owing, he could not determine, though he made ſeveral experiments for this purpoſe.

Upon the whole, it is eaſy to conceive, that when particular clouds or different parts of the earth poſſeſs oppoſite electricities, ſome being electrified poſitively, and others negatively, a diſcharge will take place within a certain diſtance; or the one will ſtrike into the other, and in the diſcharge a flaſh of *lightning* will be obſerved. But how the clouds or earth acquire this ſtate, is ſtill a queſtion not abſolutely determined. Mr. Canton queries, whether the clouds become poſſeſſed of electricity by the gradual heating and cooling of the air; and whether air ſuddenly rarefied may not give electric fire to, and air ſuddenly condenſed receive electric fire from, clouds and vapours paſſing through it. Mr. Wilcke ſuppoſes the air to contract its electricity, in the ſame manner as ſulphur and other ſubſtances do when they are heated and cooled in contact with various bodies. Thus the air, being heated or cooled in the neighbourhood of the earth, gives electricity to the earth, or takes it from it; and the electrified air, being conveyed upwards by various means, communicates its electricity to the clouds. Others have queried, whether, ſince thunder generally happens in a ſultry ſtate of the air, when it ſeems repleniſhed with ſome ſulphureous vapours, the electric matter then in the clouds may not be generated by the fermentation of ſulphureous vapours with mineral or acid vapours in the air.

Dr. Franklin adviſes perſons who are apprehenſive of danger from *lightning*, to ſit in in the middle of a room, provided it be not under a metal luſtre ſuſpended by a chain, ſitting on one chair, and laying their feet on another. It is ſtill ſafer, he ſays, to bring two or three mattreſſes or beds into the middle of the room, and folding them double, to place the chairs upon them, for as they are not ſo good conductors as the wall, the *lightning* will not chooſe to paſs through them: but the ſafeſt place of all is in a hammock hung with ſilken cords, at an equal diſtance from all the ſides of a room. Doctor Prieſtley obſerves, that the place of moſt abſolute ſafety muſt be the cellar, and eſpecially the middle of it; for when a perſon is lower than the ſurface of the earth, the *lightning* muſt ſtrike it before it can poſſibly reach him. In the fields, the place of ſafety is within a few yards of a tree, but not quite near it. Nevertheleſs, S. Beccaria cautions perſons not to depend upon the neighbourhood of a higher, or in all caſes, a better conductor than their own body; ſince, according to his repeated obſervations, the *lightning* by no means deſcends in one undivided track; but bodies of various kinds conduct their ſhare of it at the ſame time, in proportion to their quantity and conducting power. See on the ſubject of this article Franklin's Letters, Beccaria's Lettre dell' Elettricifmo, Prieſtley's Hiſtory, &c. of Electricity paſſim. Lord Mahon obſerves, tha damage may be done by *lightning*, not only by the main ſtroke and lateral exploſion, bnt likewiſe by that which he calls the returning ſtroke, that is, by the ſudden violent return of that part of the natural ſhare of electricity (of any conducting body, or of any combination of conducting bodies) which had been gradually expelled from ſuch body or bodies reſpectively, by the ſuperinduced elaſtic electrical preſſure of a thunder-cloud's electrical atmoſphere. See an account of his theory and experiments relating to this ſubject, in his Principles of Electricity, &c. quarto, 1779.

LIGHTNING was looked upon as ſacred both by the Greeks and Romans, and was ſuppoſed to be ſent to execute vengeance on the earth: Hence perſons killed with lightning, being thought hateful to the gods, were buried apart by themſelves, leſt the aſhes of other men ſhould receive pollution from them. Some ſay they were interred upon the very ſpot where they died; others will have it that they had no interment, but were ſuffered to rot where they fell, becauſe it was unlawful for any man to approach the place. For this reaſon the ground was hedged in, leſt any perſon unawares ſhould contract pollution from it. All places ſtruck with lightning were carefully avoided and fenced round, out of an opinion that Jupiter had either taken offence at them, and fixed upon them the marks of his diſpleaſure, or that he had, by this means, pitched upon them as ſacred to himſelf. The ground thus fenced about was called by the Romans *bidental*. Lightning was much obſerved in augury, and was a good or bad omen, according to the circumſtances attending it.

Artificial LIGHTNING. Before the diſcoveries of Dr. Franklin concerning the identity of electricity and lightning, many contrivances were invented in order to repreſent this terrifying phenomenon in miniature: the coruſcations of phoſphorus in warm weather, the aſcenſion of the vapour of ſpirit of wine evaporated in a cloſe place, &c. were uſed in order to ſupport the hypotheſis which at that time prevailed; namely, that lightning was formed of ſome ſulphureous, nitrous, or other combuſtible vapours, floating in long trains in the atmoſphere, which by ſome unaccountable means took fire, and produced all the deſtructive effects of that phenomenon. Theſe repreſentations, however, are no more exhibited; and the only true artificial lightning is univerſally acknowledged to be the diſcharge of electric matter from bodies in which it is artificially ſet in motion by our machines.

LIGNICENCIS TERRA, in the materia medica, the name of a fine yellow bole dug in many parts of Germany, particularly about Emeric in the circle of Weſtphalia, and uſed in cordial and aſtringent complaints.

LIGNUM VITÆ. See GUAIACUM.

LIGNUM *Aloes*. See EXCOECARIA.

LIGNUM *Nephriticum*. See GUILANDINA.

LIGNUM *Rhodium*, or *Roſewood*, in the materia medica; a wood, or root, chiefly brought to us from the Canary iſlands. The writers on botany and the materia medica are much divided about the lignum rhodium, not only with regard to the plant which affords it, but likewiſe in their accounts of the drug itſelf, and have deſcribed, under this name, ſimples manifeſtly different. This confuſion ſeems to have ariſen from an opinion, that the *rhodium*, and the *aſpalathus* (an article of conſiderable eſteem among the ancients, but with regard to which the moderns are very much at a loſs), are the ſame; whence different woods brought into Europe for the unknown aſpalathus, were ſold again by the name of *rhodium*.

In the few pharmacopœias which admit the lignum rhodium, different Linnæan names are given to it: thus the authors of the Diſpenſatorium Brunſvicenſe ſuppoſe it to be the *Rhodiola roſea* of Linnæus: and thoſe of the Pharmacopœia Roſſica, the

Geniſta Canarienſis. As to *Aſpalathus*, the ancients themſelves diſagree; Dioſcorides meaning by this appellation the wood of a certain ſhrub freed from the bark, and Galen the bark of a root. At preſent we have nothing under this name in the ſhops. What was heretofore ſold among us as aſpalathus, were pieces of a pale-coloured wood brought from the Eaſt Indies, and more commonly called *calambour*.

The aſpalathus, calambour, and lignum aquilæ, are ſuppoſed to be woods of the nature of agallochum, or lignum aloes, but weaker in quality. The lignum rhodium of the ſhops is uſually in long crooked pieces, full of knots, which when cut appear of a yellow colour like box, with a reddiſh caſt: the largeſt, ſmootheſt, moſt compact, and deepeſt coloured pieces, ſhould be choſen; and the ſmall, thin, or pale ones, rejected. The taſte of this wood is lightly bitteriſh, and ſomewhat pungent; its ſmell is very fragrant, reſembling that of roſes: long kept, it ſeems to loſe its ſmell; but on cutting, or rubbing one piece againſt the other, it ſmells as well as at firſt. Diſtilled with water, it yields an odoriferous eſſential oil, in very ſmall quantity. Rhodium is at preſent in eſteem only upon account of its oil, which is employed as an high and agreeable perfume in ſcenting pomatums and the like.

LIGNUM *Campechenſe*. See HEMATOXILUM.

LIGNUM *Colubrinum*. See OPHIORHIZA.

LIGULATED, among botaniſts, an appellation given to ſuch floſcules as have a ſtraight end turned downwards, with three indentures, but not ſeparated into ſegments. See BOTANY.

LIGURIA (anc. geog.), a country of Italy, bounded on the ſouth by the Mediterranean ſea, on the north by the Apennine mountains, on the weſt by part of Tranſalpine Gaul, and on the Eaſt by Etruria. There is a great diſagreement among authors concerning the origin of the Ligurians, though moſt probably they were deſcended from the Gauls. Some carry up their origin as far as the fabulous heroes of antiquity; while others trace them from the Ligyes, a people mentioned by Herodotus as attending Xerxes in his expeditions againſt Greece. Theſe Ligyes are by ſome ancient geographers placed in Colchis; by others, in Albania.—According to Diodorus Siculus, the Ligurians led a very wretched life; their country being entirely overgrown with woods, which they were obliged to pull up by the root, in order to cultivate their land, which was alſo encumbered with great ſtones, and, being naturally barren, made but very poor returns for all their labour. They were much addicted to hunting; and by a life of continual exerciſe and labour, became ſo ſtrong, that the weakeſt Ligurian was generally an overmatch for the ſtrongeſt and moſt robuſt among the Gauls. The women are ſaid to have been almoſt as ſtrong as the men, and to have born an equal ſhare in all laborious enterpriſes. With all their bravery, however, they were not able to reſiſt the Roman power; but were ſubdued by that warlike nation, about 211 B. C.

LIGUSTICUM, LOVAGE, in botany: A genus of the digynia order, belonging to the pentandria claſs of plants; and in the natural method ranking under the 45th order, *Umbellatæ*. The fruit is oblong, and quinqueſulcated on each ſide; the florets are equal; the petals involuted or rolled inwards, and entire. There are ſeven ſpecies; of which the moſt remarkable are, the *leviſticum* or common, and the *ſcoticum* or Scots, lovage. The firſt is a native of the Apennine mountains in Italy. It has a thick, fleſhy, deeply-penetrating perennial root, crowned by very large, many-parted, radical leaves, with broad lobes, having inciſions at top, upright, ſtrong, channelled ſtalks, branching ſix or ſeven feet high, and all the branches terminated by yellow flowers in large umbels. The ſecond is a native of Scotland, and grows near the ſea in various parts of the country. It has a thickiſh, fleſhy, penetrating perennial root, crowned by large doubly-trifoliated leaves, with broad, ſhort, indented lobes, upright round ſtalks half a yard high, terminated by ſmall yellow umbels. Both ſpecies are hardy, and eaſily propagated by ſeeds ſown in ſpring or autumn.

The root of the firſt ſpecies agrees nearly in quality with that of angelica: the principal difference is, that the lovage root has a ſtronger ſmell, and a ſomewhat leſs pungent taſte, accompanied with a more durable ſweetneſs, the ſeeds being rather warmer than the root; but although certainly capable of being applied to uſeful purpoſes, this root is not regarded in the preſent practice. The leaves of the ſecond are ſometimes eaten raw as a ſalad, or boiled as greens, by the inhabitants of the Hebrides. They give an infuſion of the leaves in whey to calves, to purge them.

LIGUSTRUM, PRIVET, in botany: A genus of the monogynia order, belonging to the diandria claſs of plants; and in the natural method ranking under the 44th order, *Sepiariæ*. The corolla is quadrifid; the berry tetraſpermous. There is but one ſpecies; of which there are two varieties, the deciduous and the evergreen. They are hardy plants, riſing from 10 to 15 feet high, adorned with oblong entire leaves, and ſpikes of infundibuliform oblong white flowers, ſucceeded by black berries. They are eaſily propagated by ſeed, layers, ſuckers, or cuttings. They are uſed for making hedges. The purple colour upon cards is prepared from the berries. With the addition of alum, theſe berries are ſaid to dye wool and ſilk of a good and durable green; for which purpoſe they muſt be gathered as ſoon as they are ripe. The leaves are bitter and ſlightly aſtringent. Oxen, goats, and ſheep, eat the plant; horſes refuſe it.

LILBURNE (JOHN), an enthuſiaſtic demagogue, who was tyrannically puniſhed by the ſtar-chamber court, being put in the pillory, whipped, fined, and impriſoned, for importing and publiſhing ſeditious pamphlets, which he had got printed in Holland; they chiefly reflected on the church of England and its biſhops: he ſuffered in 1637, and in priſon was doubly loaded with irons. In 1641 he was releaſed by the long parliament; and from this time he had the addreſs to make himſelf formidable to all parties, by his bold, aſpiring genius. He ſignalized himſelf in the parliament army; and was at one time the ſecret friend and confident of Cromwell, and at another his avowed enemy and accuſer; ſo that, in 1650, Cromwell found it to be his intereſt to ſilence him, by a grant of ſome forfeited eſtates. But after this, he grew outrageous againſt the protector's government; became chief of the levellers; and was twice tried for high treaſon, but acquitted by the juries. The laſt was for returning from exile (having been baniſhed by the parliament) without a paſs. He died in 1657, aged 88.

LILIACEOUS, in botany, an appellation given to ſuch flowers as reſemble thoſe of the lily.

LILIUM, the LILY, in botany: A genus of the monogynia order, belonging to the hexandria claſs of plants; and in the natural method ranking under the 10th order, *Coronariæ*. The corolla is hexapetalous, and campanulated, with a longitudinal nectariferous line or furrow; the capſules connected by ſmall cancellated hairs. There are many ſpecies; all of them bulbous-rooted, herbaceous, flowery perennials, riſing with erect annual ſtalks three or four feet high, garniſhed with long narrow leaves, and terminated by fine cluſters of large, bell-ſhaped, hexapetalous flowers of exceeding great beauty, of white, red, ſcarlet, orange, purple, and yellow colours.

All the ſpecies are propagated by ſowing the ſeeds; and if care is taken to preſerve theſe ſeeds from good flowers, very beautiful varieties are often produced. The manner of ſowing them is as follows: Some ſquare boxes ſhould be procured, about ſix inches deep, with holes bored in the bottoms to let out the wet: theſe muſt be filled with freſh, light, ſandy earth; and the ſeeds ſown upon them pretty thick in the beginning of

Auguſt, and covered over about half an inch deep with light ſifted earth of the ſame kind. They ſhould then be placed where they may have the morning ſun; and if the weather proves dry, they muſt be watered at times, and the weeds carefully picked out. In the month of October the boxes are to be removed to a place where they may have as much ſun as poſſible, and be ſecured from the north and north-eaſt winds. In ſpring the young plants will appear, and the boxes are then to be removed into their former ſituation. In Auguſt the ſmalleſt roots are to be emptied out of theſe boxes, and ſtrewed over a bed of light earth, and covered with about half an inch depth of earth of the ſame kind ſifted over them. Here they muſt be watered, and ſhaded at times, and defended from the ſeverity of winter by a ſlight covering of ſtraw or peaſe-haulm in the hardeſt weather. In February the ſurface of the bed ſhould be cleared, and a little light earth ſifted over it. When the leaves are decayed, the earth ſhould be a little ſtirred over the roots; and in the month of September following ſome more earth ſifted on. In the September of the following year, the roots muſt be tranſplanted to the places where they are to remain, and ſet at the diſtance of eight inches; the roots being placed four inches below the ſurface: this ſhould be done in moiſt weather. They will now require the ſame care as in the preceding winters; and, the ſecond year after they are tranſplanted, the ſtrongeſt roots will begin to flower. The fine ones ſhould then be removed at the proper ſeaſon into flower beds, and planted at great diſtances from one another that they may flower ſtrong.

The roots of the white lily are emollient, maturating, and ſuppurative, and are uſed externally in cataplaſms for theſe purpoſes with ſucceſs. The common form of applying them is boiled and bruiſed. Gerard recommends them internally againſt dropſies.

The Kamtſchatence, or Kamtſchatka lily, called there *ſaranne*, makes a principal part of the food of the Kamſchatkans. Its roots are gathered by the women in Auguſt, dried in the ſun, and laid up for uſe: they are the beſt bread of the country; and after being baked are reduced to powder, and ſerve inſtead of flour in ſoups and ſeveral diſhes. They are ſometimes waſhed, and eaten as potatoes; are extremely nouriſhing, and have a pleaſant bitter taſte. Our navigators boiled and ate them with their meat. The natives often parboil, and beat it up with ſeveral ſorts of berries, ſo as to form of it a very agreeable confection. Providentially it is an univerſal plant there, and all the grounds bloom with its flower during the ſeaſon. Another happineſs remarked there is, that while fiſh are ſcarce, the ſaranne is plentiful; and when there is a dearth of this, the rivers pour in their proviſions in redoubled profuſion. It is not to the labours of the females alone that the Kamtſchatkans are indebted for theſe roots. A ſpecies of mouſe ſaves them a great deal of trouble. The ſaranne forms part of the winter proviſions of that little animal: they not only gather them in the proper ſeaſon, and lay them up in their magazines, but at times have the inſtinct of bringing them out in ſunny weather to dry them, leſt they ſhould decay. The natives ſearch for their hoards; but with prudent tenderneſs leave part for the owners, being unwilling to ſuffer ſuch uſeful caterers to periſh.

LILLO (George), an excellent dramatic writer, born at London in 1693. He was a jeweller by profeſſion, and followed his buſineſs for many years in that neighbourhood with the faireſt reputation. He was at the ſame time ſtrongly attached to the muſes, yet ſeemed to have laid it down as a maxim, that the devotion paid to them ought always to tend to the promotion of virtue, morality, and religion. In purſuance of this aim, Lillo was happy in the choice of his ſubjects, and ſhowed great power of affecting the heart, by working up the paſſions to ſuch a height, as to render the diſtreſſes of common and domeſtic life equally intereſting to the audiences as thoſe of kings and heroes, and the ruin brought on private families by an indulgence of avarice, luſt, &c. as the havock made in ſtates and empires by ambition, cruelty, or tyranny. His "George Barnwell," "Fatal Curioſity," and "Arden of Feverſham," are all planned on common and well-known ſtories; yet they have perhaps more frequently drawn tears from an audience than the more pompous tragedies of Alexander the Great, All for Love, &c. In the prologue to "Elmeric," which was not acted till after the author's death, it is ſaid, that when he wrote that play, he "was depreſſed by want," and afflicted by diſeaſe; but in the former particular there appears to be evidently a miſtake, as he died poſſeſſed of an eſtate of 60l. a year, beſides other effects to a conſiderable value. His death happened in 1739, in the 47th year of his age. His works have been lately collected, and publiſhed, with an account of his life, in 2 vols. 12mo. by Mr. T. Davis.

LILLY (John), a dramatic poet, was born in the wilds of Kent, about the year 1553, and educated in Magdalen-college, Oxford, where he took the degree of bachelor of arts in 1573, and that of maſter in 1575. From Oxford he removed to Cambridge; but how long he continued there, is uncertain. On his arrival in London, he became acquainted with ſome of Queen Elizabeth's courtiers, by whom he was careſſed and admired as a poet and a wit; and her majeſty, on particular feſtivals, honoured his dramatic pieces with her preſence. His plays are nine in number. His firſt publication, however, printed in 1580, was a romance called *Euphues*, which was univerſally read and admired. This romance, which Blount, the editor of ſix of his plays, ſays introduced a new language, eſpecially among the ladies, is, according to Berkenhout, in fact a moſt contemptible piece of affectation and nonſenſe: nevertheleſs it ſeems very certain, that it was in high eſtimation by the women of faſhion of thoſe times, who, we are told by Whalley the editor of Ben Johnſon's works, had all the phraſes by heart; and thoſe who did not ſpeak *Euphuiſm* were as little regarded at court as if they could not ſpeak French. "He was (ſays Oldys) a man of great reading, good memory, ready faculty of application, and uncommon eloquence; but he ran into a vaſt exceſs of alluſion." When or where he died is not known. Anthony Wood ſays he was living in 1597, when his laſt comedy was publiſhed. After attending the court of Queen Elizabeth 13 years, notwithſtanding his reputation as an author, he was under a neceſſity of petitioning the queen for ſome ſmall ſtipend to ſupport him in his old age. His two letters or petitions to her majeſty on this ſubject are preſerved in manuſcript.

Lilly (William), a noted Engliſh aſtrologer, born in Leiceſterſhire in 1602; where his father not being able to give him more learning than common writing and arithmetic, he reſolved to ſeek his fortune in London. He arrived in 1620, and lived four years as a ſervant to a mantua maker in the pariſh of St. Clement Danes; but then moved a ſtep higher to the ſervice of Mr. Wright, maſter of the Salters' company in the Strand, who not being able to write, Lilly among other offices kept his books. In 1627, when his maſter died, he paid his addreſſes to the widow, whom he married with a fortune of 1000l. Being now his own maſter, he followed the puritanical preachers; and, turning his mind to judicial aſtrology, became pupil to one Evans, a profligate Welſh parſon, in that pretended art. Getting a MS. of the *Ars notitia* of Corn. Agrippa, with alterations, he drank in the doctrine of the magic circle, and the invocation of ſpirits, with great eagerneſs. He was the author of the *Merlinus Anglicus junior*; *The Supernatural Sight*; and *The White King's Prophecy*. In him we have an inſtance of the general ſuperſtition and ignorance that prevailed in the

time of the civil war between Charles I. and his parliament: for the king conſulted this aſtrologer, to know in what quarter he ſhould conceal himſelf, if he could eſcape from Hampton-court; and general Fairfax, on the other ſide, ſent for him to his army, to aſk him if he could tell by his art, whether God was with them and their cauſe? Lilly, who made his fortune by favourable predictions to both parties, aſſured the general that God would be with him and his army. In 1648 he publiſhed his *Treatiſe of the three ſuns* ſeen the preceding winter; and alſo an aſtrological judgment upon a conjunction of Saturn and Mars. This year the council of ſtate gave him in money 50l. and a penſion of 100l. *per annum*, which he received for two years, and then reſigned on ſome diſguſt. In June 1660, he was taken into cuſtody by order of the parliament, by whom he was examined concerning the perſon who cut off the head of king Charles I. The ſame year he ſued out his pardon under the great ſeal of England. The plague raging in London, he removed with his family to his eſtate at Herſham; and in October 1666 was examined before a committee of the houſe of commons concerning the fire of London, which happened in September that year. After his retirement to Herſham, he applied himſelf to the ſtudy of phyſic, and, by means of his friend Mr. Aſhmole, obtained from archbiſhop Sheldon a licence for the practice of it. A little before his death he adopted for his ſon, by the name of *Merlin junior*, one Henry Coley, a taylor by trade; and at the ſame time gave him the impreſſion of his almanac, after it had been printed for 36 years. He died in 1681 of a dead palſy. Mr. Aſhmole ſet a monument over his grave in the church of Walton upon Thames.—His "Obſervations on the Life and Death of Charles late King of England," if we overlook the aſtrological nonſenſe, may be read with as much ſatisfaction as more celebrated hiſtories; Lilly being not only very well informed, but ſtrictly impartial. This work, with the Lives of Lilly and Aſhmole, written by themſelves, were publiſhed in one vol. 8vo, in 1774, by Mr. Burman.

LILY, in botany. See LILIUM.

Lily of the Valley. See CONVALLARIA.

LILYBÆUM (anc. geog.), a city of Sicily, ſituated on the moſt weſterly promontory of the iſland of Sicily, and ſaid to have been founded by the Carthaginians on their expulſion from Motya by Dionyſius tyrant of Syracuſe. It is remarkable for three ſieges it ſuſtained; one againſt Dionyſius the tyrant, another againſt Pyrrhus, king of Epirus, and the third againſt the Romans. The two firſt failed in their attempts, but the Romans with great difficulty made themſelves maſters of it. No remains of this once ſtately city are now to be ſeen, except ſome aqueducts and temples; though it was ſtanding in Strabo's time.

LILYE (WILLIAM), the grammarian, was born in the year 1466 at Oldham in Hampſhire; and in 1486, was admitted a ſemi-commoner of Magdalen college in Oxford.—Having taken the degree of bachelor of arts, he left the univerſity, and travelled to Jeruſalem. Returning from thence, he continued five years in the iſland of Rhodes, where he ſtudied the Greek language, ſeveral learned men having retired thither after the taking of Conſtantinople. From Rhodes he travelled to Rome, where he improved himſelf in the Greek and Latin languages, under Sulpitius and P. Sabinus. He then returned to London, where for ſome time he taught a private grammar-ſchool, being the firſt perſon who taught Greek in the metropolis. In 1510, when Dr. Colet founded St. Paul's ſchool, Lilye was appointed the firſt maſter; at which time, it ſeems, he was married and had many children. In this employment he had laboured 12 years, when, being ſeized by the plague, which then raged in London, he died in February 1523, and was buried in the north yard of St. Paul's. He had the character of an excellent grammarian, and a ſucceſsful teacher of the learned languages. His principal work is *Breviſſima inſtitutio, ſeu ratio grammatices cognoſcendæ*; Lond. 1513. Reprinted times without number, and commonly called *Lilye's grammar*. The Engliſh rudiments were written by Dr. Colet, dean of St. Paul's; and the preface to the firſt edition by cardinal Wolſey. The Engliſh ſyntax was written by Lilye; alſo the rules for the genders of nouns, beginning with *Propria quæ maribus*; and thoſe for the preterperfect tenſes and ſupines, beginning with *As in preſenti*. The Latin ſyntax was chiefly the work of Eraſmus. See Ward's preface to his edition of Lilye's Grammar, 1732.

LIMA, a city, capital of Peru, with an archbiſhop's ſee, and a univerſity. In 1534, Pizarro, marching through the country, was ſtruck with the beauty and fertility of the extenſive valley of Rimac. There, on a ſmall river of the ſame name with the valley, at the diſtance of five miles from Callao, the moſt commodious harbour in the Pacific Ocean, he founded a city, and gave it the name of Ciudad de los Reyes. This name it retains among the Spaniards in all legal deeds; but it is better known to foreigners by that of Lima, a corruption of the ancient appellation of the valley in which it is ſeated. Lima gives its name to the principal audience of Peru, and is ſurrounded by brick walls, with ramparts and baſtions. The ſtreets are handſome and ſtraight: the houſes are generally only one ſtory high, on account of the earthquakes. One part of the roofs is covered with coarſe linen cloth, and the others only with reeds, which is not inconvenient, becauſe it never rains here; but the rich inhabitants cover theirs with fine mats, or beautiful cotton cloths. There are trees planted all round their houſes, to keep off the heat of the ſun. What the houſes want in height they have in length and depth; for ſome of them are 200 feet long, and proportionably broad, ſo that they have 10 or 12 large apartments on the ground floor. The river forms canals in the ſtreets, which run to moſt of the houſes, and ſerve to water their gardens, &c. The churches and convents are extremely rich, and many images of the ſaints are of gold, adorned with jewels. The city is four miles in length, and two in breath, and is divided into eight pariſhes. It is the ſeat of the viceroy, and contains ſeveral courts, as that of the viceroy, of the archbiſhop, of the inquiſition, of the cruſado, and of the wills. Earthquakes are very frequent, and ſome have done the city much damage, particularly that in 1746, by which it was almoſt deſtroyed. The inhabitants are ſo rich, that when the viceroy, ſent from Spain in 1682, made his public entrance into this city, they paved the ſtreets he was to paſs through with ingots of ſilver. They are alſo very debauched, but at the ſame time extremely ſuperſtitious; and they have a ſtrong belief in the power of charms. Lima is 800 miles ſouth of Quito. W. lon. 76. 44. S. lat. 12. 1.

LIMA, an audience of Peru, lying on the Pacific Ocean, bounded on the north by the audience of Quito, on the eaſt by the Andes, on the ſouth by the audience of Los Charcos, and on the weſt by the Pacific Ocean.

LIMASSOL, or LIMISSO, a town of Cyprus, in the ſouth of the iſland. Of the ancient city nothing but ruins now remain; though it was a celebrated place, even under the government of the dukes. King Richard, the conqueror of the laſt of theſe vaſſals of the empire, razed it in 1191, and it was never afterwards rebuilt. This city originally was the ſame as AMATHUS, or Amathonte; ſo famous, as Pauſanias tells us, for its temple erected in honour of Venus and Adonis. Amathus was the reſidence of the nine firſt kings of the iſland; and amongſt others of Oneliſtus, who was ſubjected afterwards by the arms of Artabanes, the Perſian general. This city, erected into an archbiſhopric in the time of the Chriſtians, has produced a number of perſonages celebrated for their knowledge and the ſanctity of their lives. In the neighbourhood there are

ſeveral copper mines, which the Turks have been forced to abandon. The following lines, in the tenth book of Ovid's Metamorphoſes, prove that they were known in the time of that poet:

Capta viri forma, non jam Cytherea curat
Littora, non alto repetit Paphon æquore cinctam,
Piſcoſamque Gnidon, gravidamque Amathunta metallis.

The place where the new Limaſſol now ſtands, formerly had the name of *Nemoſia*, from the multitude of woods by which it was ſurrounded. Richard, king of England, having deſtroyed Amathonte, Guy de Luſignan, in the 12th century, laid the foundations of that new city which the Greeks called *Neopolcos*. The family of Luſignan, who continued to embelliſh and fortify it, built there palaces, and Greek and Latin churches; and made it the ſeat of a biſhop. When the iſland was taken by the Turks in 1570, the Ottoman army entered this city on the 2d of July, and ravaged it without mercy. It was then deſtroyed by the flames; and at preſent it is only a wretched place, in which one can ſcarcely diſtinguiſh any remains of its ancient edifices. It is governed by a commiſſary and a cadi: the latter judges caſes only proviſionally, before they are carried to the ſuperior tribunal of Nicoſia. The harbour is very commodious; and being ſheltered from impetuous winds, it affords a ſafe and calm aſylum to veſſels when overtaken by a ſtorm. The carob tree is here more abundant than any where elſe; and it is from the port of Limaſſol that the greateſt quantity of its fruit is exported. The inhabitants export alſo ſalt, procured from a lake near Salines. Cotton, wheat, barley, and mulberry-trees, are both plentiful and well cultivated in this part of the iſland: the ground alſo produces all kinds of garden-ſtuff. The beſt Cyprus wine is made from the vines that grow on the hills of Limaſſol. All the wines of the country are collected in this city to be tranſported to Larnic, where there are the largeſt cellars, and which on that account becomes the natural centre of commerce.

LIMAX, the Slug, or *Naked Snail*; a genus of inſects belonging to the order of vermes molluſca. The body is oblong, fitted for crawling, with a kind of muſcular coat on the upper part, and the belly is plain. They have four tentacula, or horns, ſituated above the mouth, which they extend or retract at pleaſure. This reptile is always deſtitute of ſhell; but beſides that its ſkin is more clammy, and of a greater conſiſtency than that of the ſnail, the black naked ſlug has a furrowed cloak, almoſt as thick and as hard as leather, under which it withdraws its head as within a ſhell. The head is diſtinguiſhed from the breaſt by a black line. It is in its head and back that the ſnail-ſtone is found; which is a ſmall pearled and ſandy ſtone, of the nature of lime ſtones: according to a popular opinion, it cures the tertian ague, if faſtened to the patient's arm. Theſe ſlugs move on ſlowly, leaving every where clammy and ſhining marks of their paſſage. Their coming together is towards the end of ſpring. The organs of generation are placed, as in the ſnail, on the right ſide of the neck. The male implement unfolds with the ſame mechaniſm as the finger of a glove when turned inſide out. They are ſometimes met with hanging in the air with their heads downwards, and their tails, united by a kind of viſcous and thick tie, grappled to the branch of a tree. In this ſituation they remain for three hours, and that is the time of impregnation. They depoſit their eggs in the earth. There are eight ſpecies, diſtinguiſhed entirely by their colour; as the black ſlug, the white ſlug, the reddiſh ſlug, the aſh-coloured ſlug, &c. The black ſlug is hermaphrodite, both ſexes being in each individual, and in the coitus both impregnate and are impregnated at the ſame time. A black ſlug, powdered over with ſnuff, ſalt, or ſugar, falls into convulſions, caſts forth all its foam, and dies. See Reproduction.

LIMB, in general, denotes the border or edge of a thing: thus we ſay, the limb of a quadrant, of the ſun, of a leaf, &c.

Limb, in anatomy, an appellation given to the extremities of the body, as to the arms and legs.

Limb, *Limbus*, in the church of Rome, is uſed in two different ſenſes. 1. The limb of the patriarchs is ſaid to be the place where the patriarchs waited the redemption of mankind: in this place they ſuppoſe our Saviour's ſoul continued from the time of his death to his reſurrection. 2. The limb of infants dying without baptiſm, is a place ſuppoſed to be diſtinct both from heaven and hell; ſince, ſay they, children dying innocent of any actual ſin, do not deſerve hell; and, by reaſon of their original ſin, cannot be admitted into heaven.

LIMBAT, the name of a periodical wind common in the iſland of Cyprus, and of great ſervice in moderating the heats of the climate, which would otherwiſe be intolerable. According to the Abbé Mariti, it begins to blow at eight in the morning the firſt day; increaſes as the ſun advances till noon; then gradually weakens, and at three falls entirely. On the ſecond day it ariſes at the ſame hour; but it does not attain its greateſt ſtrength till about one in the afternoon, and ceaſes at four preciſely. On the third day it begins as before; but it falls an hour later. On the five ſucceeding days, it follows the ſame progreſſion as on the third; but it is remarked, that a little before it ceaſes, it becomes extremely violent. At the expiration of five days it commences a new period like the former. By narrowly obſerving the ſea on that ſide from which it is about to blow a little before it ariſes, one may determine what degree of ſtrength it will have during the day. If the horizon is clear, and entirely free from clouds, the wind will be weak, and even almoſt inſenſible; but if it is dark and cloudy, the wind will be ſtrong and violent. This limbat wind, notwithſtanding its utility in moderating the exceſſive heat, often becomes the cauſe of fevers, eſpecially to the Europeans, from their being leſs habituated to the climate, and more apt than the natives to ſuffer themſelves to be ſurpriſed by the cool air, when in a ſtate of perſpiration. This wind, the falling of which happens an hour ſooner or later, is ſucceeded by a calm, accompanied by a certain moiſture that renders the air ſomewhat heavy. This moiſture diſappears in the evening, being diſſipated by a wind which ariſes every day at that period. This wind is conſidered as a land breeze by the inhabitants of the ſouthern and eaſtern parts of the iſland; but it is called *a ſea breeze* by thoſe in the northern and weſtern, who indeed receive it immediately from the ſea. In ſummer it blows till four o'clock in the morning; and when it ceaſes, it leaves a profound calm, which continues till the hour when the limbat commences. In autumn and winter it never falls till day-break, when it is ſucceeded by other winds, which proceed from the irregularity of the ſeaſon. In ſpring it does not continue longer than midnight; and is then ſucceeded by that happy calm, during which thoſe refreſhing dews are formed that moiſten the earth at ſun-riſing. The limbat winds, which ariſe in the beginning of ſummer, ceaſe about the middle of September; and this is the period when the moſt inſupportable heats commence, becauſe their violence is not moderated by the ſmalleſt breeze. They are, however, luckily not of long duration; and about the latter end of October they decreaſe ſenſibly, as the atmoſphere begins to be loaded with watery clouds.

LIMBORCH (Philip), a learned writer among the remonſtrants, born at Amſterdam in 1633. After having made great proficiency in his ſtudies, he was, in 1655, admitted to preach in public, which he did firſt at Haerlem. His ſermons

had in them no affected eloquence; but were ſolid, methodical, and edifying. He was choſen miniſter of Goudja; from whence he was called to Amſterdam, where he had the profeſſorſhip of divinity, in which he acquitted himſelf with great reputation till his death, which happened in 1712. He had an admirable genius, and a tenacious memory. He had many friends of diſtinction in foreign parts as well as in his own country. Some of his letters to Mr. Locke are printed with thoſe of that celebrated author. He had all the qualifications ſuitable to the character of a ſincere divine, lived an example of every virtue, and preſerved the vigour of his body and mind to a conſiderable age. He wrote many works, which are eſteemed; the principal of which are, 1. *Amica collatio de veritate religionis Chriſtianæ cum erudito Judæo*, in 12mo. 2. A complete body of Divinity, according to the opinions and doctrines of the remonſtrants. 3. A hiſtory of the Inquiſition; which has been tranſlated into Engliſh by Dr. Samuel Chandler. Limborch alſo publiſhed the works of the famous Epiſcopius, who was his great-uncle by the mother's ſide.

LIMBURGH-DUCHY, a province of the Auſtrian Netherlands, bounded by the duchy of Juliers on the north and eaſt, by Luxemburgh on the ſouth, and by the biſhopric of Liege on the weſt. It is about 30 miles in length, and 25 in breadth; and conſiſts of good arable and paſture land, with plenty of wood, and ſome iron mines.

LIMBURGH, the capital city of the duchy of Limburgh, in the Auſtrian Netherlands, is ſeated on a ſteep rock near the river Veſſe. This town is ſmall, but pleaſantly ſeated on a hill, with ſhady woods; and conſiſts chiefly of one broad ſtreet, not very well built. It is ſtrong by ſituation, and almoſt inacceſſible; however, it was taken by the French in 1675, and by the confederates under the duke of Marlborough in 1703, for the houſe of Auſtria, to whom it remains by the treaties of Raſtadt and Baden, after having been diſmantled. It is famous for its cheeſe, which is exceeding good. E. lon. 6. 8. N. lat. 50. 40.

LIME. See QUICKLIME and KILN.

LIME-*Tree*. See CITRUS.

LIME or LINDEN-*Tree*. See TILIA.

LIME-*Water*, the clear liquor, decanted, after intimately mixing quicklime with water. It is an article of the London College Pharmacopœia, and uſed both internally and as a topical remedy.

LIME, or *Lyme*. See LYME.

LIMERICK, a county of Ireland, in the province of Munſter, is bounded on the eaſt by Tipperary, on the weſt by Kerry, on the north by the river Shannon, and on the ſouth by Cork. It is a fruitful and populous tract, the ſoil requiring little or no manure in moſt places; beſides rich paſture for ſheep and cows, it produces rich crops of all kinds of corn and rape, with ſome hemp. It gave title of earl to the family of Dongan. It contains 375,320 Iriſh plantation acres, about fifty-ſix church livings, though a much greater number of pariſhes, ten baronies, three boroughs, and ſends eight members to parliament. It has ſome clays, furze, fern, and mountain lands, and is famous for good cyder; it has been much benefited by the palatines, who ſettled there and increaſed tillage; they are a laborious independent people, moſtly employed in their own farms. This country is well watered by large and ſmall rivers; the Shannon runs at the north ſide of the county, and fertilizes its banks. The firing of the inhabitants is chiefly turf, and the bogs are conveniently ſituated. At Loghill, in the weſt of the county, there is a mine of coal or culm, but it is more uſed in kilns than in houſes. There are few lakes except Lough Gur; and the principal hills are Knockgreny, Knockany, Knockfiring, and Toryhill. The mountains lie weſtward, the higheſt being Knockpatrick or St. Patrick's hill. This county is about 45 miles long and 42 broad.

LIMERICK, or *Lough Meath*, a market town, a borough, and a biſhop's ſee, now the metropolis of the province of Munſter. It is ſituated on the river Shannon, 94 miles from Dublin; and was the ſtrongeſt fortreſs in the kingdom. Its ancient name was Lunneach; and during the firſt ages it was much frequented by foreign merchants, and after the arrival of the Danes was a place of conſiderable commerce till the 12th century. It was plundered by Mahon, brother of Brien Boromh, after the battle of Sulchoid, in 970; and Brien, in a future period, exacted from the Danes of this city 365 tons of wine as a tribute, which ſhows the extenſive traffic carried on by thoſe people in that article. About the middle of the 6th century, St. Munchin erected a church and founded a biſhopric here; which, however, was deſtroyed by the Danes on their taking poſſeſſion of this port in 853, and remained in ruins until their converſion to the Chriſtian faith in the 10th century; at which period the church of St. Munchin was rebuilt, and the biſhopric eſtabliſhed. Donald O'Brien, about the time of the arrival of the Engliſh, founded and endowed the cathedral; and Donat O'Brien, biſhop of Limerick, in the 13th century, contributed much to the opulence of the ſee. About the cloſe of the 12th century, the biſhoprick of Inniscathy was united to that of Limerick. It was beſieged by king William III. in the year 1690; and though there was no army to aſſiſt it, the king was obliged to raiſe the ſiege. In the year 1691 it was again beſieged by the Engliſh and Dutch on the 21ſt of September; and it was obliged to ſurrender on the 13th of October following, not without the loſs of abundance of men; however, the garriſon had very honourable and advantageous conditions, being permitted to retire where they thought fit, and the Roman-catholics by theſe articles were to be tolerated in the free exerciſe of their religion. Within a century this place was reckoned the ſecond city in Ireland, at preſent it has loſt its rank; not becauſe it thrives leſs, but becauſe Cork thrives more. It is compoſed of the Iriſh and Engliſh town; the latter ſtands on the king's iſland, formed by the river Shannon. The town is three miles in circumference, having weekly markets on Wedneſday and Saturday, and fairs on Eaſter Tueſday, 1ſt July, 4th Auguſt, and 12th December. There is a privilege annexed to the fair held on 4th Auguſt, that, during 15 days, no perſon can be arreſted in the city or liberties, on any proceſs iſſuing out of the Tholſel court of Limerick. Ardfert and Achadoe, in the county of Kerry, are united to the biſhoprick of Limerick. This city returns two members to parliament; and gives title of viſcount to the family of Hamilton. It is governed by a mayor, ſheriffs, recorder, aldermen, and burgeſſes; there is alſo a barrack and a military governor and town-major: it had ſome time the privilege of coinage; and different parliaments have been held there. The town was formerly entirely walled in; and in 1760, there were 17 of the city gates ſtanding; but to the great improvement of the place they are now all demoliſhed, except the watergate of king John's caſtle. The linen, woollen, and paper manufactures, are carried on here to great extent, and the export of proviſions is very conſiderable. Here are many charitable hoſpitals and handſome public buildings, beſides the cathedral and other churches. A charter was granted to this city by king John, and confirmed in ſucceeding reigns. Dr. Campbell obſerves, that as you approach Limerick, the grounds grow rich and exquiſitely beautiful; the only diſagreeable matter is, that the ſituation renders the air moiſt, and conſequently rather unwholeſome to ſtrangers. About ſix miles from this is the famous Caſtleconnel-ſpa,

Limerick is 50 miles from Cork, 50 from Galway, and 73 from Waterford. It appears that Limerick obtained the privilege of having mayors 10 years before that right was allowed to the citizens of London. It was before governed by provoſts, of which the firſt was John Spafford, in 1195 and 1197; during the provoſtſhip of Henry Troy a charter was granted, 9 Richard I. whereby the citizens were allowed to chooſe mayors and bailiffs; Adam Servant, in 1198, being the firſt mayor. It continued to be governed by mayors and bailiffs until the office of bailiff was changed into that of ſheriff, in 1609.

Limerick is alſo the name of a fair-town in the county of Wexford and province of Leinſter; the fairs are four in the year.

LIMIT, in a reſtrained ſenſe, is uſed by mathematicians for a determined quantity to which a variable one continually approaches; in which ſenſe, the circle may be ſaid to be the limit of its circumſcribed and inſcribed polygons. In algebra, the term *limit* is applied to two quantities, one of which is greater and the other leſs than another quantity; and in this ſenſe it is uſed in ſpeaking of the limits of equations, whereby their ſolution is much facilitated.

LIMME, a town of Kent, in England, near Hithe, and four miles from Romney, was formerly a port, till choaked up by the ſands; and though it is thereby become a poor town, yet it has the horn and mace and other tokens left of its ancient grandeur, and uſed to be the place where the lord warden of the cinque-ports was ſworn at his entrance upon his office. The Roman road from Canterbury, called *Stane-ſtreet*, ended here; and from the brow of its hill may be ſeen the ruinous Roman walls almoſt at the bottom of the marſhes. Here formerly was a caſtle, now converted into a farm-houſe. When or by whom this edifice was erected is not known. It has, however, great marks of antiquity; as has alſo the adjoining church, in which are ſeveral old tombſtones with croſſes on them.

Limning, the art of painting in water-colours, in contradiſtinction to painting which is done in oil-colours. Limning is much the more ancient kind of painting. Till a Flemiſh painter, one John van Eyck, better known by the name of *John of Bruges*, found out the art of painting in oil, the painters all painted in water and in freſco, both on their walls, on wooden boards, and elſewhere. When they made uſe of boards, they uſually glued a fine linen cloth over them, to prevent their opening; then laid on a ground of white; laſtly, they mixed up their colours with water and ſize, or with water and yolks of eggs, well beaten with the branches of a fig-tree, the juice whereof thus mixed with the eggs; and with this mixture they painted their pieces.

In limning, all colours are proper enough, except the white made of lead, which is apt to turn black. The azure and ultramarine muſt always be mixed with ſize or gum; but there are always applied two layers of hot ſize before the ſize-colours are laid on: the colours are all ground in water, each by itſelf; and, as they are required in working, are diluted with ſize or gum water.

To limn, or draw a face in colours; having all the materials in readineſs, ſketch the outline and lay in the dead colour on the ivory even and thin. The picture being laid, the work is to be done at three ſittings. At the firſt you are only to dead-colour the face, which will require about two hours. At the ſecond ſitting, go over the work more curiouſly, adding its particular graces or deformities. At the third ſitting, finiſh the whole: carefully remarking whatever may conduce to render the piece perfect, as the caſt of the eyes, moles, ſcars, geſtures, and the like.

An ingenious German artiſt in London, of the name of Einſle, has lately diſcovered a moſt valuable method of *preparing ivory* for the better reception of colours in miniature painting. By the application of ſome chemical liquid, the ſurface of the ivory is mellowed in a very extraordinary way, ſo as to render the working of the colours extremely pleaſant, and the effect remarkably ſtriking.

LIMOGES, an ancient town of France, in the department of Upper Vienne and late territory of Limoſin, with a biſhop's ſee. It is a trading place, the capital of the department; and its horſes are in great eſteem. It is ſeated on the Vienne, 50 miles N. E. of Perigueux, and 110 E. of Bourdeaux. E. lon. 1. 20. N. lat. 45. 50.

LIMOSIN, a late province of France, bounded on the north by Marche, on the eaſt by Auvergne, on the ſouth by Querci, and on the weſt by Perigord and Angoumois. It has foreſts of cheſtnut-trees, and contains mines of lead, copper, tin, and iron; but the principal trade conſiſts in cattle and horſes. It is now the department of Upper Vienne.

LIMPET. See Patella.

LIMPURG, a barony of Germany, in the circle of Franconia, included almoſt entirely within Suabia, and ſeated to the ſouth of Hall in Suabia. It is about 15 miles long, and eight broad. Gaildorf and Shonburg, near which is the caſtle of Limpurg, are the principal places.

Limpurg, a town of Germany, in the electorate of Trier or Treves, and in Wetteravia, formerly free and imperial, but now ſubject to the electorate of Treves. It is ſeated on the river Lahn. E. lon. 8. 13. N. lat. 50. 18.

LINARIA, in ornithology. See Fringilla.

LINACRE (Thomas), phyſician, was born at Canterbury about the year 1460, and there educated under the learned William Selling: thence he removed to Oxford, and in 1484 was choſen fellow of All-Souls college. Tilly, *alias* Selling, his former inſtructor, being at this time appointed ambaſſador from king Henry VII. to the court of Rome, Mr. Linacre accompanied him to Italy, where he attained the higheſt degree of perfection in the Greek and Latin languages. At Rome, he applied himſelf particularly to the ſtudy of Ariſtotle and Galen, in the original. On his return to Oxford, he was incorporated doctor of phyſic, and choſen public profeſſor in that faculty. But he had not been long in England, before he was commanded to court by king Henry VII. to attend the young prince Arthur as his tutor and phyſician. He was afterwards appointed phyſician to the king, and, after his death, to his ſucceſſor Henry VIII. Dr. Linacre founded two medical lectures at Oxford, and one at Cambridge; but that which moſt effectually immortaliſed his name among the faculty, is his being the firſt founder of the college of phyſicians in London. He beheld with vexation the wretched ſtate of phyſic in thoſe times; and, by an application to cardinal Wolſey, obtained a patent in 1518, by which the phyſicians of London were incorporated. The intention of this corporation was to prevent illiterate and ignorant medicaſters from practiſing the art of healing. Dr. Linacre was the firſt preſident, and held the office as long as he lived. Their meetings were in his own houſe in Knight-rider-ſtreet, which houſe he bequeathed to the college. But our doctor, when he was about the age of 50, took it into his head to ſtudy divinity; entered into orders; and was collated, in 1509, to the rectory of Merſham. In the ſame year he was inſtalled prebendary of Wells, in 1518 prebendary of York, and in the following year was admitted precentor of that cathedral. This, we are told, he reſigned for other preferments. He died of the ſtone in the bladder in October 1524, aged 64; and was buried in St. Paul's. Thirty-three years after his death, doctor John Caius cauſed a monument to be erected to his memory, with a Latin inſcription, which contains the outlines of his life and character. He was a man of great natural ſagacity, a ſkilful phyſician, a profound grammarian, and one of the beſt Greek and Latin ſcholars of his time. Eraſmus in his epiſtles ſpeaks

highly of the doctor's tranſlations from Galen, preferring them even to the original Greek. His works are, 1. *De emendata ſtructura Latini ſermonis, libri ſex*; London, printed by Pynſon, 1524, 8vo, and by Stephens, 1527, 1532. 2. The rudiments of grammar, for the uſe of the princeſs Mary, printed by Pynſon. Buchanan tranſlated it into Latin; Paris, 1536. He likewiſe tranſlated into very elegant Latin, ſeveral of Galen's works, which were printed chiefly abroad at different times. Alſo *Procli Diadochi ſphæra*, tranſlated from the Greek; Venet. 1499, 1500.

LINCOLN, a city of England, and capital of a county of the ſame name, is diſtant 132 miles from London. It ſtands on the ſide of a hill; at the bottom of which runs the river Witham in three ſmall channels, over which are ſeveral bridges. The old *Lindum* of the Britons, which ſtood on the top of the hill, as appears from the veſtiges of a rampart, and deep ditches ſtill remaining, was taken and demoliſhed by the Saxons; who built a town upon the ſouth ſide of the hill down to the river ſide, which was ſeveral times taken by the Danes, and as often retaken by the Saxons. In Edward the confeſſor's time, it appears, from Doomſday-book, to have been a very conſiderable place; and in the time of the Normans, Malmſbury ſays, it was one of the moſt populous cities in England. William I. built a caſtle upon the ſummit of the hill above the town. The dioceſe, though the biſhopric of Ely was taken out of it by Henry II. and thoſe of Peterborough and Oxford by Henry VIII. is ſtill vaſtly large, containing the counties of Leiceſter, Huntingdon, Bedford, and part of Bucks, making 1255 pariſhes. Though the other churches are mean, the cathedral or minſter is a moſt magnificent piece of Gothic architecture. Here is a prodigious large bell, called *Tom of Lincoln*, which is near five ton in weight, and 23 feet in compaſs. The hill on which the church ſtands is ſo high, and the church itſelf ſo lofty, that it may be ſeen 50 miles to the north, and 30 to the ſouth. Beſides other tombs, it contains one of braſs, in which are the entrails of queen Eleanor, wife to Edward I. It is ſaid there were anciently 52 churches, which are now reduced to 14. Such is the magnificence and elevation of the cathedral, that the monks thought the ſight of it muſt be very mortifying to the devil; whence it came to be ſaid of one who was diſpleaſed, *that he looked like the devil over Lincoln*. The declivity on which the city is built being ſteep, the communication betwixt the upper and lower town is very troubleſome, and coaches and horſes are obliged to make a compaſs.

King Edward III. made this city a ſtaple for wool, leather, lead, &c. It was once burnt; once beſieged by king Stephen, who was here defeated and taken priſoner; and once taken by Henry III. from his rebellious barons. It abounded heretofore with monaſteries and other religious houſes. There is a great pool here, formed by the river on the weſt ſide of it, called *Swan-Pool*, becauſe of the multitude of ſwans on it. The Romans north gate ſtill remains entire, by the name of *Newport-Gate*. It is one of the nobleſt of this ſort in Britain. It is a vaſt ſemicircle of ſtones of very large dimenſions laid without mortar, connected only by their uniform ſhape. This magnificent arch is 16 feet in diameter, the ſtones are four feet thick at the bottom. It ſeems to have a joint in the middle, not a key-ſtone; and on both ſides, towards the upper part, are laid horizontal ſtones of great dimenſions, ſome 10 or 12 feet long. This arch riſes from an impoſt of large mouldings, which are not perceivable now; there are alſo divers fragments of the old Roman wall. Over againſt the caſtle is an entrenchment caſt up by king Stephen; and here are carved the arms of John of Gaunt, duke of Lancaſter, who lived here like a king, and had a mint. The city has a communication with the Trent, by a canal called the Foſsdyke. In the centre of the ruined old caſtle there is a handſome modern ſtructure for holding the aſſizes. Its walls are almoſt entire, and very ſubſtantial: the Keep, or principal tower, is ſituated on a high and very ſteep mount, which yet continues in its original ſtate; but the remains of the tower on it are only five or ſix yards high. The outer walls of the caſtle are of very conſiderable height, which appear ſtill higher than they really are, from their lofty ſituation, and the moat below them. The great gateway is ſtill entire. This city is a county of itſelf, and has a viſcountial juriſdiction for 20 miles round, which is a privilege that no other city in England can equal. It now conſiſts principally of one ſtreet above two miles long, well paved, beſides ſeveral croſs and parallel ſtreets well peopled. Here are ſome very handſome modern buildings, but more antique ones; upon the whole, it has an air of ancient greatneſs, ariſing in a great meaſure from the number of monaſtic remains, moſt of which are now converted into ſtables, out-houſes, &c. Upon the hill, in the caſtle, are the ruins of the biſhop's palace, and other ruins of ancient grandeur and magnificence. The city is ſupplied with water by ſeveral conduits, among which is a modern one, ſomewhat in the pyramidical ſtyle, enriched with ſculpture. It is governed by a mayor, twelve aldermen, two ſheriffs, a recorder, four chamberlains, a ſword-bearer, four coroners, and above forty common-council men. Here are four charity-ſchools, where 120 poor children are taught by the widows of clergymen. The neighbouring courſe is noted for its frequent horſe-races. On the down of Lincoln, towards Boſton, that rare fowl the buſtard is ſeen ſometimes, as well as on Saliſbury-Plain. Lincoln-Heath extends above 50 miles, viz. from Sleaford and Ancaſter ſouth to the Humber north, though it is but three or four miles over where broadeſt. Five miles from Boſton, on this extenſive heath, the late lord Le Deſpenſer built a few years ago a tower for the direction of ſtrangers. It is a lofty ſquare building with a ſtaircaſe, which terminates in a flat roof, and round the baſe is a ſquare court-yard. Great part of this extenſive heath is lately enclofed. The markets here are Tueſdays and Fridays; and there are four fairs in the year. We read that David king of Scots met king John here, on the 22d of November, in the third year of his reign, and performed homage to him on a hill without the city, for his Engliſh territories, in preſence of the archbiſhops of Canterbury, York, and Raguſa, thirteen biſhops, and a vaſt number of temporal lords and knights. King Henry VII. kept his court here at Eaſter in 1486. The Jews were once its chief inhabitants, till they were forced to remove, after having impiouſly crucified the child of one Grantham, and thrown it into a well, to this day called *Grantham's Well*. Lincoln has given the title of earl to the family of Clinton ever ſince the reign of queen Elizabeth. W. lon. 27. 1. N. lat. 53. 16.

LINCOLN-*Shire*, a maritime county of England, 77 miles in length and 48 in breadth, is bounded on the eaſt by the German ocean, on the weſt by Nottinghamſhire, on the north by Yorkſhire, on the ſouth by Rutlandſhire, Northamptonſhire, and Cambridgeſhire. It contains 4590 houſes, 24,340 inhabitants, 631 pariſhes, and 31 market towns, whereof five ſend members to parliament, which, with two for the county, make twelve in all. The principal rivers are the Humber, the Trent, the Witham, the Nenn, the Welland, the Ankham, and the Dun. It is divided into three parts, Lindſay, Keſteven, and Holland; the air of which laſt is unwholſome and foggy, on account of the fens and large marſhes. The ſoil of the north and weſt parts is very fertile, and abounds in corn and paſtures. The eaſt and ſouth parts are not ſo proper for corn: but then they ſupply them with fiſh and fowl in great plenty, particularly ducks and geeſe. Lincoln is the

principal town. By the late inland navigation, this county has communication with the rivers Merſey, Dee, Ribble, Ouſe, Darwent, Severn, Thames, Avon, &c. which navigation, including its windings, extends above 500 miles through diverſe counties.

LINDESFARN, or LANDISFARN. See HOLY-*Iſland*.

LINDSAY (Sir DAVID), a celebrated Scots poet, was deſcended of an ancient family, and born in the reign of king James IV. at his father's ſeat called the *Mount*, near Cupar in Fifeſhire. He was educated at the univerſity of St. Andrew's; and, after making the tour of Europe, returned to Scotland in the year 1514. Soon after his arrival, he was appointed gentleman of the bed-chamber to the king, and tutor to the young prince, afterwards James V. From the verſes prefixed to his dream, we learn that he enjoyed ſeveral other honourable employments at court: but, in 1533, he was deprived of all his places, except that of *Lion king at arms*, which he held to the time of his death. His diſgrace was moſt probably owing to his invectives againſt the clergy, which are frequent in all his writings. After the deceaſe of king James V. Sir David became a favourite of the earl of Arran, regent of Scotland; but the abbot of Paiſley did not ſuffer him to continue long in favour with the earl. He then retired to his paternal eſtate, and ſpent the remainder of his days in rural tranquillity. He died in 1553. His poetical talents, conſidering the age in which he wrote, were not contemptible; but he treats the Romiſh clergy with great ſeverity, and writes with ſome humour: but, whatever merit might be formerly attributed to him, he takes ſuch licentious liberties with words, ſtretching, or carving them for meaſure or rhyme, that the Scots have a proverb, when they hear an unuſual expreſſion, that, *There is nae ſic a word in a' Davie Lindſay*. Mackenzie tells us, that his comedies were ſo facetious, that they afforded abundance of mirth. Some fragments of theſe comedies are ſtill preſerved in manuſcript. He is ſaid to have alſo written ſeveral tragedies, and to have firſt introduced dramatic poetry into Scotland. One of his comedies was played in 1515. Mackenzie ſays, he underſtood nothing of the rules of the theatre. He was cotemporary with John Heywood, the firſt Engliſh dramatic poet. His poems are printed in one ſmall volume; and fragments of his plays, in manuſcript, are in Mr. William Carmichael's collection.

LINDSEY, the third and largeſt diviſion of the county of Lincolnſhire in England. On the eaſt and north it is waſhed by the ſea, into which it runs out with a large front; on the weſt it has Yorkſhire and Nottinghamſhire, from which it is parted by the rivers Trent and Dun; on the ſouth it has Keſteven, from which it is ſeparated by the river Witham and the Foſs-dyke, which is 7 miles long, and was cut by Henry I. between the Witham and the Trent, for the convenience of carriage in thoſe parts. It had its name from Lincoln, the capital of the county, which ſtands in it, and by the Romans called *Lindum*, by the Britons *Lindcoit*, by the Saxons *Lindocollyne*, probably from its ſituation on a hill, and the lakes or woods that were anciently thereabouts; but the Normans called it *Nichol*. It gives title of earl and marquis to the duke of Ancaſter.

LINDUS, (anc. geog.) a town of Rhodes, ſituated on a hill on the weſt ſide of the iſland. It was built by Tlepolemus the ſon of Hercules, according to Diodorus Siculus; by one of the Heliades, grandſons of the Sun, named *Lindus*, according to Strabo. It was the native place of Cleobulus, one of the wiſe men. Here we ſee the famous temple of Lindian Minerva, which was built by the daughters of Danaus. Cadmus enriched this temple with many ſplendid offerings. The citizens dedicated and hung up here the ſeventh of Pindar's Olympic odes, written in letters of gold. The ruins of that ſuperb edifice are ſtill to be ſeen on the top of an high hill which overlooks the ſea. Some remains of the walls, conſiſting of ſtones of an enormous ſize, ſtill ſhow it to have been built in the Egyptian ſtyle. The pillars and other ornaments have been carried off. On the moſt elevated peak of the rock are the ruins of a caſtle, which may have ſerved as a fortreſs to the city. Its circumference is very extenſive, and is filled with rubbiſh.

The modern city, *Lindo*, ſtands at the foot of the hill. A bay, of conſiderable wideneſs and depth, ſerves as a harbour to the city. Ships find good anchorage there in twenty fathoms water. They are ſafely ſheltered from the ſouth-weſt winds, which conſtantly prevail through the ſevereſt ſeaſon of the year. In the beginning of winter they caſt anchor off a ſmall village named Maſſary. Before the building of Rhodes, Lindus was the harbour which received the fleets of Egypt and Tyre. It was enriched by commerce. Mr. Savary obſerves, that a judicious government, by taking advantage of its harbour and happy ſituation, might yet reſtore it to a flouriſhing ſtate.

LINE, in geometry, a quantity extended in length only, without any breadth or thickneſs. It is formed by the flux or motion of a point. See FLUXIONS and GEOMETRY.

LINE, in the art of war, is underſtood of the diſpoſition of an army ranged in order of battle, with the front extended as far as may be, that it may not be flanked.

LINE *of Battle*, is alſo underſtood of a diſpoſition of the fleet in the day of engagement; on which occaſion the veſſels are uſually drawn up as much as poſſible in a ſtraight line, as well to gain and keep the advantage of the wind as to run the ſame board. See *Naval* TACTICS.

Horizontal LINE, in geography and aſtronomy, a line drawn parallel to the horizon of any part of the earth.

Equinoctial LINE, in geography, is a great circle on the earth's ſurface, exactly at the diſtance of 90° from each of the poles, and of conſequence biſecting the earth in that part. From this imaginary line the degrees of longitude and latitude are counted.—In aſtronomy, the equinoctial line is that circle which the ſun ſeems to deſcribe round the earth on the days of the equinox in March and September. See ASTRONOMY and GEOGRAPHY.

Meridian LINE, is an imaginary circle drawn through the two poles of the earth and any part of its ſurface. See GEOGRAPHY.

Ship of the LINE, a veſſel large enough to be drawn up in the line, and to have a place in a ſea-fight. No ſhips having leſs than 64 guns are reckoned ſhips of the line.

LINE, in genealogy, a ſeries or ſucceſſion of relations in various degrees, all deſcending from the ſame common father. See DESCENT.

LINE alſo denotes a French meaſure containing the 12th part of an inch, or the 144th part of a foot. Geometricians conceive the line ſubdivided into ſix points. The French line anſwers to the Engliſh barley-corn.

Fiſhing LINE. See FISHING *Line*.

LINES, in heraldry, the figures uſed in armories to divide the ſhield into different parts, and to compoſe different figures. Theſe lines, according to their different forms and names, give denomination to the pieces or figures which they form, except the ſtraight or plain lines. See HERALDRY.

LINEA ALBA, in anatomy, the concourſe of the tendons of the oblique and tranſverſe muſcles of the abdomen; dividing the abdomen in two, in the middle. It is called *linea*, line, as being ſtraight; and *alba*, from its colour, which is white.—The *linea alba* receives a twig of a nerve from the intercoſtals in each of its digitations or indentings, which are viſible to the eye, in lean perſons eſpecially.

LINEAR NUMBERS, in mathematics, ſuch as have relation to length only; ſuch is a number which repreſents one ſide of a plain figure. If the plain figure be a ſquare, the linear figure is called a *root*.

LINEAR *Problem*; that which may be ſolved geometrically by the interſection of two right lines. This is called a *ſimple problem*, and is capable but of one ſolution.

LINEN, in commerce, a well-known kind of cloth chiefly made of flax.—Linen was not worn by the Jews, Greeks, or Romans, as any part of their ordinary dreſs. Under tunies of a finer texture ſupplied the place of ſhirts: Hence the occaſion for frequent bathing. Alexander Severus was the firſt emperor who wore a ſhirt: but the uſe of ſo neceſſary a garment did not become common till long after him.

The linen manufacture was probably introduced into Britain with the firſt ſettlements of the Romans. The flax was certainly firſt planted by that nation in the Britiſh ſoil. The plant itſelf indeed appears to have been originally a native of the eaſt. The woollen drapery would naturally be prior in its origin to the linen; and the fibrous plants from which the threads of the latter are produced, ſeems to have been firſt noticed and worked by the inhabitants of Egypt. In Egypt, indeed, the linen manufacture appears to have been very early: for even in Joſeph's time it had riſen to a conſiderable height. From the Egyptians the knowledge of it proceeded probably to the Greeks, and from them to the Romans. Even at this day the flax is imported among us from the eaſtern nations; the weſtern kind being merely a degenerate ſpecies of it.

The principal and almoſt only linen manufacture in the Britiſh dominions is in Ireland, whence prodigious quantities of linens are exported. It is of great importance, however, in order to ſucceed in the linen manufacture, that one ſet of people ſhould be confined to the ploughing and preparing the ſoil, ſowing and covering the ſeed, to the weeding, pulling, rippling, and taking care of the new ſeed, and watering and dreſſing the flax till it is lodged at home: others ſhould be employed in the drying, breaking, ſcutching, and heckling the flax, to fit it for the ſpinners; and others in ſpinning and reeling it, to fit it for the weaver: others ſhould be concerned in taking due care of the weaving, bleaching, beetling, and finiſhing the cloth for the market. It is reaſonable to believe, that if theſe ſeveral branches of the manufacture were carried on by diſtinct dealers in thoſe places, where our home-made linens are manufactured, the ſeveral parts would be better executed, and the whole would be afforded cheaper, and with greater profit to the manufacturer.

Staining of LINEN. Linen receives a black colour with much more difficulty than woollen or cotton. The black ſtruck on linen with common vitriol and galls, or logwood, is very periſhable, and ſoon waſhes out.—Inſtead of the vitriol, a ſolution of iron in ſour ſtrong beer or vinegar is to be made uſe of. This is well known to all the calico-printers; and by the uſe of this, which they call their *iron liquor*, and madder-root, are the blacks and purples made which we ſee on the common printed linens. The method of making this iron-liquor is as follows: A quantity of iron is put into the ſour ſtrong beer or vinegar; and, to promote a ſolution of the metal, the whole is occaſionally well ſtirred, the liquor occaſionally drawn off, and the ruſt beat from the iron, after which the liquor is poured on again. A length of time is required to make the impregnation perfect; the ſolution being reckoned unfit for uſe till it has ſtood at leaſt a twelvemonth. This ſolution ſtains the linen of a yellow, and different ſhades of buff-colour; and is the only known ſubſtance by which theſe colours can be fixed on linen. The cloth ſtained deep with the iron liquor, and afterwards boiled with madder, without any other addition, becomes of the dark colour which we ſee on printed linens and cottons; which, if not a perfect black, has a very near reſemblance to it. Others are ſtained paler with the ſame liquor diluted with water, and come out purple.

Linen may alſo be ſtained of a durable purple by means of ſolution of gold in aqua regia. The ſolution for this purpoſe ſhould be as fully ſaturated as poſſible; it ſhould be diluted with three times its quantity of water; and if the colour is required deep, the piece, when dry, muſt be repeatedly moiſtened with it. The colour does not take place till a conſiderable time, ſometimes ſeveral days, after the liquor has been applied: to haſten its appearance, the ſubject ſhould be expoſed to the ſun and free air, and occaſionally removed to a moiſt place, or moiſtened with water.—When ſolution of gold in aqua regia is ſoaked up in linen cloths, the metal may be recovered by drying and burning them.

The anacardium nut, which comes from the Eaſt-Indies, is remarkable for its property of ſtaining linen of a deep black colour, which cannot be waſhed out either with ſoap or alkaline ley. The ſtain is at firſt of a reddiſh-brown, but afterwards turns to a deep black on expoſure to the air. The caſhew-nut, called the *anacardium of the Weſt-Indies*, differs from the oriental anacardium in its colouring quality. The juice of this nut is much paler than the other, and ſtains linen or cotton only of a browniſh colour; which indeed is very durable, but does not at all change towards blackneſs. There are, however, trees, natives of our own colonies, which appear to contain juices of the ſame nature with thoſe of India. Of this kind are ſeveral, and perhaps the greater number, of the ſpecies of the toxicodendron or poiſon-tree, (ſee RHUS.) Mr. Cateſby, in his hiſtory of Carolina, deſcribes one called there the *poiſon-aſh*, from whoſe trunk flowed a liquid as black as ink, and ſuppoſed to be poiſonous; which reputed poiſonous quality has hitherto prevented the inhabitants from collecting or attempting to make any uſe of it. In the Philoſophical Tranſactions for the year 1755, the abbé Mazeas gives an account of three ſorts of the toxicodendron raiſed in a botanic garden in France, containing in their leaves a milky juice, which in drying became quite black, and communicated the ſame colour to the linen on which it was dropped. The linen thus ſtained was boiled with ſoap, and came out without the leaſt diminution of colour; nor did a ſtrong ley of wood-aſhes make any change in it. Several of theſe trees have been planted in the open ground in England, and ſome ſtill remain in the biſhop of London's garden at Fulham.

That ſpecies called by Mr. Miller the *true lac tree*, was found by Dr. Lewis to have properties of a ſimilar kind. It contains in its bark, and the pedicles and ribs of the leaves, a juice ſomewhat milky, which ſoon changed in the air to a reddiſh-brown, and in two or three hours to a deep blackiſh or browniſh-black colour: wherever the bark was cut or wounded, the inciſion became blackiſh: and on ſeveral parts of the leaves the juice had ſpontaneouſly exuded, and ſtained them of the ſame colour. This juice dropped on linen gave at firſt little or no colour, looking only like a ſpot of oil; but, by degrees, the part moiſtened with it darkened in the ſame manner as the juice itſelf. On waſhing and boiling the linen with ſoap, the ſtain not only was not diſcharged, but ſeemed to have its blackneſs rather improved; as if a brown matter, with which the black was manifeſtly debaſed, had been in part waſhed out, and left the black more pure.

As the milky juice of ſome of our common plants turn dark-coloured or blackiſh in drying, the Doctor was induced to try the effects of ſeveral of them on linen. The milks of wild-poppies, garden-poppies, dandelion, hawk-weed, and ſow-thiſtle, gave brown or browniſh-red ſtains, which were diſcharged by waſhing with ſoap; the milks of the fig-tree, of lettuces, and of different kinds of ſpurges, gave no colour at all. The

colourleſs juice which iſſues from hop-ſtalks when cut, ſtains linen of a pale-reddiſh, or browniſh-red, extremely durable; the colour was deepened by repeated applications of the juice, but it never made any approach to blackneſs. The juice of ſloes gave likewiſe a pale-browniſh ſtain, which by repeated waſhings with ſoap, and being wetted with ſtrong ſolution of alkaline ſalt, was darkened to a deeper brown: on baking the ſloes, their juice turns red; and the red ſtain which it then imparts to linen is, on waſhing with ſoap, changed to a pale-blueiſh, which alſo proves durable. Theſe colours could not be deepened by repeated applications of the juice. The ſloes were tried in different ſtates of maturity, from the beginning of September to the middle of December, and the event was always nearly the ſame.

In the fifth volume of Linnæus's *Amœnitates Academicæ*, mention is made of a black colour obtained from two plants which grow ſpontaneouſly in Britain; the one is the *actæa ſpicata*, herb-chriſtopher, or bane-berries; the other the *erica baccifera nigra*, black-berried heath, crow-berries, or crake-berries. The juice of the bane-berries, boiled with alum, is ſaid to yield a black ink; and the heath-berries, boiled alſo with alum, to dye linen of a purpliſh black.

Foſſile LINEN, is a kind of amianthus, which conſiſts of flexible, parallel, ſoft fibres, and which has been celebrated for the uſes to which it has been applied, of being woven, and forming an *incombuſtible cloth*. Paper alſo, and wicks for lamps, have been made of it. See AMIANTHUS and ASBESTOS.

LING, in zoology. See GADUS.

LINGEN, a ſtrong town of Germany, in the circle of Weſtphalia, and capital of a county of the ſame name. It belongs to the king of Pruſſia; and is ſituated on the river Embs, in E. lon. 7 30. N. lat. 52. 32.

LINGELBACH (JOHN), an excellent painter, born at Franckfort on the Maine in 1625. He firſt learned the art in Holland, but perfected himſelf at Rome; where he ſtudied till he was 25 years of age, when he ſettled at Amſterdam. His uſual ſubjects are fairs, mountebanks, ſea-pieces, and land-ſcapes, which he compoſed and executed exceeding well: his landſcapes are enriched with antiquities, animals, and elegant figures; his ſea-fights are full of expreſſion, exciting pity and terror, and all his objects are well deſigned. He had an uncommon readineſs in painting figures and animals, on which account he was employed by ſeveral eminent artiſts to adorn their landſcapes with ſuch objects; and whatever he inſerted in the works of other maſters, were always well adapted, and produced an agreeable effect. He died in 1687.

LINIMENT, in pharmacy, a compoſition of a conſiſtence ſomewhat thinner than an unguent, and thicker than an oil uſed for anointing different parts of the body in various intentions.—The materials proper for compoſing liniments are, oils, balſams, ſoap, &c.

LINLITHGOW, a borough, the county-town of Linlithgowſhire. It has a fine lake on the north ſide, abounding with fiſh. Here the kings of Scotland had one of their nobleſt palaces, now in ruins; but here is ſtill ſhown the room in which Mary queen of Scots was born. Linlithgow is 16 miles W. of Edinburgh. W. lon. 3. 34. N. lat. 56. 0.

LINLITHGOWSHIRE, or WEST LOTHIAN, a county of Scotland, bounded on the N. by the frith of Forth, on the E. by Edinburghſhire, on the S. W. by Lanerkſhire, and on the W. by Stirlingſhire. It extends near 20 miles from N. E. to S. W. and its breadth does not exceed 12, except on the ſhore of the Forth

LINNÆUS (Sir CHARLES), a celebrated botaniſt and natural hiſtorian, was born on May 24, 1707, in a village called *Roeſhult* in Smaland, where his father, Nicolas Linnæus, was then vicar, but afterwards preferred to the curacy of Stenbrohult. We are told, that on the farm where Linnæus was born, there yet ſtands a large lime-tree, from which his anceſtors took the furnames of *Tiliander*, *Lindelius*, and *Linnæus*; and that this origin of ſurnames, taken from natural objects, is not uncommon in Sweden.

This eminent man, whoſe talents enabled him to reform the whole ſcience of natural hiſtory, accumulated, very early in life, ſome of the higheſt honours that await the moſt ſucceſsful proficients in medical ſcience; ſince we find that he was made profeſſor of phyſic and botany, in the univerſity of Upſal, at the age of 34; and ſix years afterwards, phyſician to his ſovereign the late king Adolphus; who in the year 1753 honoured him ſtill farther, by creating him knight of the order of the Polar Star. His honours did not terminate here: for in 1757 he was ennobled; and in 1776 the late king of Sweden accepted the reſignation of his office, and rewarded his declining years by doubling his penſion, and by a liberal donation of landed property ſettled on him and his family.

Dr. Pultney, in his "General View of the Life and Writings of Linnæus," ſays, it is probable that Linnæus's taſte for the ſtudy of nature was caught from the example of his father; who, as he has himſelf informed us, cultivated, as his firſt amuſement, a garden plentifully ſtored with plants. Young Linnæus ſoon became acquainted with theſe, as well as with the indigenous ones of his neighbourhood. Yet, from the ſtraitneſs of his father's income, our young naturaliſt was on the point of being deſtined to a mechanical employment: fortunately, however, this deſign was over-ruled. In 1717 he was ſent to ſchool at Wexſio; where, as his opportunities were enlarged, his progreſs in all his favourite purſuits was proportionably extended. At this early period he paid attention to other branches of natural hiſtory, particularly to the knowledge of inſects.

The firſt part of his academical education Linnæus received under profeſſor Stobæus, at Lund, in Scania, who favoured his inclinations to the ſtudy of natural hiſtory. After a reſidence of about a year, he removed in 1728 to Upſal. Here he ſoon contracted a cloſe friendſhip with Artedi, a native of the province of Angermania, who had already been four years a ſtudent in that univerſity, and, like himſelf, had a ſtrong bent to the ſtudy of natural hiſtory in general, but particularly to ichthyology. Soon after his reſidence at Upſal, our author was alſo happy enough to obtain the favour of ſeveral gentlemen of eſtabliſhed character in literature. He was in a particular manner encouraged in the purſuit of his ſtudies by the patronage of Dr. Olaus Celſius, at that time profeſſor of divinity, and the reſtorer of natural hiſtory in Sweden; who, being ſtruck with the diligence of Linnæus in deſcribing the plants of the Upſal garden, and his extenſive knowledge of their names, not only patronized him in a general way, but admitted him to his houſe, his table, and his library. Under ſuch encouragement it is not ſtrange that our author made a rapid progreſs both in his ſtudies and the eſteem of the profeſſors: in fact, we have a very ſtriking proof of his merit and attainments, inaſmuch as we find, that, after only two years reſidence, he was thought ſufficiently qualified to give lectures occaſionally from the botanic chair, in the room of profeſſor Rudbeck.

In the year 1731 the royal academy of ſciences at Upſal having for ſome time meditated the deſign of improving the natural hiſtory of Sweden, at the inſtance particularly of profeſſors Celſius and Rudbeck, deputed Linnæus to make the tour of Lapland, with the ſole view of exploring the natural hiſtory of that arctic region; to which undertaking, his reputation, already high as a naturaliſt, and the ſtrength of his conſtitution, equally recommended him. He left Upſal on

13th of May, and took his route to Gevalia or Gevels, the principal town of Geſtricia, 45 miles diſtant from Upſal. Hence he travelled through Helſingland into Medalpadia, where he made an excurſion, and aſcended a remarkable mountain, before he reached Hudwickſwald, the chief town of Helſingland. From hence he went through Angermanland to Hernoſand, a ſea-port on the Bothnic gulf, 70 miles diſtant from Hudwickſwald. When he had proceeded thus far, he found it proper to retard his journey, as the ſpring was not ſufficiently advanced; and took this opportunity of viſiting thoſe remarkable caverns on the ſummit of mount Skula, though at the hazard of his life.

When Linnæus arrived at Uma, in Weſt Bothnia, about 96 miles from Hernoſand, he quitted the public road, and took his courſe through the woods weſtward, in order firſt to traverſe the moſt ſouthern parts of Lapland. Being now come to the country that was more particularly the object of his inquiries, equally a ſtranger to the language and to the manners of the people, and without any aſſociate, he committed himſelf to the hoſpitality of the inhabitants, and never failed to experience it fully. He ſpeaks in ſeveral places, with peculiar ſatisfaction, of the innocence and ſimplicity of their lives and their freedom from diſeaſes. In this excurſion he reached the mountains towards Norway; and, after encountering great hardſhips, returned into Weſt Bothnia, quite exhauſted with fatigue. Our traveller next viſited Pitha and Lula, upon the gulf of Bothnia; from which latter place he took again a weſtern route, by proceeding up the river of that name, and viſited the ruins of the temple of Jockmock in Lula Lapland or Lap Mark: thence he traverſed what is called the *Lapland Deſert*, deſtitute of all villages, cultivation, roads, or any conveniences; inhabited only by a few ſtraggling people, originally deſcended from the Finlanders, and who ſettled in this country in remote ages, being entirely a diſtinct people from the Laplanders. In this diſtrict he aſcended a noted mountain called *Wallevari*; in ſpeaking of which he has given us a pleaſant relation of his finding a ſingular and beautiful new plant *(Andromeda tetragona)* when travelling within the arctic circle, with the ſun in his view at midnight, in ſearch of a Lapland hut. From hence he croſſed the Lapland Alps into Finmark, and traverſed the ſhores of the north ſea as far as Sallero.

Theſe journeys from Lula and Pitha on the Bothnian gulf, to the north ſhore, were made on foot; and our traveller was attended by two Laplanders, one his interpreter, and the other his guide. He tells us, that the vigour and ſtrength of thoſe two men, both old, and ſufficiently loaded with his baggage, excited his admiration, ſince they appeared quite unhurt by their labour; while he himſelf, although young and robuſt, was frequently quite exhauſted. In this journey he was wont to ſleep under the boat with which they forded the rivers, as a defence againſt rain, and the gnats, which in the Lapland ſummer are not leſs teazing than in the torrid zones. In deſcending one of theſe rivers, he narrowly eſcaped periſhing by the overſetting of the boat, and loſt many of the natural productions which he had collected.

Linnæus thus ſpent the greater part of the ſummer in examining this arctic region, and thoſe mountains on which, four years afterwards, the French philoſophers ſecured immortal fame to Sir Iſaac Newton. At length, after having ſuffered incredible fatigues and hardſhips in climbing precipices, paſſing rivers in miſerable boats, ſuffering repeated viciſſitudes of extreme heat and cold, and not unfrequently hunger and thirſt, he returned to Tornoa in September. He did not take the ſame route from Tornoa as when he came into Lapland, having determined to viſit and examine the country on the eaſtern ſide of the Bothnian gulf: his firſt ſtage, therefore, was to Ula in Eaſt Bothnia; from thence to Old and New Carleby, 84 miles ſouth from Ula. He continued his route through Waſa, Chriſtianſtadt, and Biorneburgh, to Abo, a ſmall univerſity in Finland. Winter was now ſetting in apace; he therefore croſſed the gulf by the iſland of Aland, and arrived at Upſal in November, after having performed, and that moſtly on foot, a journey of ten degrees of latitude in extent, excluſively of thoſe deviations which ſuch a deſign rendered neceſſary.

In 1733 he viſited and examined the ſeveral mines in Sweden; and made himſelf ſo well acquainted with mineralogy and the docimaſtic art, that we find he was ſufficiently qualified to give lectures on thoſe ſubjects upon his return to the univerſity. The outlines of his ſyſtem on mineralogy appeared in the early editions of the *Syſtema Naturæ*; but he did not exemplify the whole until the year 1768.

In the year 1734 Linnæus was ſent by baron Reuterholm governor of Dalecarlia, with ſeveral other naturaliſts in that province, to inveſtigate the natural productions of that part of the Swediſh dominions; and it was in this journey that our author firſt laid the plan of an excellent inſtitution, which was afterwards executed, in a certain degree at leaſt, by himſelf, with the aſſiſtance of many of his pupils, and the reſult publiſhed under the title of *Pan Suecus*, in the ſecond volume of the *Amœnitates Academicæ*.

After the completion of this expedition, it appears that Linnæus reſided for a time at Fahlun, the principal town in Dalecarlia; where he tells us that he taught mineralogy and the docimaſtic art, and practiſed phyſic; and where he was very hoſpitably treated by Dr. More, the phyſician of the place. It alſo appears, that he contracted at this time an intimacy with one of that gentleman's daughters, whom he married about five years afterwards upon his ſettling as a phyſician at Stockholm. In this journey he extended his travels quite acroſs the Dalecarlian Alps into Norway; but we have no particular account of his diſcoveries in that kingdom. In 1735 Linnæus travelled over many other parts of Sweden, ſome parts of Denmark and Germany, and fixed in Holland, where he chiefly reſided until his return to Stockholm, about the year 1739. In 1735, the year in which he took the degree of M. D. he publiſhed the firſt ſketch of his *Syſtema Naturæ*, in a very compendious way, and in the form of tables only, in 12 pages in folio. By this it appears, that he had at a very early period of his life (certainly before he was 24 years old) laid the baſis of that great ſtructure which he afterwards raiſed, not only to the increaſe of his own fame, but to that of natural ſcience.

In 1736, Linnæus came into England, and viſited Dr. Dillenius, the late learned profeſſor at Oxford, whom he juſtly conſidered as one of the firſt botaniſts in Europe. He mentions with particular reſpect the civilities he received from him, and the privileges he gave him of inſpecting his own and the Sherardian collections of plants. It is needleſs to ſay, that he viſited Dr. Martyn, Mr. Rand, and Mr. Miller, and that he was in a more ſingular manner indebted to the friendſhip of Dr. Iſaac Lawſon. He alſo contracted an intimate friendſhip with Mr. Peter Collinſon, which was reciprocally increaſed by a multitude of good offices, and continued to the laſt without any diminution. Dr. Boerhaave had furniſhed him with letters to our great naturaliſt Sir Hans Sloane; but, it is with regret that we muſt obſerve, they did not procure him the reception which the warmth of his recommendation ſeemed to claim.

One of the moſt agreeable circumſtances that happened to Linnæus during his reſidence in Holland, aroſe from the patronage of Mr. Clifford, in whoſe houſe he lived a conſiderable part of his time, being now as it were the child of fortune:—

Exivi patriâ triginta ſex nummis aureis dives—are his own words. With Mr. Clifford, however, he enjoyed pleaſures and privileges ſcarcely at that time to be met with elſewhere in the world; that of a garden excellently ſtored with the fineſt exotics, and a library furniſhed with almoſt every botanic author of note. How happy he found himſelf in this ſituation, thoſe only who have felt the ſame kind of ardour can conceive. Whilſt in Holland, our author was recommended by Boerhaave to fill the place, then vacant, of phyſician to the Dutch ſettlement at Surinam; but he declined it on account of his having been educated in ſo oppoſite a climate.

Beſides being favoured with the particular patronage and friendſhip of Boerhaave and Mr. Clifford, as is above mentioned, our author had alſo the pleaſure of being contemporary with, and of reckoning among the number of his friends, many other learned perſons who have ſince proved ornaments to their profeſſion, and whoſe merit has moſt deſervedly raiſed them to fame and honour. Among theſe we may properly mention Dr. John Burman, profeſſor of botany at Amſterdam, whoſe name and family are well known in the republic of letters, and to whom our author dedicated his *Bibliotheca Botanica*, having been greatly aſſiſted in compiling that work by the free acceſs he had to that gentleman's excellent library; John Frederick Gronovius of Leyden, editor of Clayton's *Flora Virginica*, and who very early adopted Linnæus's ſyſtem; Baron Van Swieten, late phyſician to the Empreſs Queen; Iſaac Lawſon, before mentioned, afterwards one of the phyſicians to the Britiſh army, who died much regretted at Ooſterhout in the year 1747, and from whom Linnæus received ſingular and very important civilities; Kramer, ſince well known for an excellent treatiſe on the docimaſtic art; Van Royen, botanic profeſſor at Leyden; Lieberkun of Berlin, famous for his ſkill in microſcopical inſtruments and experiments. To theſe may be added alſo the names of Albinus and Gaubius, and of others, were it requiſite to ſhow that our author's talents had very early rendered him conſpicuous, and gained him the regard of all thoſe who cultivated and patroniſed any branch of medical ſcience, and to which, doubtleſs, the ſingular notice with which Boerhaave honoured him did not a little contribute.

Early in the year 1738, after Linnæus had left Mr. Clifford, and, as it ſhould ſeem, when he reſided with Van Royen, he had a long and dangerous fit of ſickneſs; and upon his recovery went to Paris, where he was properly entertained by the Juſſieus, at that time the firſt botaniſts in France. The opportunity this gave him of inſpecting the Herbaria of Surian and Tourneſort, and thoſe of the above-named gentlemen, afforded him great ſatisfaction. He had intended to have gone from thence into Germany, to viſit Ludwig and the celebrated Haller, with whom he was in cloſe correſpondence; but he was not able to complete this part of his intended route, and was obliged to return without this gratification.

Our author did not fail to avail himſelf of every advantage that acceſs to the ſeveral muſeums of this country afforded him, in every branch of natural hiſtory; and the number and importance of his publications, during his abſence from his native country, ſufficiently demonſtrate that ſtund of knowledge which he muſt have imbibed before, and no leſs teſtify his extraordinary application. Theſe were, *Syſtema Naturæ*, *Fundamenta Botanica*, *Bibliotheca Botanica*, and *Genera Plantarum*, the laſt of which is juſtly conſidered as the moſt valuable of all the works of this celebrated author What immenſe application had been beſtowed upon it, the reader may eaſily conceive, on being informed, that before the publication of the firſt edition the author had examined the characters of 8000 flowers. The laſt book of Linnæus's compoſition, publiſhed during his ſtay in Holland, was the *Claſſes Plantarum*, which is a copious illuſtration of the ſecond part of the *Fundamenta*.

About the latter end of the year 1738, or the beginning of the next, our author ſettled as a phyſician at Stockholm; where he ſeems to have met with conſiderable oppoſition, and was oppreſſed with many difficulties; but all of theſe at length he overcame, and got into extenſive practice; and ſoon after his ſettlement, married the lady before ſpoken of. By the intereſt of Count Teſſin, who was afterwards his great patron, and even procured medals to be ſtruck in honour of him, he obtained the rank of phyſician to the fleet, and a ſtipend from the citizens for giving lectures in botany. And what at this time eſpecially was highly favourable to the advancement of his character and fame, by giving him an opportunity of diſplaying his abilities, was the eſtabliſhment of the Royal Academy of Sciences at Stockholm; of which Linnæus was conſtituted the firſt preſident, and to which eſtabliſhment the king granted ſeveral privileges, particularly that of free poſtage to all papers directed to the ſecretary. By the rules of the academy, the preſident held his place but three months. At the expiration of that term, Linnæus made his *Oratio de memorabilibus in Inſectis*, Oct. 3, 1739; in which he endeavours to excite an attention and inquiry into the knowledge of inſects, by diſplaying the many ſingular phenomena that occur in contemplating the nature of thoſe animals, and by pointing out, in a variety of inſtances, their uſefulneſs to mankind in particular, and to the economy of nature in general.

During all this time, however, Linnæus appears to have had his eye upon the botanic and medical chair at Upſal, at this time occupied by Rudbeck, who was far advanced in life. We learn indeed that he was ſo intent on purſuing and perfecting his great deſigns in the advancement of his favourite ſtudy of nature, that he had determined, if he failed in procuring the profeſſorſhip at Upſal, to accept the offer that had been made to him by Haller of filling the botanic chair at Gottingen. However, in courſe of time, he obtained his wiſh. In the year 1741, upon the reſignation of Roberg, he was conſtituted joint profeſſor of phyſic and phyſician to the king with Roſen, who had been appointed in the preceding year on the death of Rudbeck. Theſe two colleagues agreed to divide the medical departments between them; and their choice was confirmed by the univerſity. Roſen took anatomy, phyſiology, pathology, and the therapeutic part; Linnæus, natural hiſtory, botany, materia medica, the dietetic part, and the diagnoſis morborum.

During the interval of his removal from Stockholm to Upſal in conſequence of this appointment, our profeſſor was deputed by the ſtates of the kingdom to make a tour to the iſlands of Oeland and Gothland in the Baltic, attended by ſix of the pupils, commiſſioned to make ſuch inquiries as might tend to improve agriculture and arts in the kingdom, to which the Swediſh nation had for ſome time paid a particular attention. The reſult of this journey was very ſucceſsful, and proved fully ſatisfactory to the ſtates, and was afterwards communicated to the public. On his return he entered upon the profeſſorſhip, and pronounced before the univerſity his oration *De peregrinationum intra patriam neceſſitate*, October 17, 1741; in which he forcibly diſplays the uſefulneſs of ſuch excurſions, by pointing out to the ſtudents that vaſt field of objects which their country held out to their cultivation, whether in geography, phyſics, mineralogy, botany, zoology, or economics, and by ſhowing the benefit that muſt accrue to themſelves and their country as rewards to their diligence. That animated ſpirit which runs through the whole of this compoſition, renders it one of the moſt pleaſing and inſtructive of all our author's productions.

Linnæus was now fixed in the ſituation that was the beſt adapted to his character, his taſte, and abilities; and which ſeems to have been the object of his ambition and centre of his hopes. Soon after his eſtabliſhment, he laboured to get the academical garden, which had been founded in 1657, put on a better footing, and very ſoon effected it; procuring alſo a houſe to be built for the reſidence of the profeſſor. The whole had been in ruin ever ſince the fire in 1702; and at the time Linnæus was appointed profeſſor of botany, the garden did not contain above fifty plants that were exotic. His correſpondence with the firſt botaniſts in Europe ſoon ſupplied him with great variety. He received Indian plants from Juſſieu of Paris, and from Van Royen of Leyden; European plants from Haller and Ludwig; American plants from the late Mr. Collinſon, Mr. Cateſby, and others; and variety of annuals from Dillenius: in ſhort, how much the garden owed to his diligence and care in a few years, may be ſeen by the catalogue publiſhed under the title of *Hortus Upſalienſis, exhibens plantas exoticas horto Upſalienſis Academiæ a ſeſe (Linnæo) illatas ab anno* 1742, *in annum* 1748, *additis, differentiis ſynonymis, habitationibus, hoſpitiis, rariorumque deſcriptionibus, ingratiam ſtudioſæ juventutis*; Holm. 1748, 8vo, p. 306. tab. 3. By this catalogue it appears, that the profeſſor had introduced 1100 ſpecies, excluſively of all the Swediſh plants and of varieties; which latter, in ordinary gardens, amount not unfrequently to one-third of the whole number. The preface contains a curious hiſtory of the climate at Upſal, and the progreſs of the ſeaſons throughout the whole year.

From the time that Linnæus and Roſen were appointed profeſſors at Upſal, it ſhould ſeem that the credit of that univerſity, as a ſchool of phyſic, had been increaſing: numbers of ſtudents reſorted thither from Germany, attracted by the character of theſe two able men; and in Sweden itſelf many young men were invited to the ſtudy of phyſic by the excellent manner in which it was taught, who otherwiſe would have engaged in different purſuits.

Whilſt Linnæus was meditating one of his capital performances, which had long been expected and greatly wiſhed for, he was interrupted by a tedious and painful fit of the gout, which left him in a very weak and diſpirited ſtate; and, according to the intelligence that his friends gave of him, nothing was thought to have contributed more to the reſtoration of his ſpirits than the ſeaſonable acquiſition, at this juncture, of a collection of rare and undeſcribed plants.

The fame which our author had now acquired by his *Syſtema Naturæ*, of which a ſixth edition, much enlarged, had been publiſhed at Stockholm in 1748 in 8vo, p. 232, with eight tables explanatory of the claſſes and orders (and which was alſo republiſhed by Gronovius at Leyden), had brought, as it were, a conflux of every thing rare and valuable in every branch of nature, from all parts of the globe, into Sweden. The king and queen of Sweden had their ſeparate collections of rarities; the former at Ulrickſdahl; the latter, very rich in exotic inſects and ſhells, procured at a great expence, at the palace of Drottningholm; both of which our author was employed in arranging and deſcribing. Beſides theſe, the muſeum of the royal academy of Upſal had been augmented by a conſiderable donation from the king, whilſt hereditary prince, in 1746: by another from Count Gyllenborg the year before; by a third from M. Grill, an opulent citizen of Stockholm.

From this time we ſee the profeſſor in a more elevated rank and ſituation in life. His reputation had already procured him honours from almoſt all the royal ſocieties in Europe: and his own ſovereign, truly ſenſible of his merit, and greatly eſteeming his character and abilities, favoured him with a mark of his diſtinction and regard, by creating him a knight of the polar ſtar. It was no longer *laudatur et alget.* His emoluments kept pace with his fame and honours: his practice in his profeſſion became lucrative; and we find him ſoon after poſſeſſed of his country-houſe and gardens at Hammarby, about five miles from Upſal. He had moreover received one of the moſt flattering teſtimonies of the extent and magnitude of his fame that perhaps was ever ſhown to any literary character, the ſtate of the nation which conferred it, with all its circumſtances, duly conſidered. This was an invitation to Madrid from the king of Spain, there to preſide as a naturaliſt, with the offer of an annual penſion for life of 2000 piſtoles, letters of nobility, and the perfect free exerciſe of his own religion: But, after the moſt perfect acknowledgments of the ſingular honour done him, he returned for anſwer, 'that if he had any merits, they were due to his own country.'

In the year 1755, the Royal Academy of Sciences at Stockholm honoured our profeſſor with one of the firſt premiums, agreeably to the will of Count Sparree; who had decreed two gold medals, of ten ducats value each, to be annually given by the academy to the authors of ſuch papers, in the preceding year's Stockholm Acts, as ſhould be adjudged moſt uſeful in promoting agriculture particularly, and all branches of rural economy. This medal bore on one ſide the arms of the count, with this motto, *Superſtes in ſcientiis amor Frederici Sparre.* Linnæus obtained it in conſequence of a paper *De plantis quæ Alpium Succicarum indigenæ, magno rei œconomicæ et medicæ emolumento fieri poſſint*; and the ultimate intention was to recommend theſe plants, as adapted to culture in Lapland. This paper was inſerted in the Stockholm Acts for 1754, Vol. XV. Linnæus alſo obtained the *præmium centum aureorum*, propoſed by the Imperial academy of Sciences at Peterſburgh, for the beſt paper written to eſtabliſh or diſprove, by new arguments, the doctrine of the ſexes of plants. It was, if poſſible, an additional glory to Linnæus to have merited this premium from the Peterſburgh academy; inaſmuch as a profeſſor of that ſociety, a few years before, had with more than common zeal, although with a futility like that of the other antagoniſts of our author, endeavoured to overturn the whole Linnæan ſyſtem of botany, by attempting to ſhow that the doctrine of the ſexes of plants had no foundation in nature, and was unſupported by facts and experiments.

It appears that Linnæus, upon the whole, enjoyed a good conſtitution; but that he was ſometimes ſeverely afflicted with a *hemicrania*, and was not exempted from the gout. About the cloſe of 1776, he was ſeized with an apoplexy, which left him paralytic; and at the beginning of the year 1777, he ſuffered another ſtroke, which very much impaired his mental powers. But the diſeaſe ſuppoſed to have been the more immediate cauſe of his death, was an ulceration of the urinary bladder; of which, after a tedious indiſpoſition, he died, January 11, 1778, in the 71ſt year of his age—His principal other works, beſide thoſe already mentioned, are, The *Iter Oëlandicum et Gotlandicum*, *Iter Scanicum*, *Flora Succica*, *Fauna Succica*, *Materia Medica*, *Philoſophia Botanica*, *Genera Morborum*, different papers in the *Acta Upſalienſia*, and the *Amœnitates Academicæ*. The laſt of this great man's treatiſes was the *Mantiſſa Altera*, publiſhed in 1771: but before his death he had finiſhed the greateſt part of the *Mantiſſa Tertia*, afterwards completed and publiſhed by his ſon.

To the lovers of ſcience it will not appear ſtrange, nor will it be unpleaſant to hear, that uncommon reſpect was ſhown to the memory of this great man. We are told, that "on his death a general mourning took place at Upſal, and that his funeral proceſſion was attended by the whole univerſity, as well profeſſors as ſtudents, and the pall ſupported by ſixteen doctors

of phyſic, all of whom had been his pupils." The king of Sweden, after the death of Linnæus, ordered a medal to be ſtruck, of which one ſide exhibits Linnæus's buſt and name, and the other Cybele, in a dejected attitude, holding in her left hand a key, and ſurrounded with animals and growing plants; with this legend, *Deam luctus angit amiſſi*; and beneath, *Poſt obitum Upſaliæ, die* x. *Jan.* M.DCC.LXXVIII. *Rege jubente*.—The ſame generous monarch not only honoured the Royal Academy of Sciences with his preſence when Linnæus's commemoration was held at Stockholm, but, as a ſtill higher tribute, in his ſpeech from the throne to the aſſembly of the ſtates, he lamented Sweden's loſs by his death. Nor was Linnæus honoured only in his own country. The late worthy profeſſor of botany at Edinburgh, Dr. Hope, not only pronounced an eulogium in honour of him before his ſtudents at the opening of his lectures in the ſpring 1778, but alſo laid the foundation-ſtone of a monument (which he afterwards erected) to his memory, in the botanic garden there; which, while it perpetuates the name and merits of Linnæus, will do honour to the founder, and, it may be hoped, prove the means of raiſing an emulation favourable to that ſcience which this illuſtrious Swede ſo highly dignified and improved.

As to the private and perſonal character of this illuſtrious philoſopher: His ſtature was diminutive and puny; his head large, and its hinder part very high; his look was ardent, piercing, and apt to daunt the beholder; his ear not ſenſible to muſic; his temper quick, but eaſily appeaſed.

Nature had, in an eminent manner, been liberal in the endowments of his mind. He ſeems to have been poſſeſſed of a lively imagination, corrected however by a ſtrong judgment, and guided by the laws of ſyſtem. Add to theſe, the moſt retentive memory, and unremitting induſtry, and the greateſt perſeverance in all his purſuits; as is evident from that continued vigour with which he proſecuted the deſign, that he appears to have formed ſo early in life, of totally reforming and fabricating anew the whole ſcience of natural hiſtory; and this fabric he raiſed, and gave to it a degree of perfection unknown before; and had moreover the uncommon felicity of living to ſee his own ſtructure riſe above all others, notwithſtanding every diſcouragement its author at firſt laboured under, and the oppoſition it afterwards met with. Neither has any writer more cautiouſly avoided that common error of building his own fame on the ruin of another man's. He every where acknowledged the ſeveral merits of each author's ſyſtem; and no man appears to have been more ſenſible of the partial defects of his own. Thoſe anomalies which had principally been the objects of criticiſm, he well knew every artificial arrangement muſt abound with; and having laid it down as a firm maxim, that every ſyſtem muſt finally reſt on its intrinſic merit, he willingly commits his own to the judgment of poſterity. Perhaps there is no circumſtance of Linnæus's life which ſhows him in a more dignified light than his conduct towards his opponents. Diſavowing controverſy, and juſtly conſidering it as an unimportant and fruitleſs ſacrifice of time, he never replied to any, numerous as they were at one ſeaſon.

To all who ſee the aid this extraordinary man has brought to natural ſcience, his talents muſt appear in a very illuſtrious point of view; but more eſpecially to thoſe who, from ſimilarity of taſte, are qualified to ſee more diſtinctly the vaſt extent of his original deſign, the greatneſs of his labour, and the elaborate execution he has given to the whole. He had a happy command of the Latin tongue, which is alone the language of ſcience; and no man ever applied it more ſucceſſfully to his purpoſes, or gave to deſcription ſuch copiouſneſs, united with that preciſion and conciſeneſs which ſo eminently characteriſe his writings.

The ardour of Linnæus's inclinations to the ſtudy of nature, from his earlieſt years, and that uncommon application which he beſtowed upon it, gave him a moſt comprehenſive view both of its pleaſures and uſefulneſs, at the ſame time that it opened to him a wide field hitherto but little cultivated, eſpecially in his own country. Hence he was early led to regret, that the ſtudy of natural hiſtory, as a public inſtitution, had not made its way into the univerſities; in many of which, logical diſputations and metaphyſical theories had too long prevailed, to the excluſion of more uſeful ſcience. Availing himſelf therefore of the advantages which he derived from a large ſhare of eloquence, and an animated ſtyle, he never failed to diſplay, in a lively and convincing manner, the relation this ſtudy hath to the public good; to incite the great to countenance and protect it; to encourage and allure youth into its purſuits, by opening its manifold ſources of pleaſure to their view, and ſhowing them how greatly this agreeable employment would add, in a variety of inſtances, both to their comfort and emolument. His extenſive view of natural hiſtory, as connected with almoſt all the arts of life, did not allow him to confine theſe motives and incitements to thoſe only who were deſigned for the practice of phyſic. He alſo laboured to inſpire the great and opulent with a taſte for this ſtudy; and wiſhed particularly that ſuch as were devoted to an eccleſiaſtic life ſhould ſhare a portion of natural ſcience; not only as a means of ſweetening their rural ſituation, confined as many are, perpetually to a country reſidence, but as what would almoſt inevitably lead, in a variety of inſtances, to diſcoveries which only ſuch ſituations could give riſe to, and which the learned in great cities could have no opportunities to make. Not to add, that the mutual communication and enlargement of this kind of knowledge among people of equal rank in a country ſituation, muſt prove one of the ſtrongeſt bonds of union and friendſhip, and contribute, in a much higher degree than the uſual periſhing amuſements of the age, to the pleaſures and advantage of ſociety.

Linnæus lived to enjoy the fruit of his own labour in an uncommon degree. Natural hiſtory raiſed itſelf in Sweden, under his culture, to a ſtate of perfection unknown elſewhere; and was from thence diſſeminated through all Europe. His pupils diſperſed themſelves all over the globe; and, with their maſter's fame, extended both ſcience and their own. More than this, he lived to ſee the ſovereigns of Europe eſtabliſh ſeveral public inſtitutions in favour of this ſtudy, and even profeſſorſhips eſtabliſhed in divers univerſities for the ſame purpoſe, which do honour to their founders and patrons, and which have excited a curioſity for the ſcience, and a ſenſe of its worth, that cannot fail to further its progreſs, and in time raiſe it to that rank which it is entitled to hold among the purſuits of mankind.

LINNET, in ornithology. See FRINGILLA. It is remarkable of this bird, that when it builds in hedges, and when in furze-buſhes on heaths, in both which places the neſts are very common, they are made of very different materials. When they build in hedges, they uſe the ſlender filaments of the roots of trees, and the down of feathers and thiſtles; but when they build on heaths, they uſe moſs principally for the outer part, finiſhing it within with ſuch things as the place will afford. Theſe birds will have young ones three or four times a-year, eſpecially if they are taken away before they are able to leave the neſts.

When linnets are to be taught to whiſtle tunes, or to imitate the notes of any other bird, they muſt be taken from the old one when they are not above four days old; for at this time they have no idea of the note of the old ones, and will be readily taught to modulate their voice like any thing that is moſt familiar to their ears, and within the compaſs of their throats. More care is required in feeding them when taken

thus young, than when they are left in the neſt till nearly fledged; but they will be reared very well upon a food half bread and half rapeſeed boiled and bruiſed: this muſt be given them ſeveral times a day. It muſt be made freſh every day, and given them ſufficiently moiſt, but not in the extreme. If it be in the leaſt ſour, it gripes and kills them; and if too ſtiff, it is as miſchievous by binding them up.——They muſt be hung up as ſoon as taken from the neſt, under the bird whoſe note they are intended to learn; or, if they are to be taught to whiſtle tunes, it muſt be done by giving them leſſons at the time of feeding; for they will profit more, while young, in a few days, than in a long time afterwards, and will take in the whole method of their notes before they are able to crack hard ſeeds. Some have attempted to learn them to ſpeak in the manner of the parrot or other birds; and they will arrive at ſome ſort of perfection in it, with great pains.

LINSEED, the ſeed of the plant linum. Linſeed ſteeped and bruiſed in water gives it very ſoon a thick mucilaginous nature, and communicates much of its emollient virtue to it. See LINUM.

LINT. See FLAX, LINEN, and LINUM.

LINT, in ſurgery, is the ſcrapings of fine linen, uſed by ſurgeons in dreſſing wounds. Lint made up in an oval or orbicular form is called a *pledgit*; if in a cylindrical form, or in ſhape of a date, or olive ſtone, it is called a *doſſil*. Lint is required for many purpoſes; as, 1. To ſtop blood in freſh wounds, by cloſing them up and laying on ſome dry lint before the application of a bandage: though, if ſcraped lint be not at hand, a piece of fine linen may be torn into ſmall rags, and uſed in the ſame manner. A tight bandage applied over all is of the greateſt importance. 2. To granulate or heal wounds; to which end lint is occaſionally ſpread with ſome digeſtive ointment, balſam, or vulnerary liquor. 3. In drying up wounds and ulcers, and forwarding the formation of a cicatrix. 4. In keeping the lips of wounds or abſceſſes at a proper diſtance, that they may not haſtily unite before the bottom is well digeſted. 5. Lint is highly neceſſary to preſerve wounds from the injuries of the air.—Surgeons of former ages formed compreſſes of ſponge, wool, feathers, or cotton; but lint is far preferable to all theſe, and is at preſent univerſally uſed.

LINTERNUM, or LITERUM, (anc. geog.), a city of Campania, ſituated at the mouth of the Clanius, which is alſo called Liturnus, between Cumæ and Vulturnum. It received a Roman colony at the ſame time with Puteoli and Vulturnum; was improved and enlarged by Auguſtus; afterwards forfeited its right of colonyſhip, and became a prefecture. Hither Scipio Africanus the elder retired from the mean envy of his ungrateful countrymen; and here he died, and was buried: though this laſt is uncertain, he having a monument both here and at Rome. No veſtige of the place now remains.

LINTSTOCK, in military affairs, a wooden ſtaff about three feet long, having a ſharp point in one end and a ſort of fork or crotch on the other; the latter of which ſerves to contain a lighted match, and by the former the lintſtock is occaſionally ſtuck in the ground, or in the deck of a ſhip during an engagement. It is very frequently uſed in ſmall veſſels, where there is commonly one fixed between every two guns, by which the match is always kept dry, and ready for firing.

LINTZ, a very handſome town of Germany, and capital of Upper Auſtria, with two fortified caſtles; the one upon a hill, the other below it. Here is a hall in which the ſtates aſſemble, a bridge over the Danube, a manufacture of gunpowder, and ſeveral other articles. It was taken by the French in 1741, but the Auſtrians retook it in the following year. E. lon. 14. 33. N. lat. 48. 16.

LINTZ, a town of Germany, in the circle of the Lower Rhine, and electorate of Cologne, ſubject to that elector. It is ſeated on the river Rhine, in E. lon. 7. 1. N. lat. 50. 31.

LINUM, FLAX; a genus of the pentagynia order, belonging to the pentandria claſs of plants; and in the natural method ranking under the 14th order, *Gruinales*. The calyx is pentaphyllous; the petals are five, the capſule is quinquevalved and decemlocular; and the ſeeds are ſolitary.

The ſpecies are, 1. The *uſitatiſſimum*, or common annual flax, hath a taper fibrous root; upright, ſlender, unbranched ſtalks two feet and a half high; garniſhed with narrow, ſpear-ſhaped, alternate grey-coloured leaves; and the ſtalks divided into footſtalks at top, terminated by ſmall blue crenated flowers in June and July; ſucceeded by large round capſules of ten cells, containing each one ſeed. 2. The *perenne*, or perennial Siberian flax, hath a fibrous perennial root, ſending up ſeveral upright, ſtrong, annual ſtalks, branching four or five feet high; garniſhed with ſmall narrow, ſpear-ſhaped, alternate leaves of a dark green colour; and terminated by umbellate cluſters of large blue flowers in June, ſucceeded by ſeeds in autumn. 3. The *catharticum*, or purging flax, with leaves oppoſite and lanceolate; the ſtem bifurcated, and the corollæ acute. This is a very ſmall plant, not above four or five inches high; found wild upon chalky hills and in dry pleaſure-grounds. There are 18 other ſpecies.

The firſt ſpecies is cultivated in the fields according to the directions given under the article FLAX. The ſecond ſort is raiſed from ſeed in a bed or border of common garden-earth, in ſhallow drills ſix inches aſunder; and when the plants are two or three inches high, thin them to the ſame diſtance; and in autumn plant them out where they are wanted.

The firſt ſpecies may juſtly be looked upon as one of the moſt valuable of the whole vegetable kingdom; as from the bark of its ſtalks is manufactured the lint or flax for making all ſorts of linen-cloth; from the rags of the linen is made paper; and from the ſeeds is expreſſed the linſeed oil ſo uſeful in painting and other trades. The ſeeds themſelves are eſteemed an excellent emollient and anodyne: they are uſed externally in cataplaſms, to aſſuage the pain of inflamed tumors; internally, a ſlight infuſion of linſeed, by way of tea, is recommended in coughs as an excellent pectoral, and of great ſervice in pleuriſies, nephritic complaints, and ſuppreſſions of urine. The virtue of the third ſpecies is expreſſed in its title: an infuſion in water or whey of a handful of the freſh leaves, or a dram of them in ſubſtance when dried, are ſaid to purge without inconvenience.

LINUS, in claſſical hiſtory, a native of Colchis, cotemporary with Orpheus, and one of the moſt ancient poets and muſicians of Greece. It is impoſſible, at this diſtance of time, to diſcover whether Linus was the diſciple of Orpheus, or Orpheus of Linus. The majority, however, ſeem to decide this queſtion in favour of Linus. According to archbiſhop Uſher, he flouriſhed about 1280 B. C. and he is mentioned by Euſebius among the poets who wrote before the time of Moſes. Diodorus Siculus tells us, from Dionyſius of Mitylene the hiſtorian, who was cotemporary with Cicero, that Linus was the firſt among the Grecks who invented verſes and muſic, as Cadmus firſt taught them the uſe of letters. The ſame writer likewiſe attributes to him an account of the exploits of the firſt Bacchus, and a treatiſe upon Greek mythology, written in Pelaſgian characters, which were alſo thoſe uſed by Orpheus, and by Pronapides the preceptor of Homer. Diodorus ſays that he added the ſtring *lichanos* to the Mercurian lyre; and aſcribes to him the invention of rhime and melody; which Suidas, who regards him as the moſt ancient of lyric poets, confirms. Mr. Marpurg tells us, that Linus invented cat-gut ſtrings for the uſe of the lyre, which, before his time, was

only ſtrung with thongs of leather, or with different threads of flax ſtrung together. He is ſaid by many writers to have had ſeveral diſciples of great renown; among whom were Hercules, Thamyris, and, according to ſome, Orpheus.—Hercules, ſays Diodorus, in learning from Linus to play upon the lyre, being extremely dull and obſtinate, provoked his maſter to ſtrike him; which ſo enraged the young hero, that, inſtantly ſeizing the lyre of the muſician, he beat out his brains with his own inſtrument.

LION, in zoology. See FELIS.

LIONCELLES, in heraldry, a term uſed for ſeveral lions borne in the ſame coat of arms.

LIOTARD, called the *Turk*, an eminent painter, was born at Geneva in 1702, and by his father was deſigned for a merchant; but, by the perſuaſion of his friends, who obſerved the genius of the young man, he was permitted to give himſelf up to the art of painting. He went to Paris in 1725, and in 1738 accompanied the marquis de Puiſieux to Rome, who was going ambaſſador to Naples. At Rome he was taken notice of by the earls of Sandwich and Beſborough, then lord Duncannon, who engaged Liotard to go with them on a voyage to Conſtantinople. There he became acquainted with the late lord Edgecumbe, and Sir Everard Fawkener, our ambaſſador, who perſuaded him to come to England, where he ſtaid two years. In his journey to the Levant he had adopted the eaſtern habit, and wore it here with a very long beard. It contributed much to the portraits of himſelf, and ſome thought to draw cuſtomers; but he was really a painter of uncommon merit. After his return to the continent, he married a young wife, and ſacrificed his beard to Hymen. He came again to England in 1772, and brought a collection of pictures of different maſters, which he ſold by auction, and ſome pieces of glaſs, painted by himſelf, with ſurpriſing effect of light and ſhade, but a mere curioſity, as it was neceſſary to darken the room before they could be ſeen to advantage; he affixed, too, as uſual, extravagant prices to them. He ſtaid here about two years, as in his former journey. He has engraved ſome Turkiſh portraits, one of the empreſs queen and the eldeſt arch-ducheſs in Turkiſh habits, and the heads of the emperor and empreſs. He painted admirably well in miniature; and finely in enamel, though he ſeldom practiſed it. But he is beſt known by his works in crayons. His likeneſſes were as exact as poſſible, and too like to pleaſe thoſe who ſat to him; thus he had great buſineſs the firſt year, and very little the ſecond. Devoid of imagination, and one would think of memory, he could render nothing but what he ſaw before his eyes. Freckles, marks of the ſmall-pox, every thing found its place; not ſo much from fidelity, as becauſe he could not conceive the abſence of any thing that appeared to him. Truth prevailed in all his works, grace in very few or none. Nor was there any eaſe in his out-line; but the ſtiffneſs of a buſt in all his portraits. *Walpole.*

LIP, in anatomy. See ANATOMY.

Hare LIP, a diſorder in which the upper lip is in a manner ſlit or divided, ſo as to reſemble the upper lip of a hare, whence the name. See SURGERY.

LIPARA, (anc. geog.), the principal of the iſlands called *Æolia*, ſituated between Sicily and Italy, with a cognominal town, ſo powerful as to have a fleet, and the other iſlands in ſubjection to it. According to Diodorus Siculus, it was famous for excellent harbours and medicinal waters. He informs us alſo, that it ſuddenly emerged from the ſea about the time of Hannibal's death. The name is Punic, according to Bochart: and given it, becauſe, being a volcano, it ſhone in the night. It is now called *Lipari*, and gives name to nine others in its neighbourhood; viz. Stromboli, Pare, Rotto, Panaria, Saline, Volcano, Fenicuſa, Alicor, and Uſtica. Theſe are called, in general, the *Lipari Iſlands*. Some of theſe are active volcanoes at preſent, though Lipari is not. It is about 15 miles in circumference; and abounds in corn, figs, and grapes; bitumen, ſulphur, alum, and mineral waters.

LIPARI, the largeſt, moſt fertile, and populous of the Lipari iſlands, about 15 miles in circumference. It was celebrated among the ancients; and, by the deſcription of Ariſtotle, it appears to have been conſidered by the ſailors in his time, what Strombolo is in ours, as a lighthouſe, as its fires were never extinguiſhed. It has not ſuffered from ſubterraneous fires for ages paſt, though it every where bears the marks of its former ſtate. The form of this iſland is very irregular; and in this volcanic ſpot ſuch a number of ſpiracles have been opened, that the greateſt part of them are confounded with each other. It abounds with the currant grape; cotton alſo grows here, and great quantities of pumice are gathered.

LIPARI, an ancient town, capital of the iſland of Lipari, with a biſhop's ſee. It was ruined in 1544 by Barbaroſſa, who carried the inhabitants into ſlavery, and demoliſhed the place; but it was rebuilt by the emperor Charles V. The principal trade of the inhabitants is in the exportation of the products of the iſland; but the chief neceſſaries of life are imported from Sicily. This town has a garriſon, and ſtands on the ſouth ſide of the iſland. E. lon. 15. 30. N. lat. 38. 35.

LIPARI *Iſlands*, iſlands in the Mediterranean, which lie to the north of Sicily, and formerly called Æolian iſlands. They are 12 in number; and nearly as follows, in the order of their ſize; namely, Lipari, Strombolo, Volcano, Salini, Felicudi, Alicudi, Panari, Volcanello, Vacheluſe, Liſca, Dattolo, and Tila Navi. They are ſubject to the king of Naples, and bring in a good revenue. They produce great quantities of alum, ſulphur, nitre, cinnabar, and moſt kinds of fruits, particularly raiſins, currants, and figs in great perfection. Some of their wines are much eſteemed; particularly the Malvaſia, well known all over Europe. Theſe iſlands are of volcanic origin. See STROMBOLO, VOLCANO, &c.

LIPOTHYMIA, SYNCOPE, or FAINTING, may ariſe from ſeveral cauſes; as too violent exerciſe, ſuppreſſion of the menſes or other accuſtomed evacuations, &c.

LIPPA, a town of Hungary, with a caſtle. It was taken by the Turks in 1552; by the Imperialiſts in 1688; and by the Turks again in 1691; who abandoned it in 1695, after having demoliſhed the fortifications. It is ſeated on a mountain, in E. lon. 21. 55. N. lat. 36. 5.

LIPPE, the capital of a country of the ſame name in Germany, and the circle of Weſtphalia. It is ſeated on a river of the ſame name, and was formerly the reſidence of the principal branch of the houſe of Lippe. It is now in the poſſeſſion of the king of Pruſſia, and carries on a good trade in preparing timber for building veſſels on the Rhine, with which it has a communication by the river Lippe. The country round it is unwholſome and marſhy. E. lon. 8. 12. N. lat. 51. 43.

LIPPI (LORENZO), a painter of hiſtory and portraits, was born in 1606, and learned the principles of painting from Matteo Roſelli. He had an exquiſite genius for muſic and poetry, as well as for painting: and in the latter, his proficiency was ſo great, that ſome of his compoſitions in the hiſtorical ſtyle were taken for thoſe of Roſelli. However, growing at laſt diſſatisfied with the manner of that maſter, he choſe the manner of Santi di Titi, who was excellent both in deſign and invention, and appeared to have more of ſimple nature and truth in his compoſitions than any other artiſt of that time. At Florence, Lippi painted many grand deſigns for the chapels and convents, by which he enlarged his reputation; and at the court of Inſpruck, he painted a great number of portraits of the firſt nobility, which were deſervedly

admired. Yet, although he was fond of imitating ſimple nature without any embelliſhments from invention, his works are held in the higheſt eſteem for the graceful airs of the heads, for the correctneſs of his outline, and for the elegant diſpoſition of the figures. He died in 1664.

LIPSIUS (Justus), a learned critic, was born at Iſch, a ſmall village near Bruſſels, in 1547. After having diſtinguiſhed himſelf in polite literature, he became ſecretary to cardinal de Granvellan at Rome, where the beſt libraries were open to him; and he ſpent much labour in collating the MSS. of ancient authors. He lived 13 years at Leyden, during which he compoſed and publiſhed what he eſteemed his beſt works; but ſettled at Louvain, where he taught polite literature with great reputation. He was remarkable for unſteadineſs in religion, fluctuating often between the Proteſtants and Papiſts; but he became finally a bigoted catholic. He died at Louvain in 1606; and his works are collected in ſix volumes folio.

LIQUEFACTION, an operation by which a ſolid body is reduced into a liquid; or the action of fire or heat on fat and other fuſible bodies, which puts their parts into a mutual inteſtine motion.—The liquefaction of wax, &c. is performed by a moderate heat; that of ſal tartari, by the mere moiſture of the air. All ſalts liquefy; ſand, mixed with alkalis, becomes liquefied by a reverberatory fire, in the making of glaſs. In ſpeaking of metals, inſtead of liquefaction, we ordinarily uſe the word *fuſion*.

LIQUID, a body which has the property of fluidity; and, beſides that, a peculiar quality of wetting other bodies immerged in it, ariſing from ſome configuration of its particles, which diſpoſes them to adhere to the ſurfaces of bodies contiguous to them. See Fluid.

Liquid, among grammarians, is a name applied to certain conſonants oppoſed to mutes. Thus l, m, n, and r, are liquids.

LIQUIDAMBAR, Sweet-gum-tree, in botany: a genus of the polyandria order, belonging to the monœcia claſs of plants; and in the natural method ranking with thoſe of which the order is doubtful. The male calyx is common, and triphyllous; there is no corolla, but numerous filaments; the female calyces are collected into a ſpherical form, and tetraphyllous; there is no corolla, but ſeven ſtyles; and many bivalved and monoſpermous capſules, collected into a ſphere. There are only two ſpecies, both deciduous, viz. 1. The *ſtyraciflua*, or the Virginia or maple-leaved liquidambar; a native of the rich moiſt parts of Virginia and Mexico. It will ſhoot in a regular manner to thirty or forty feet high, having its young twigs covered with a ſmooth light-brown bark, while thoſe of the older are of a darker colour. The leaves are of a lucid green, and grow irregularly on the young branches, on long footſtalks: they reſemble thoſe of the common maple in figure; the lobes are all ſerrated; and from the baſe of the leaf a ſtrong mid-rib runs to the extremity of each lobe that belongs to it. The flowers are of a kind of ſaffron colour: they are produced at the ends of the branches the beginning of April, and ſometimes ſooner; and are ſucceeded by large round brown fruit, which looks ſingular, but is thought by many to be no ornament to the tree. 2. The *peregrinum*, Canada liquidambar, or ſpleenwort-leaved gale, is a native of Canada and Pennſylvania. The young branches of this ſpecies are ſlender, tough, and hardy. The leaves are oblong, of a deep green colour, hairy underneath, and have indentures on their edges alternately very deep. The flowers come out from the ſides of the branches, like the former; and they are ſucceeded by ſmall roundiſh fruit, which ſeldom ripens in England.

Theſe may be propagated either by ſeeds or layers; but the firſt method is the beſt. 1. We receive the ſeeds from America in the ſpring. Againſt their arrival, a fine bed, in a warm well ſheltered place, ſhould be prepared. If the ſoil is not naturally good, and inclined to be ſandy, it ſhould be wholly taken out near a foot deep, and the vacancy filled up with earth taken up a year before from a freſh paſture with the ſward, and all well rotted and mixed by being often turned, and afterwards mixed with a ſixth part of drift or ſea ſand. A dry day being made choice of, early in March, let the ſeeds be ſown, and the fineſt of this compoſt riddled over them a quarter of an inch deep. When the hot weather in the ſpring comes on, the beds ſhould be ſhaded, and waterings given often, but in very ſmall quantities, only affording them a gentle, nay, a very ſmall ſprinkling, at a time. Millar ſays, the ſeeds of theſe plants never come up under two years. But, continues Hanbury, with this eaſy management, I hardly ever knew it longer than the end of May before the young plants made their appearance. The plants being come up, ſhading ſhould ſtill be afforded them in the parching ſummer, and a watering every other night; and this will promote their growth, and cauſe them to become ſtronger plants by the autumn. In the autumn, the beds ſhould be hooped to be covered with mats in the ſevere froſts. Theſe mats, however, ſhould always be taken off in open weather; and this is all the management they will require during the firſt winter. The ſucceeding ſummer they will require no other trouble than weeding; though, if it ſhould prove a dry one, they will find benefit from a little water now and then. By the autumn they will be grown ſtrong enough to reſiſt the cold of the following winter, without demanding the trouble of matting, if the ſituation is well ſheltered; if not, it will be proper to have the hoops prepared, and the mats ready, againſt the black northern froſts, which would endanger at leaſt their loſing their tops. After this, nothing except weeding will be wanted; and in the ſpring following, that is, three years from their firſt appearance, they ſhould be taken up (for they ſhould not be removed before, unleſs ſome of the ſtrongeſt plants be drawn out of the bed), and planted in the nurſery a foot aſunder, and two feet diſtant in the rows. Hoeing the weeds in the rows in the ſummer, and digging them in the winter, is all the trouble they will afterwards occaſion until they are finally planted out. 2. Theſe plants are eaſily increaſed by layers. The operation muſt be performed in the autumn, on the young ſummer's ſhoots; and the beſt way is by ſlitting them at a joint, as is practiſed for carnations. In a ſtrong dry ſoil, they will be often two years or more before they ſtrike root; though, in a fine light ſoil, they will be found to take freely enough. By this method good plants may be obtained; though it is not ſo eligible as the other, if we have the convenience of procuring the ſeeds.

The leaves of this tree emit their odoriferous particles in ſuch plenty as to perfume the circumambient air; nay, the whole tree exudes ſuch a fragrant tranſparent reſin, as to have given occaſion to its being taken for the ſweet ſtorax. (See Styrax.) Theſe trees, therefore, are very proper to be planted ſingly in large opens, that they may amply diſplay their fine pyramidal growth, or to be ſet in places near ſeats, pavilions, &c. The reſin was formerly of great uſe as a perfume, and is at preſent no ſtranger in the ſhops.

LIQUOR, a name for any fluid ſubſtance of the aqueous or ſpirituous kind. The principal beverage among the Jews, as well as the Greeks and Romans, in their early ſtate, was water, milk, and the juices of various plants infuſed therein. For a long time, under the commonwealth of Rome, wine was ſo ſcarce, that in their ſacrifices to the gods the libations were made with milk only. Wine did not become common there till A. U. C. 600, when vines began to be planted.

LIQUOR *of Flints*. See CHEMISTRY.

Mineral Anodyne LIQUOR *of Hoffman*. This is a compoſition of highly rectified ſpirit of wine, vitriolic ether, and a little of the dulcified oil of vitriol. It is made by mixing an ounce of the ſpirit of wine, which riſes firſt in the diſtillation of ether, with as much of the liquor which is to be diſtilled, and afterwards by diſſolving in the mixture which riſes next, and which contains the ether, 12 drops of the oil which riſes after the ether is paſſed. This has the ſame virtues with the ether, and is now generally diſuſed, the pure ether being ſubſtituted in its place.

LIQUORICE. See GLYCYRRHIZA.

LIRIODENDRON, the TULIP-TREE, in botany: a genus of the polyginia order, belonging to the polyandria claſs of plants; and in the natural method ranking under the 52d order, *Coadunatæ*. The calyx is tryphyllous; there are nine petals; and the ſeeds imbricated in ſuch a manner as to form a cone. There is but one ſpecies, viz. the *tulipifera*, a deciduous tree, native of moſt part of America. It riſes with a large upright trunk, branching, 40 or 50 feet high. The trunk, which often attains to a circumference of 30 feet, is covered with a grey bark. The branches, which are not very numerous, of the two-years-old wood, are ſmooth and brown; while the bark of the ſummer ſhoots is ſmoother and ſhining, and of a blueiſh colour. They are very pithy. Their young wood is green, and when broken emits a ſtrong ſcent. The leaves grow irregularly on the branches, on long footſtalks. They are of a particular ſtructure, being compoſed of three lobes, the middlemoſt of which is ſhortened in ſuch a manner that it appears as if it had been cut off and hollowed at the middle. The two others are rounded off. They are about four or five inches long, and as many broad. They are of two colours; their upper ſurface is ſmooth, and of a ſtronger green than the lower. They fall off pretty early in autumn; and the buds for the next year's ſhoots ſoon after begin to ſwell and become dilated, inſomuch that, by the end of December, thoſe at the ends of the branches will become near an inch long, and half an inch broad. The outward laminæ of theſe leaf-buds are of an oval figure, have ſeveral longitudinal veins, and are of a blueiſh colour. The flowers are produced with us in July, at the ends of the branches. They ſomewhat reſemble the tulip, which occaſions its being called the Tulip-tree. The number of petals of which each is compoſed, like thoſe of the tulip, is ſix; and theſe are ſpotted with green, red, white, and yellow, thereby making a beautiful mixture. The flowers are ſucceeded by large cones, which never ripen in England.

The propagation of this tree is very eaſy, if the ſeeds are good; for by theſe, which we receive from abroad, they are to be propagated. No particular compoſt need be ſought for; neither is the trouble of pots, boxes, hot-beds, &c. required. They will grow exceedingly well in beds of common garden-mould, and the plants will be hardier and better than thoſe raiſed with more tenderneſs and care. Therefore, as ſoon as you receive the ſeeds, which is generally in February, and a few dry days have happened, ſo that the mould will work freely, ſow the ſeeds, covering them three quarters of an inch deep; and in doing of this, obſerve to lay them lengthwiſe, otherwiſe, by being very long, one part, perhaps that of the embryo plant, may be out of the ground ſoon, and the ſeed be loſt. This being done, let the beds be hooped; and as ſoon as the hot weather and drying winds come on in the ſpring, let them be covered from ten o'clock in the morning till ſun-ſet. If little rain happens, they muſt be duly watered every other day; and by the end of May the plants will come up. Shade and watering in the hotteſt ſummer muſt be afforded them, and they will afterwards give very little trouble. The next winter they will want no other care than, at the approach of it, ſticking ſome furze-buſhes round the bed, to break the keen edge of the black froſts; for it is found that the ſeedlings of this ſort are very hardy, and ſeldom ſuffer by any weather. After they have been two years in the ſeed-bed, they ſhould be taken up and planted in the nurſery, a foot aſunder, and two feet diſtant in the rows. After this, the uſual nurſery care of hoeing the weeds, and digging between the rows in the winter, will ſuffice till they are taken up for planting out.

The tulip-tree, in thoſe parts of America where it grows common, affords excellent timber for many uſes: particularly the trunk is frequently hollowed, and made into a canoe ſufficient to carry many people: and for this purpoſe no tree is thought more proper by the inhabitants of thoſe parts. With us, it may be ſtationed among trees of forty feet growth.

LIS or LYS (JOHN VANDER), painter of hiſtory, landſcapes and converſations, was born at Oldenburgh in 1570, but went to Haerlem to place himſelf as a diſciple under Henry Goltzius; and as he was endowed with great natural talents, he ſoon diſtinguiſhed himſelf in that ſchool, and imitated the manner of his maſter with great ſucceſs. He adhered to the ſame ſtyle till he went to Italy; where, having viſited Venice and Rome, he ſtudied the works of Titian, Tintoretto, Paolo Veroneſe, and Domenico Fetti, ſo effectually, that he improved his taſte and judgment, and altered his manner entirely. He ſoon received marks of public approbation; and his compoſitions became univerſally admired for their good expreſſion, for their lively and natural colouring, and the ſweetneſs and delicacy of his pencil: although it muſt be acknowledged, that he could never totally diveſt himſelf of the ideas and taſte peculiar to the Flemings. His ſubjects uſually were hiſtories taken from the ſacred writings, or the repreſentation of rural ſports, marriages, balls, and villagers dancing, dreſſed in Venetian habits; all which ſubjects he painted in a ſmall as well as a large ſize, with a number of figures, well deſigned, and touched with a great deal of delicacy. He was likewiſe accounted to paint naked figures admirably, with natural and elegant attitudes, and a very agreeable turn of the limbs. A capital picture of this maſter is, Adam and Eve lamenting the death of Abel; which is extremely admired, not only for the expreſſion, but alſo for the beauty of the landſcape: and in the church of St. Nicholas at Venice is another of his paintings, repreſenting St. Jerom in the deſert, with a pen in his hand, and his head turned to look at an angel who is ſuppoſed to be ſounding the laſt trumpet. The colouring of this picture is rather too red; but it is deſigned in a fine ſtyle, and charmingly penciled. The paintings of this maſter are very rarely to be purchaſed. He died in 1620.

LIS (John Vander) of Breda, hiſtorical painter, was born at Breda about the year 1601, and became a diſciple of Cornelius Polemburg, whoſe manner he imitated with extraordinary exactneſs, in the tints of his colouring, his neatneſs of pencilling, and the choice of his ſubjects. There are ſome paintings of this maſter's hand, which, though they appear to have ſomewhat leſs freedom and lightneſs of touch, are nearly equal to thoſe of Polemburg, and are frequently taken to be his. At Rotterdam, in the poſſeſſion of Mr. Biſchop, there is a delicate painting repreſenting Diana in the Bath, attended by her nymphs; and his moſt capital performance in England, is ſaid to be in the poſſeſſion of the Viſcount Middleton. The portrait of Vander Lis, painted by himſelf, is in the poſſeſſion of Horace Walpole, Eſq. which is deſcribed by that ingenious gentleman, as being worked up equal to the ſmoothneſs of enamel.

LISBON, the capital of the kingdom of Portugal, ſituated in the province of Eſtremadura, on the banks of the river Tagus, in W. lon. 9. 25. N. lat. 38. 25. It was anciently

called *Oliſipo*, *Oliſippo*, and *Ulyſſipo*, which are ſuppoſed to be derived from the Phenician *Uliſubbo* or *Oliſippo*, ſignifying in that tongue a *pleaſant bay*, ſuch as that on which this city ſtands. It firſt became conſiderable in the reign of king Emmanuel; from that king it had been the capital of the kingdom, the reſidence of its monarchs, the ſeat of the chief tribunals and offices of the metropolitan, a noble univerſity, and the receptacle of the richeſt merchandize of the Eaſt and Weſt Indies. Its air is excellent; being refreſhed by the delightful ſea-breezes, and thoſe of the Tagus. The city extends for about two miles along the Tagus; but its breadth is inconſiderable. Like old Rome, it ſtands on ſeven hills: but the ſtreets in general are narrow and dirty, and ſome of them are very ſteep; neither are they lighted at night. The churches in general are very fine; but the magnificence of the chapel royal is amazing. Here is one of the fineſt harbours in the world; and there were a great number not only of fine churches and convents here, but alſo of other public buildings, and particularly of royal palaces, and others belonging to the grandees; but the greateſt part of them, and of the city, were deſtroyed by a moſt dreadful earthquake, on November 1, 1755, from which it will require a long time to recover. The inhabitants, before the earthquake, did not at moſt exceed 150,000. The government of it is lodged in a council, conſiſting of a preſident, ſix counſellors, and other inferior officers. The harbour has water enough for the largeſt ſhips, and room enough for 10,000 ſail without being crowded. For its ſecurity, there is a fort at the mouth of the river on each ſide, and a bar that runs acroſs it, and is very dangerous to paſs without pilots. Higher up, at a place where the river is conſiderably contracted, there is a fort called *Torre de Belem*, or the *Tower of Belem*, under whoſe guns all ſhips muſt paſs in their way to the city; and on the other ſide are ſeveral more forts. Before the earthquake, moſt of the private houſes were old and unſightly, with lattice-windows; and the number of convents and colleges amounted to 50, namely, 32 for monks, and 18 for nuns. The king's principal palace ſtands on the river, and is large and commodious. Of the hoſpitals, that called the *Great* is obliged to receive all perſons, of what degree, nation, or religion ſoever, without exception. At the village of Belem, near Liſbon, is a noble hoſpital for decayed gentlemen who have ſerved the king, and have not wherewithal to maintain themſelves. That called the *houſe of mercy* is alſo a noble charity. In the centre of the city, upon one of the higheſt hills, is the caſtle, which commands the whole, being large and ancient, and having always a garriſon of four regiments of foot. The cathedral is a vaſt edifice of the Gothic kind, but heavy and clumſy: it contains, however, great riches, and is finely adorned within. The ſquare called *Roſſio* is large, and ſurrounded with magnificent buildings. The whole city is under the eccleſiaſtical juriſdiction of the patriarch, who was appointed in the year 1717. Here is alſo an archbiſhop, who has, or at leaſt had before the erection of the patriarchate, a revenue of 40,000 cruſadoes, or 6000l. The univerſity, which was removed for ſome time to Coimbra, but afterwards reſtored to its ancient ſeat, makes a conſiderable figure, though much inferior to that of Coimbra.

LISBURN, a town of Ireland, in the county of Antrim and province of Ulſter, 73 miles from Dublin. It was burnt down about 50 years ago, but is now rebuilt in a neat and handſome manner, and has a large linen manufactory. It is ſeated on the river Laggan, in W. lon. 6. 20. N. lat. 54. 31. It gives title of earl to the family of Vaughan; and it returns two members to parliament, one half of the patronage of this borough being in the earl of Hertford. Fairs held 21ſt of July and 5th of October.

LISIEUX, an ancient town of France, in the department of Calvados, and lately an epiſcopal ſee in Normandy. The churches, and the late epiſcopal palace and convents, are handſome ſtructures. It has a good trade, particularly in linen cloth, and is ſeated at the confluence of the Touque and Orbec, 12 miles from the ſea, and 40 ſouth weſt of Rouen. E. lon. 0. 20. N. lat. 49. 11.

LISLE, a ſtrong city of France, in the department of the North and late province of French Flanders, of which it was the capital. It is one of the richeſt and moſt commercial towns in France; and the inhabitants are computed to be 65,000. It is called Liſle (that is *L'Iſle*, the Iſland) becauſe it was formerly ſurrounded by marſhes, which are now drained. Its citadel is ſuppoſed to be the fineſt in Europe, next to that of Turin. The ſtreets, particularly thoſe of the New Town, are adorned with noble buildings. The Great Square and the Little Square are both diſtinguiſhed in this reſpect; and among the public ſtructures are the exchange, a magazine of vaſt extent, and a general hoſpital very lately built. Here are manufactures of all ſorts; but the principal trade is in camlets.—Liſle was taken by the allies, after three months ſiege, in 1708, but was reſtored by the treaty of Utrecht in 1713, in conſideration of the demolition of the fortifications of Dunkirk. In 1792 it ſuſtained a bombardment from the Auſtrians. It is ſeated on the Deule, 14 miles weſt of Tournay, and 130 north of Paris. E. lon. 3. 9. N. lat. 50. 38.

LISLE (Claudius de), a learned hiſtoriographer, born at Vancouleurs, in 1644. He ſtudied among the Jeſuits at Pontamouſſon, took his degrees in law, and afterwards applied himſelf entirely to the ſtudy of hiſtory and geography; and to perfect himſelf in thoſe ſciences went to Paris, where the principal lords of the court became his ſcholars, and among the reſt the Duke of Orleans, afterwards regent of the kingdom. He wrote, 1. An hiſtorical account of the kingdom of Siam. 2. A genealogical and hiſtorical Atlas. 3. An abridgement of univerſal hiſtory. He died at Paris in 1720.

Lisle (William de), ſon of the former, and the moſt learned geographer France has produced, was born at Paris in 1675. He became firſt geographer to the king, royal cenſor, and member of the academy of ſciences. He died in 1726. He publiſhed a great number of excellent maps, and wrote many pieces in the memoirs of the academy of ſciences.

Lisle (Sir John), a brave loyaliſt in the time of the civil wars, was the ſon of a bookſeller in London, and received his education in the Netherlands. He ſignalized himſelf upon many occaſions in the civil war, particularly in the laſt battle of Newbury, where, in the duſk of the evening, he led his men to the charge in his ſhirt, that his perſon might be more conſpicuous. The king, who was an eye-witneſs of his bravery, knighted him in the field of battle. In 1643 he roſe for his majeſty in Eſſex; and was one of the royaliſts who ſo obſtinately defended Colcheſter, and who died for the defence of it. This brave man having tenderly embraced the corpſe of Sir Charles Lucas, his departed friend, immediately preſented himſelf to the ſoldiers who ſtood ready for his execution. Thinking that they ſtood at too great a diſtance, he deſired them to come nearer: one of them ſaid, "I warrant you, ſir, we ſhall hit you." He replied with a ſmile, "Friends, I have been nearer you when you have miſſed me." He was executed Auguſt 2d, 1648.

LISMORE, one of the weſtern iſlands of Scotland, ſeated at the mouth of Loch Linnhe, a capacious lake in Argyleſhire, navigable for the largeſt ſhips to Fort William, which ſtands in the country called Lochaber. This iſland is above ſeven miles in length by one in breadth, and contains 1500 inhabitants. It abounds in lime-ſtone, from which, however, it has hitherto derived little advantage, owing to the want of good peat, the neglect of timber, and ſtill more the duty upon coals. Thus,

with the advantages of navigation in every direction, and of a ſoil lying upon the richeſt manure, the people are indigent, and frequently obliged to import meal for their ſubſiſtence. Many of them live a part of the year upon milk only. This iſland was formerly the reſidence of the biſhops of Argyle.

Lismore, a borough, market, fair, and poſt town of Ireland, in the county of Waterford, and province of Munſter, 100 miles from Dublin; N. lat. 52. 5. W. lon. 7. 50. It was anciently called *Leſſmore*, or *Lios-more*, i. e. the great incloſure, or habitation; it is now a biſhopric, and formerly had an univerſity.

LISSA, an iſland in the Gulph of Venice, on the coaſt of Dalmatia, belonging to the Venetians, where they have a fiſhery of ſardines and anchovies. It produces excellent wine, and is 70 miles weſt of Ragufa. E. lon. 17. 0. N. lat. 43. 22.

Lissa, a town of Poland, in the palatinate of Poſna, of which it is the capital. E. lon. 16. 0. N. lat. 32. 15.

Lissa, a village of Sileſia, 16 miles from Breſlau, remarkable for a battle fought between the Pruſſians and the Auſtrians on the 15th of December 1757, when the latter were entirely defeated.

LISSUS, (anc. geog.) the laſt town of Illyricum, towards Macedonia, ſituated on the Drilo. It had a capacious port, the work of Dionyſius the Tyrant, who led the colony thither, enlarged and walled it round, (Diodorus Siculus.) Now called *Aleſſio*, in Albania, on the Drino, near the Gulph of Venice. E. lon. 20. N. lat. 42.

LIST, in commerce, the border of cloth or ſtuff; ſerving not only to ſhow their quality, but to preſerve them from being torn in the operations of fulling, dyeing, &c.—Liſt is uſed on various occaſions; but chiefly by gardeners for ſecuring their wall-trees.

List, in architecture, a little ſquare moulding, otherwiſe called a *fillet*, *liſtel*, &c. See Architecture.

List is alſo uſed to ſignify the incloſed field or ground wherein the ancient knights held their juſts and combats. It was ſo called, as being hemmed round with pales, barriers, or ſtakes, as with a liſt. Some of theſe were double, one for each cavalier; which kept them apart, ſo that they could not come nearer each other than a ſpear's length. See Just, Tournament, Duel, &c.

Civil List, in the Britiſh polity. The expences defrayed by the civil liſt are thoſe that in any ſhape relate to civil government; as the expences of the houſehold; all ſalaries to officers of ſtate, to the judges and every one of the king's ſervants; the appointments to foreign ambaſſadors; the maintenance of the queen and royal family; the king's private expences, or privy purſe; and other very numerous outgoings, as ſecret-ſervice money, penſions, and other bounties: which ſometimes have ſo far exceeded the revenue appointed for that purpoſe, that application has been made to parliament to diſcharge the debts contracted on the civil liſt; as particularly in 1724, when one million was granted for that purpoſe by the ſtatute 11 Geo. I. c. 17. and in 1769, when half a million was appropriated to the like uſes by the ſtatute 9 Geo. III. c. 34.

The civil liſt, Judge Blackſtone obſerves, is indeed, properly, the whole of the king's revenue in his own diſtinct capacity; the reſt being rather the revenue of the public, or its creditors, though collected and diſtributed again in the name and by the officers of the crown: it now ſtanding in the ſame place as the hereditary income did formerly; and as that has gradually diminiſhed, the parliamentary appointments have increaſed. The whole revenue of queen Elizabeth did not amount to more than 600,000l. a-year: that of king Cha. I. was 800,000l. and the revenue voted for king Charles II. was 1,200,000l. though complaints were made (in the firſt years at leaſt) that it did not amount to ſo much. But it muſt be obſerved, that under theſe ſums were included all manner of public expences; among which lord Clarendon, in his ſpeech to the parliament, computed, that the charge of the navy and land-forces amounted annually to 800,000l. which was ten times more than before the former troubles. The ſame revenue, ſubject to the ſame charges, was ſettled on king James II.: but by the increaſe of trade, and more frugal management, it amounted on an average to 1,500,000l. *per annum*, (beſides other additional cuſtoms granted by parliament, which produced an annual revenue of 400,000l. out of which his fleet and army were maintained at the yearly expence of 1,100,000l. After the revolution, when the parliament took into its own hands the annual ſupport of the forces both maritime and military, a civil-liſt revenue was ſettled on the new king and queen, amounting, with the hereditary duties, to 700,000l. *per annum*; and the ſame was continued to queen Anne and king George I. That of king Geo. II. was nominally augmented to 800,000l. and in fact was conſiderably more: but that of his preſent majeſty is expreſsly limited to that ſum; though 200,000l. hath been ſince added. And upon the whole, it is doubtleſs much better for the crown, and alſo for the people, to have the revenue ſettled upon the modern footing rather than the ancient. For the crown, becauſe it is more certain, and collected with greater eaſe: for the people; becauſe they are now delivered from the feodal hardſhips, and other odious branches of the prerogative. And though complaints have ſometimes been made of the increaſe of the civil liſt, yet if we conſider the ſums that have been formerly granted, the limited extent under which it is now eſtabliſhed, the revenues and prerogatives given up in lieu of it by the crown, the numerous branches of the preſent royal family, and (above all) the diminution of the value of money compared with what it was worth in the laſt century, we muſt acknowledge theſe complaints to be void of any rational foundation; and that it is impoſſible to ſupport that dignity, which a king of Great Britain ſhould maintain, with an income in any degree leſs than what is now eſtabliſhed by parliament. See Revenue.

To List, *or enliſt*, *Soldiers*, to retain or enroll men as ſoldiers, either as volunteers, or by a kind of compulſion. Perſons liſted muſt be carried within four days, but not ſooner than 24 hours after, before the next juſtice of peace of any county, riding, city, or place, or chief magiſtrate of any city or town corporate (not being an officer in the army); and if before ſuch juſtice or magiſtrate they diſſent from ſuch enliſting, and return the enliſting-money, and alſo 20 ſhillings in lieu of all charges expended on them, they are to be diſcharged. But perſons refuſing or neglecting to return and pay ſuch money within 24 hours, ſhall be deemed as duly liſted as if they had aſſented thereto before the proper magiſtrate; and they ſhall, in that caſe, be obliged to take the oath, or, upon refuſal, they ſhall be confined by the officer who liſted them till they do take it.

LISTER (Dr. Martin), an eminent Engliſh phyſician and naturaliſt, was born in 1638, and educated at Cambridge. He afterwards travelled into France; and at his return practiſed phyſic at York, and afterwards at London. In 1683 he was created doctor of phyſic, and became fellow of the college of phyſicians in London. In 1698 he attended the earl of Portland in his embaſſy from king William III. to the court of France; of which journey he publiſhed an account at his return, and was afterwards phyſician to queen Anne. He alſo publiſhed, 1. *Hiſtoria animalium Angliæ*, quarto. 2. *Conchyliorum ſynopſis*, folio. 3. *Cochlearum & limachum exercitatio anatomica*, 4 vols. 8vo. 4. Many pieces in the Philoſophical Tranſactions; and other works.

LISTOWEL, a pariſh, alſo a poſt and fair town, of Ireland, in the county of Kerry, and province of Munſter, 121

miles from Dublin, anciently *Lis Tuathal*, i. e. "the fort of Tuathal," who was exiled in the 1st century, but returned; and his life forms a brilliant æra in Iriſh hiſtory. Near this are the ruins of a caſtle, pleaſantly ſituated on the river Feale: it was taken in November 1600, by ſir Charles Wilmot, being then held out for the lord Kerry againſt queen Elizabeth. Five miles beyond Liſtowel are the ruins of a church. The fairs are three in the year.

LITANA SILVA (anc. geog.), a wood of the Boii, in the Gallia Togata, or Ciſpadana, where the Romans, under L. Poſthumius Albinus (whoſe head the Boii cut off, and carried in triumph into their moſt ſacred temple), had a great defeat, of twenty-five thouſand ſcarce ten eſcaping (Livy). Holſtenius conjectures, that this happened above the ſprings of the Scultenna, in a part of the Apennine, between Cerſinianum and Mutina. Now *Selva di Lugo*.

LITANY, a ſolemn form of ſupplication to God, in which the prieſt utters ſome things fit to be prayed for, and the people join in their interceſſion, ſaying, *We beſeech thee to hear us, good Lord!* &c. The word comes from the Greek λιτανεια, "ſupplication;" of λιτανευω, "I beſeech."

At firſt the uſe of litanies was not fixed to any ſtated time, but were only employed as exigencies required. They were obſerved, in imitation of the Ninevites, with ardent ſupplications and faſtings, to avert the threatning judgments of fire, earthquakes, inundations, or hoſtile invaſions. About the year 400, litanies began to be uſed in proceſſions, the people walking barefoot, and repeating them with great devotion; and it is pretended, that by this means ſeveral countries were delivered from great calamities. The days on which theſe were uſed were called *rogation-days*: theſe were appointed by the canons of different councils, till it was decreed by the council of Toledo, that they ſhould be uſed every month throughout the year; and thus by degrees they came to be uſed weekly on Wedneſdays and Fridays, the ancient ſtationary days for faſting. To theſe days the rubric of our church has added Sunday, as being the greateſt day for aſſembling at divine ſervice. Before the laſt review of the common prayer, the litany was a diſtinct ſervice by itſelf, and uſed ſome time after the morning prayer was over; at preſent it is made one office with the morning-ſervice, being ordered to be read after the third collect for grace, inſtead of the intercеſſional prayers in the daily ſervice.

LITCHFIELD, a city of Staffordſhire, in England, 117 miles from London. It ſtands low, about three miles from the Trent; and its ancient name is ſaid to have been *Licidfield*, ſignifying, "a field of carcaſſes," from a great number of Chriſtians having, as it is pretended, ſuffered martyrdom here in the perſecution under Diocleſian. In the Saxons time, it was a biſhoprick for a ſhort ſpace; and is now, together with Coventry, a biſhoprick. It is divided into two parts by a rivulet and a kind of ſhallow lake, over which are two cauſeways with ſluices. It is a long ſtraggling place; but has ſome very handſome houſes, and well-paved clean ſtreets. That part on the ſouth-ſide of the rivulet is called the *city*, and the other the *cloſe*. The *city* is much the largeſt, and contains ſeveral public ſtructures. It was incorporated by Edward VI. with the name of bailiffs and burgeſſes; and is both a town and county, governed by two bailiffs choſen yearly out of 24 burgeſſes, a recorder, a ſheriff, a ſteward, and other officers. The city has power of life and death within their juriſdiction, a court of record, and a pie-powder court. Here is a gaol both for debtors and felons, a free ſchool, and a pretty large well endowed hoſpital for a maſter and 12 brethren. The county of the city is 10 or 12 miles in compaſs, which the ſheriff rides yearly on the 8th of September, and then feaſts the corporation and neighbouring gentry. The *cloſe* is ſo called from its being incloſed with a wall and a deep dry ditch on all ſides except towards the city, where it is defended by a great lake or marſh formed by its brook. The cathedral, which ſtands in the cloſe, was originally built by Oſwius king of Northumberland about 300. It was rebuilt and enlarged by Offa king of Mercia in 766. In 1148 it was rebuilt, and greatly enlarged in 1296. At the reformation, Coventry was divided from it. In the civil wars its ſpire was deſtroyed, and it converted to a ſtable. In 1776 a beautiful painted window, by the benefaction of Dr. Adenbrook, has been ſet up at the weſt end of the cathedral. In the civil wars it was ſeveral times taken and retaken, and thereby ſuffered much; but was ſo repaired after the reſtoration, at the expence of 20,000l. that it was one of the faireſt and nobleſt ſtructures of the kind in England. It is walled in like a caſtle, and ſtands ſo high as to be ſeen 10 miles round. It is 450 feet long, of which the choir is 110, and the breadth in the broadeſt place 80. Its portico is hardly to be paralleled in England. There were, till lately, 26 ſtatues of the prophets, apoſtles, kings of Judah, and ſome kings of this land, in a row above it, as big as the life; and on the top, at each corner of the portico, is a ſtately ſpire, beſides a fine high ſteeple on the middle of the church. The choir is paved in great part with alabaſter and cannel-coal, in imitation of black and white marble. In 1789 it went under a general repair, when the maſſive groined arch betwixt the weſt end of the church and the tranſcript, which had forced the ſide wall out of its perpendicular, was removed. The prebendaries ſtalls, which are thought to be the beſt in England, were moſt of them re-erected at the charge of the country gentlemen, whoſe names and arms are painted at the top of the ſtalls. The north door is extremely rich in ſculpture, but much injured by time. The body, which is ſupported by pillars formed of numbers of ſlender columns, has lately had its decayed leaden roof replaced by a neat ſlated covering. The choir merits attention on account of the elegant ſculpture about the windows, and the embattled gallery that runs beneath them; to which the altar-piece of Grecian architecture but ill correſponds; behind which is Mary's chapel, divided from it by a moſt elegant ſtone ſkreen of beautiful workmanſhip. Here ſtood St. Chad's ſhrine, which coſt 2000l. The charter-houſe is an octagonal room. In the ſame cloſe are the palaces of the biſhop and dean, and the prebendaries houſes in a court on the hill. Here are three other churches; one of which, St. Michael's, has a church-yard of 6 or 7 acres. There was a caſtle here, long ſince deſtroyed: and ancient camps have been diſcovered in its environs. In the neighbourhood are frequent horſe-races. The markets there are on Tueſday and Friday, and ſix fairs in the year. By the late inland navigation, this place has communication with the rivers Merſey, Dee, Ribble, Ouſe, Trent, Darwent, Severn, Humber, Thames, Avon, &c.; which navigation, including its windings, extends above 500 miles in the counties of Lincoln, Nottingham, York, Lancaſter, Weſtmoreland, Cheſter, Warwick, Leiceſter, Oxford, Worceſter, &c. Litchfield ſends two members to parliament.

LITERARY *Property*, or *Copy-Right*. See COPY-*Right*.

LITERATI (*letrados*, "lettered"), an epithet given to ſuch perſons among the Chineſe as are able to read and write their language. The literati alone are capable of being made mandarins.

LITERATI is alſo the name of a particular ſect, either in religion, philoſophy, or politics, conſiſting principally of the learned men of that country; among whom it is called *jukiao*, i. e. "learned." It had its riſe in the year of Chriſt 1400, when the emperor, to awaken the native affection of the people for knowledge, which had been quite baniſhed by the preceding civil wars among them, and to ſtir up emulation among the mandarins, choſe out 42 of the ableſt among their doctors, to

whom he gave a commiſſion to compoſe a body of doctrine agreeable to that of the ancients, which was then become the rule or ſtandard of the learned. The delegates applied themſelves to the buſineſs with very great attention; but ſome fancied them rather to have wreſted the doctrine of the ancients, to make it conſiſt with theirs, than to have built up theirs on the model of the ancients.

They ſpeak of the Deity as if it were no more than mere nature, or the natural power or virtue that produces, diſpoſes, and preſerves the ſeveral parts of the univerſe. It is, ſay they, a pure, perfect principle, without beginning or end; it is the ſource of all things, the eſſence of every being, and that which determines it to be what it is. They make God the ſoul of the world: they ſay, he is diffuſed through all matter, and produces all the changes that happen there. In ſhort, it is not eaſy to determine whether they reſolve God into nature, or lift up nature into God; for they aſcribe to it many of thoſe things which we attribute to God.

This doctrine, in lieu of the idolatry that prevailed before, introduced a refined kind of atheiſm. The work, being compoſed by ſo many perſons of learning and parts, and approved by the emperor himſelf, was received with infinite applauſe by all the people. Many were pleaſed with it, becauſe it ſeemed to ſubvert all religion; others approved it, becauſe the little religion that it left them could not give them much trouble. And thus was formed the ſect of the Literati; which conſiſts of the maintainers and adherents to this doctrine. The court, the mandarins, and the perſons of fortune and quality, &c. are generally retainers to it; but a great part of the common people ſtill hold to their worſhip of idols.

The literati freely tolerate the Mahometans, becauſe they adore, with them, the king of heaven, and author of nature; but they bear a perfect averſion to all ſorts of idolaters among them: and it was once reſolved to extirpate them; but the diſorder this would have occaſioned in the empire prevented it: they now content themſelves with condemning them, in general, as hereſies; which they do ſolemnly every year at Pekin.

LITERNUM. See LINTERNUM.

LITHANTHRAX, or PIT-*Coal*, is a black or brown, laminated, bituminous ſubſtance; not very eaſily inflammable, but, when once inflamed, burns longer and more intenſely than any other ſubſtance. Of this ſubſtance three kinds are diſtinguiſhed by authors. The reſiduum of the firſt after combuſtion is black; the reſiduum of the ſecond is ſpongy, and like pumice-ſtone; and the reſiduum of the third is whitiſh aſhes. Some foſſil coal, by long expoſure to air, falls into a greyiſh powder, from which alum may be extracted. Foſſil coal by diſtillation yields, 1. a phlegm or water; 2. a very acid liquor; 3. a thin oil like naphtha; 4. a thicker oil, reſembling petroleum, which falls to the bottom of the former, and which riſes with a violent fire; 5. an acid concrete ſalt; 6. an uninflammable earth remains in the retort. Theſe conſtituent parts of foſſil coal are very ſimilar to thoſe of amber and other bitumens. For the exciting of intenſe heats, as of furnaces for ſmelting iron-ore, and for operations where the acid and oily vapours would be detrimental, as the drying of malt, foſſil coals are previouſly charred, or reduced to *coaks*; that is, they are made to undergo an operation ſimilar to that by which charcoal is made. By this operation coals are deprived of their phlegm, their acid liquor, and the greateſt part of their fluid oil. Coaks therefore conſiſt of the two moſt fixed conſtituent parts, the heavy oil and the earth, together with the acid concrete ſalt, which though volatile is detained by the oil and earth.

LITHARGE, a preparation of lead, uſually in form of ſoft flakes, of a yellowiſh reddiſh colour. If calcined lead be urged with a haſty fire, it melts into the appearance of oil, and on cooling concretes into litharge. Greateſt part of the litharge met with in the ſhops is produced in the purification of ſilver from lead, and the refining of gold and ſilver by means of this metal: according to the degree of fire and other circumſtances, it proves of a pale or deep colour; the firſt has been commonly called *litharge of ſilver*, the other *litharge of gold*. See CHEMISTRY.

LITHOMANTIA, in antiquity, a ſpecies of divination performed with ſtones. Sometimes the ſtone called *ſideritis* was uſed: this they waſhed in ſpring-water in the night by candle-light; the perſon that conſulted it was to be purified from all manner of pollution, and to have his face covered: this done, he repeated divine prayers, and placed certain characters in an appointed order; then the ſtone moved of itſelf, and, in a ſoft gentle murmur, or (as ſome ſay) in a voice like that of a child, returned an anſwer. By a ſtone of this nature, Helena is reported to have foretold the deſtruction of Troy.

LITHONTRIPTICUS (from λίθος "a ſtone," and θρύπλη "to break"); an epithet for medicines that are ſuppoſed to break the ſtone in the bladder. Though the different ſtones that are generated in the human bladder require different ſolvents when out of the body; and though art hath not yet afforded a medicine which, when injected into the bladder, will, without injury thereto, diſſolve the ſtone therein lodged; it cannot thence be concluded that there are no lithontriptic medicines. It may be here obſerved, that one ſolvent affects one ſubject, but hath no effect on another; ſo a ſolvent may yet be met with that will deſtroy the ſtone, and not hurt the human body. Soap ley-taken at firſt in ſmall doſes, in broth that is freed from all its fat, ſucceeds in moſt caſes which require an alkaline ſolvent. The patient may begin with 20 drops, and gradually increaſe the doſe as he is able; and by repeating it three times a-day for ſix, eight, or twelve months, the wiſhed-for effects often follow.

LITHOPHYTA, the name of Linnæus's third order of vermes. See ZOOLOGY.

LITHOSPERMUM, GROMWELL: A genus of the monogynia order, belonging to the pentandria claſs of plants; and in the natural method ranking under the 41ſt order, *Aſperifoliæ*. The corolla is funnel-ſhaped, with the throat perforated and naked; the calyx quinquepartite. There are ſeveral ſpecies; but the only remarkable ones are the officinale or common gromwell, and the arvenſe or baſtard alkanet. Both theſe are natives of Britain; the former growing in dry gravelly ſoil, the latter in corn-fields. The ſeeds of the firſt are reputed to be of ſervice in calculous caſes. Dr. Grew ſays, that they have ſo much earth in their compoſition, that they effervеſce with acids; but if this is the caſe, it muſt be attributed rather to an alkaline than an earthy quality.

LITHOSTROTION, in natural hiſtory, the name of a ſpecies of foſſil coral, compoſed of a great number of long and ſlender columns, ſometimes round, ſometimes angular, jointed nicely to one another, and of a ſtarry or radiated ſurface at their tops. Theſe are found in conſiderable quantities in the northern and weſtern parts of this kingdom, ſometimes in ſingle, ſometimes in complex ſpecimens. See plate S,, vol. II.

LITHOSTROTON, among the Romans, was a pavement of Moſaic work, conſiſting of ſmall pieces of cut marble of different kinds and colours. The *lithoſtrota* began to be uſed in the time of Sylla, who made one at Prænеſte in the temple of Fortune. At laſt they were uſed in private houſes; and were brought to ſuch perfection, that they exhibited moſt lively repreſentations of nature, with all the exactneſs of the fineſt painting.

LITHOTOMY, in ſurgery, the operation of cutting for the ſtone. See SURGERY.

LITHUANIA, a large country of Europe, anciently governed by its grand dukes, but, in 1569, united to Poland, under one elective king. It is bounded on the south by Volhinia; on the west by Little Poland, Polachia, Prussia, and Samogitia; on the north by Livonia and Russia, which last bounds it on the east. It is 300 miles long and 250 broad. Its principal rivers are, the Dnieper, Dwina, Nieman, Pripecz, and Bog. It is a flat country; and the soil is not only fertile in corn, but it produces honey, wood, pitch, and vast quantities of wool: here are also excellent little horses, which are never shod, their hoofs being very hard. There are vast forests, in which are bears, wolves, elks, wild oxen, lynxes, beavers, wild cats, &c. and eagles and vultures are very common. In the forests, large pieces of yellow amber are frequently dug up. The country swarms with Jews, who, though numerous in every other part of Poland, seem to have fixed their headquarters in this duchy; and this, perhaps, is the only country in Europe where the Jews cultivate the ground. The peasants are in a state of the most abject vassalage. In 1772, the empress Catharine compelled the Poles to cede to her all that part of Lithuania bordering upon Russia, and including at least one-third of the country. This she erected into the two governments of Polotsk and Mohilef. In 1793, in conjunction with the king of Prussia, she effected another partition of Poland, in consequence of which she extended her dominion over almost the whole of Lithuania.

LITMUS, or Lacmus, in the arts, is a blue pigment, formed from *archil*. It is brought from Holland at a cheap rate; but may be prepared by adding quick lime and putrified urine, or spirit of urine distilled from lime, to the archil previously bruised by grinding. The mixture having cooled, and the fluid suffered to evaporate, becomes a mass of the consistence of a paste, which is laid on boards to dry in square lumps. It is only used in miniature paintings, and cannot be well depended on, because the least approach of acid changes it instantly from blue to red. The best litmus is very apt to change and fly.

LITTER *(lectica)*, a kind of vehicle borne upon shafts; anciently esteemed the most easy and genteel way of carriage. Du-Cange derives the word from the barbarous Latin *lectria* "straw or bedding for beasts." Others will rather have it come from *lectus* "bed;" there being ordinarily a quilt and a pillow to a litter, in the same manner as to a bed. Pliny calls the litter the *traveller's chamber:* it was much in use among the Romans, among whom it was borne by slaves kept for that purpose; as it still continues to be in the east, where it is called a *palanquin*. The Roman lectica, made to be borne by four men, was called *tetraphorum*; that borne by six, *hexaphorum*; and that borne by eight, *octaphorum*. The invention of litters, according to Cicero, was owing to the kings of Bithynia: in the time of Tiberius they were become very frequent at Rome, as appears from Seneca: and even slaves themselves were borne in them, though never by more than two persons, whereas men of quality had six or eight.

Litter also denotes a parcel of dry old straw put upon the floor of a horse's stall for him to lie down and rest upon. When a horse comes tired into a stable, fresh litter has the virtue of making him stale immediately. This is known to be a very great advantage to a horse in a tired state; and when the litter is old and dirty, it never has any such effect upon him. If the owners knew how refreshing it is for a horse to discharge his urine on his return from labour, they would be more careful of giving them all means and occasions of it than they are. This staling after fatigue prevents those obstructions in the neck of the bladder or urinary passages which horses are too subject to. The bladder being often inflamed by the long retention of the heated urine in it, the creature is thus in danger of perishing.

LITTLE (William), an ancient English historian, known also by the name of *Gulielmus Neubrigensis*, was born at Bridlington in the county of York, in the year 1136; and educated in the abbey of Newborough in the same county, where he became a monk. In his advanced years, he composed a history of England, in five books, from the Norman conquest to A.D. 1197; which, for veracity, regularity of disposition, and purity of language, is one of the most valuable productions of this period.

LITTLETON (Sir Thomas), judge of the common-pleas, was the eldest son of Thomas Westcote, esq. of the county of Devon, by Elizabeth, sole heiress of Thomas Littleton of Frankley in Worcestershire, at whose request he took the name and arms of that family. He was educated at one of our universities, probably at Cambridge. Thence he removed to the Inner Temple, where he became one of the readers; and was afterwards, by Henry VI. made steward or judge of the court of the palace, or marshalsea of the king's household. In 1455, the thirty-third of that reign, he was appointed king's serjeant, and rode the northern circuit as judge of assize. In 1462, the second of Edward IV. he obtained a pardon from the crown; and, in 1466, was appointed one of the judges of the common-pleas, and rode the Northamptonshire circuit. In the year 1474 he was, with many of the first nobility, created knight of the Bath. He died in 1481; and was buried in the cathedral church of Worcester, where a marble tomb, with his statue upon it, was erected to his memory. As to his character as a lawyer, it is sufficient to inform the reader, that he was the author of the Treatise upon Tenures, on which Sir Edward Coke wrote a comment, well known by the title of *Coke upon Littleton*.

Littleton (Adam), descended from an ancient family in Shropshire, was born in 1627, educated at Westminster-school, and went to Oxford a student of Christ-church, whence he was ejected by the parliament visitors in 1648. Soon after, he became usher of Westminster-school, and in 1658 was made second master. After the restoration he taught a school at Chelsea in Middlesex, of which church he was admitted rector in the year 1664. In 1670 he accumulated the degrees in divinity, being then chaplain in ordinary to his majesty. In 1674 he became prebendary of Westminster, of which church he was afterwards sub-dean. Beside the well-known *Latin* and *English* Dictionary, he published several other works. He died in 1694, and was interred at Chelsea. He was an universal scholar; and extremely charitable, humane, and easy of access.

LITURGY, denotes all the ceremonies in general belonging to divine service. The word comes from the Greek λειτουργια "service, public ministry;" formed of λειτος "public," and εργον "work." In a more restrained signification, liturgy is used among the Romanists to signify the *mass*, and among us the *common-prayer*.

All who have written on liturgies agree, that in the primitive days divine service was exceedingly simple, only clogged with a very few ceremonies, and consisting of but a small number of prayers; but by degrees they increased the number of external ceremonies, and added new prayers, to make the office look more awful and venerable to the people. At length things were carried to such a pitch, that a regulation became necessary; and it was found proper to put the service, and the manner of performing it, into writing; and this was what they called a *liturgy*.

Liturgies have been different at different times, and in different countries. We have the liturgy of St. Chrysostom, that of St. Peter, of St. James, the liturgy of St. Basil, the Armenian liturgy, the liturgy of the Maronites, of the Cophtæ, the Roman liturgy, the Gallican liturgy, the English liturgy, the Ambrosian liturgy, the Spanish and African liturgies, &c.

In the more early ages of the church, every biſhop had a power to form a liturgy for his own dioceſe; and if he kept to the analogy of faith and doctrine, all circumſtances were left to his own diſcretion. Afterwards the practice was for the whole province to follow the metropolitan church, which alſo became the general rule of the church: and this Lindwood acknowledges to be the common law of the church; intimating, that the uſe of ſeveral ſervices in the ſame province, which was the caſe in England, was not to be warranted but by long cuſtom. The liturgy of the church of England was compoſed in the year 1547, and eſtabliſhed in the ſecond year of King Edward VI. ſtat. 2. and 3 Ed. VI. cap. 1.

In the fifth year of this king it was reviewed; becauſe ſome things were contained in that liturgy which ſhowed a compliance with the ſuperſtition of thoſe times, and ſome exceptions were taken againſt it by ſome learned men at home, and by Calvin abroad. Some alterations were made in it, which conſiſted in adding the general confeſſion and abſolution, and the communion to begin with the ten commandments. The uſe of oil in confirmation and extreme unction were left out, and alſo prayers for ſouls departed, and what tended to a belief of Chriſt's real preſence in the euchariſt. This liturgy, ſo reformed, was eſtabliſhed by the act of 5 and 6 Ed. VI. cap. 1. However it was aboliſhed by Queen Mary, who enacted, that the ſervice ſhould ſtand as it was moſt commonly uſed in the laſt year of the reign of King Henry VIII. The liturgy of 5 and 6 Ed. VI. was re-eſtabliſhed with ſome few alterations and additions, by 1 Eliz. cap. 2. Some farther alterations were introduced, in conſequence of the review of the common prayer-book, by order of King James, in the firſt year of his reign; particularly in the office of private baptiſm, in ſeveral rubrics and other paſſages, with the addition of five or ſix new prayers and thankſgivings, and all that part of the catechiſm which contains the doctrine of the ſacraments. The book of common-prayer, ſo altered, remained in force from the firſt year of King James to the fourteenth of Charles II. But the laſt review of the liturgy was in the year 1661, and the laſt act of uniformity enjoining the obſervance of it is 13 and 14 Car. II. cap. 4. See COMMON-Prayer. Many applications have been ſince made for a review, but hitherto without ſucceſs.

LITUUS, among the Romans, was the ſtaff made uſe of by the augurs in quartering the heavens. It bore a great reſemblance to the croſier of a biſhop, but was ſhorter. It was crooked at one end, and thickeſt in the curved part, according to A. Gellius. We frequently meet with a repreſentation of it upon medals, amongſt other pontifical inſtruments. It was called *Lituus Quirinalis*, from Quirinus, a name of Romulus, who was ſkilled in all the myſteries of augury.

LITUUS was alſo an inſtrument of muſic in uſe in the Roman army. It was ſtraight, excepting that it had a little bending at the upper end like a lituus or ſacred ſtaff of the augurs; and from the ſimilitude it derived its name. The lituus, as an inſtrument of martial muſic, was of a middle kind, betwixt the cornu and the tuba.

LIVADIA, anciently *Achaia* and *Hellas*, or *Greece* properly ſo called; a province of Turkey in Europe, bounded on the north by Epirus and Theſſaly, from which it is ſeparated by mount Oëta, now Banina, and by the Euripus, now the ſtrait of Negropont; on the eaſt, by the Archipelago; on the ſouth, by the gulf of Engia or Egina, the iſthmus of Corinth, and the gulf of Lepanto; and on the weſt, by the Ionian ſea and part of Epirus. Its extent is about 130 miles from north-weſt to ſouth-eaſt; but its greateſt breadth is not above 36 miles. It is in general a mountainous country; but neither unpleaſant nor unfruitful. The principal mountains are, mount Oëta in Bœotia, where is the famous paſs of Thermopylæ, not above 25 feet broad; and Parnaſſus, Helicon, and Cythæron in Phocis, which were ſacred to Apollo and the muſes, and conſequently much celebrated by the poets. The rivers of moſt note are, the Sionapro, anciently the Achelous, the Cephiſſus, the Iſmenus, and the Aſopus. The province is at preſent divided into Livadia proper, Stramulippa, and the duchy of Athens. The principal places are, Lepanto, anciently Naupactus; Livadia, anciently Libadia or Lebadia; the celebrated city of Athens, now Setines; Thebes, now Stibes; Lepſina, anciently Eleuſis; Caſtri, formerly Delphi; and Megara.

LIVADIA, an ancient town of Turkey in Europe, and capital of a province of the ſame name in Greece. It is a large and populous place, ſeated on the gulf of Lepanto, about 25 miles from the city of that name. It has now a conſiderable trade in woollen ſtuffs and rice. Anciently it was celebrated for the oracle of Trophonius, which was in a cavern in a hill above the town. E. long. 23. 29. N. lat. 38. 40.

LIVER, in anatomy. See ANATOMY, p. 190.—Plato, and other of the ancients, fix the principle of love in the liver; whence the Latin proverb, *Cogit amare jecur:* and in this ſenſe Horace frequently uſes the word, as when he ſays, *Si torrere jecur quæris Idoneum.*—The Greeks, from its concave figure, called it ηπαρ, "vaulted, ſuſpended;" the Latins call it *jecur*, q. d. *juxta cor*, as being near the heart.' The French call it *foye*, from *foyer*, *focus*, or "fire-place;" agreeable to the doctrine of the ancients, who believed the blood to be boiled and prepared in it.—Eraſiſtratus, at firſt, called it *parenchyma*, i. e. *effuſion*, or *maſs of blood*; and Hippocrates, by way of eminence, frequently calls it the *hypochondrium*.

LIVER *of Antimony*. See CHEMISTRY.

LIVER *of Arſenic*, is a combination of white arſenic with liquid fixed vegetable alkali, or by the humid way. Arſenic has in general a ſtrong diſpoſition to unite with alkalis. Mr. Macquer, in his *Memoirs upon Arſenic*, mentions a ſingular kind of neutral ſalt, which reſults from the union of arſenic with the alkaline baſis of nitre, when nitre is decompoſed, and its acid is diſengaged in cloſe veſſels, by means of arſenic. To this ſalt he has given the name of *neutral arſenical ſalt*. The liver of arſenic, mentioned alſo by that chemiſt, although compoſed, like the neutral arſenical ſalt, of arſenic and fixed alkali, is nevertheleſs very different from that ſalt.

The operation for making liver of arſenic is eaſy and ſimple. To ſtrong and concentrated liquid fixed alkali, previouſly heated, fine powder of white arſenic muſt be added. This arſenic eaſily diſappears and diſſolves, and as much of it is to be added till the alkali is ſaturated, or has loſt its alkaline properties, although it is ſtill capable of diſſolving more arſenic ſuperabundantly. While the alkali diſſolves the arſenic in this operation, it acquires a browniſh colour, and a ſingular and diſagreeable ſmell; which, however, is not the ſmell of pure arſenic heated and volatilized. Laſtly, this mixture becomes more and more thick, and at length of a gluey conſiſtence. This matter is not cryſtallizable as the neutral arſenical ſalt is. It is eaſily decompoſed by the action of fire, which ſeparates the arſenic. This does not happen to the arſenical ſalt. Any pure acid is capable of ſeparating arſenic from the liver of arſenic, in the ſame manner as they ſeparate ſulphur from liver of ſulphur: whereas the neutral arſenical ſalt cannot be decompoſed but by means of the united affinities of acids and metallic ſubſtances. Thus we ſee that arſenic may be combined with fixed alkali in two very different ways.

The author has given to this combination the name of *liver of arſenic*, to diſtinguiſh it from the neutral arſenical ſalt, and in imitation of the name of the *liver of ſulphur*, given to the combination of the fixed alkali with ſulphur.

LIVER *of Sulphur*. See CHEMISTRY.

LIVER-*Wort*, in botany. See MARCHANTIA and LICHEN.

LIVER-*Stone*, (lapis hepaticus); a genus of inflammable

ſubſtances, containing, beſides its phlogiſton, argillaceous, ponderous, and ſiliceous earth, united with vitriolic acid. See EARTHS. Mr. Bergman, in his Sciagraphia, informs us, that 100 parts of this ſtone contain 33 of ſiliceous earth, 29 of cauſtic ponderous earth, almoſt 5 of argillaceous earth, and 3.7 of lime, beſides the vitriolic acid and water of cryſtalliſation: but Mr. Kirwan quotes another analyſis of the ſame author, where it is ſaid that 100 parts of it contain 33 of baro-ſelenite, 38 of ſiliceous earth, 22 of alum, 7 of gypſum, and 5 of mineral oil.

LIVERPOOL, a large, flouriſhing, and populous town of England, in the county of Lancaſter, ſituated at the influx of the river Merſey into the ſea, 18 miles weſt of Warrington, and 203 north-weſt of London. W. lon. 2. 54. N. lat. 53. 23. This town has ſo much increaſed in trade ſince the commencement of the preſent century, that it is now the greateſt ſea-port in England except London, having exceeded Briſtol conſiderably of late years. The merchants trade to all parts of the world except Turkey and the Eaſt-Indies; but the moſt beneficial trade is to Guinea and the Weſt-Indies, by which many of them have acquired very large fortunes.

Liverpool, during the laſt war, carried on more foreign trade than any town in England; and ſuch is the ſtate of it at this time, that there are near three thouſand veſſels cleared from that port in one year to different parts of the world. Here are ſeveral manufactories for China-ware, and pot-houſes which make very fine ware, ſome ſalt-works, glaſs-houſes, and upwards of 50 breweries, from ſome of which large quantities of malt-liquor are ſent abroad. Many of the buildings are formed in the moſt elegant manner; but the old ſtreets are narrow; which defect will ſoon be removed, as the corporation have lately obtained an act of parliament for the improvement of the town, which they have already begun to put in force with great ſpirit, having taken down the principal ſtreets in the centre of the town, and rebuilt them in a ſpacious and moſt magnificent manner; ſo that in a few years it will be one of the handſomeſt towns in England. This town contains ten churches, namely, St. Peter's, St. Nicholas's, St. George's, St. Thomas's, St. Paul's, St. Ann's, St. John's, St. James's, St. Catharine's, and St. Mary's. There are alſo meetings for independents, anabaptiſts, quakers, methodiſts, and preſbyterians. The exchange is a noble ſtructure, built of white ſtone in the form of a ſquare, and round it are piazzas where the merchants aſſemble to tranſact buſineſs. Above it are the mayor's offices, the ſeſſions-hall, the council-chamber, and two elegant ball-rooms. The expence of erecting this building amounted to 30,000l. The cuſtom-houſe is ſituated at the head of the old dock, and is a handſome and convenient ſtructure. Here are many charitable foundations, among which is a lunatic hoſpital; a public diſpenſary; a ſchool of inſtruction for blind perſons, who are taught to manufacture various uſeful articles; an excellent grammar-ſchool well endowed; and an infirmary in a very pleaſant airy ſituation.

In the town is a charity-ſchool ſupported by voluntary ſubſcriptions and contributions for 50 boys and 12 girls, who are not only clothed and educated, but alſo provided with food and lodging: likewiſe ſeveral alms-houſes for the widows of ſeamen; and an excellent poor-houſe, ſuperior to any in the kingdom, where upwards of 800 men, women, and children, are ſupported, many of whom are employed in ſpinning cotton and wool. There are five or ſix large wet docks, three dry docks, and ſeveral graving docks for the repairing of ſhipping; which renders it the moſt commodious ſea-port in the world. The quays which bound theſe docks are covered with warehouſes; which is a convenience that enables the merchant to diſcharge his ſhip at a very ſmall expence. The new priſon lately finiſhed is a noble edifice, being built entirely on the plan of the great and benevolent Mr. Howard, for ſolitary confinement; and is perhaps the moſt convenient, airy, magnificent building of the kind in Europe; being upon a very extenſive ſcale.

Liverpool received its charter from king John: it is under the government of a recorder, mayor, and an unlimited number of aldermen, two bailiffs, and a common-council of forty of the principal inhabitants, with a town-clerk and other proper officers. The town has a weekly market on Saturday, and is diſtant from London 204 miles. The progreſſive riſe of population has been, and continues to be, prodigious; and the town has within theſe few years been improved at an immenſe expence to the corporation.

By the late inland navigation, Liverpool has communication with the rivers Dee, Ribble, Ouſe, Trent, Darwent, Severn, Humber, Thames, Avon, &c. which navigation, including its windings, extends above 500 miles, in the counties of Lincoln, Nottingham, York, Weſtmoreland, Cheſter, Stafford, Warwick, Leiceſter, Oxford, Worceſter, &c. The Merſey, upon which the town is ſituated, abounds with ſalmon, cod, flounders, turbot, plaiſe, and ſmelts; and at full ſea it is above two miles over. In the neighbourhood are frequent horſe-races, on a five-mile courſe, the fineſt for the length in England. The ſoil in and near the town is dry and ſandy, and particularly favourable to the growth of potatoes, on which the farmers often depend more than on wheat or any other grain. Freſh water is brought into the town by pipes, from ſome ſprings four miles off, purſuant to an act of parliament in the reign of Queen Anne. Liverpool ſends two members to parliament.

LIVERY, in matters of dreſs and equipage, a certain colour and form of dreſs, by which noblemen and gentlemen chooſe to diſtinguiſh their ſervants. Liveries are uſually taken from fancy, or continued in families by ſucceſſion. The ancient cavaliers, at their tournaments, diſtinguiſhed themſelves by wearing the liveries of their miſtreſſes: thus people of quality make their domeſtics wear their livery. Father Meneſtrier, in his Treatiſe of Carouſals, has given a very ample account of the mixtures of colours in liveries. Dion tells us, that Oenomaus was the firſt who invented green and blue colours, for the troops which, in the circus, were to repreſent land and ſea-fights.

The Romiſh church has alſo her ſeveral colours and liveries; white, for confeſſors and virgins, and in times of rejoicing; black, for the dead; red, for the apoſtles and martyrs; blue or violet, for penitents; and green, in times of hope.

Formerly great men gave liveries to ſeveral, who were not of their family or ſervants, to engage them in their quarrels for that year; but this was prohibited by the ſtatutes 1 Rich. II. 1 Hen. IV. cap. 27. 2 and 7 Hen. IV. 8 Hen. VI. cap. 4. 8 Ed. IV. cap. 2; and no man, of whatever condition, was allowed to give any livery, but to his domeſtic officers, and counſel learned in the law. However, moſt of the above ſtatutes are repealed by 3 Car. I. cap. 4.

LIVERY *of Seiſin*, in law, ſignifies delivering the poſſeſſion of lands, &c. to him who has a right to them.

LIVERYMEN of London, are a number of men choſen from among the freemen of each company. Out of this body the common-council, ſheriffs, and other ſuperior officers for the government of the city, are elected; and they alone have the privilege of giving their votes for members of parliament, from which the reſt of the citizens are excluded.

LIVIUS (TITUS), the beſt of the Roman hiſtorians, as he is called by Mr. Bayle, was born at Patavium, or Padua. Few particulars of his life have been handed down to us. Coming to Rome, he acquired the notice and favour of Auguſtus

and there he long reſided. Some have ſuppoſed (for there is not any proof of it), that he was known to Auguſtus before, by certain Philoſophical Dialogues which he had dedicated to him. Seneca ſays nothing of the dedication: but mentions the dialogues, which he calls hiſtorical and philoſophical; and alſo ſome books, written purpoſely on the ſubject of philoſophy. Be this as it will, it is probable that he began his hiſtory as ſoon as he was ſettled at Rome; and he ſeems to have devoted himſelf ſo entirely to the great work he had undertaken, as to be perfectly regardleſs of his own advancement. The tumults and diſtractions of Rome frequently obliged him to retire to Naples; not only that he might be leſs interrupted in the purſuit of his deſtined taſk, but alſo enjoy that retirement and tranquillity which he could not have at Rome, and which yet he ſeems to have much ſought after: for he was greatly diſſatisfied with the manners of his age, and tells us, that "he ſhould reap this reward of his labour, in compoſing the Roman hiſtory, that it would take his attention from the preſent numerous evils, at leaſt while he was employed upon the firſt and earlieſt ages." He uſed to read parts of this hiſtory while he was compoſing it, to Mæcenas and Auguſtus; and the latter conceived ſo high an opinion of him, that he pitched upon him to ſuperintend the education of his grandſon Claudius, who was afterwards emperor. After the death of Auguſtus, Livy returned to the place of his birth, where he was received with all imaginable honour and reſpect; and there he died, in the fourth year of the reign of Tiberius, aged above ſeventy. Some ſay, he died on the ſame day with Ovid: it is certain that he died the ſame year.

Scarce any man was ever more honoured, alive as well as dead, than this hiſtorian. Pliny the younger relates, that a native gentleman travelled from Gades, in the extremeſt parts of Spain, to ſee Livy: and, though Rome abounded with more ſtupendous and curious ſpectacles than any city in the world, yet he immediately returned; as if, after having ſeen Livy, nothing farther could be worthy of his notice. A monument was erected to this hiſtorian in the temple of Juno, where was afterwards founded the monaſtery of St. Juſtina. There, in 1413, was diſcovered the following epitaph upon Livy: *Oſſa Titi Livii Patavini, omnium mortalium judicio digni, cujus prope invicto calamo invicti populi Romani res geſtæ conſcriberentur*; that is, "The bones of Titus Livius of Patavium, a man worthy to be approved by all mankind, by whoſe almoſt invincible pen the acts and exploits of the invincible Romans were written." Theſe bones are ſaid to be preſerved with high reverence to this day, and are ſhown by the Paduans as the moſt precious remains. In 1451, Alphonſus, king of Arragon, ſent his ambaſſador, Anthony Panormita, to deſire of the citizens of Padua the bone of that arm with which this their famous countryman had written his hiſtory: and, obtaining it, cauſed it to be conveyed to Naples with the greateſt ceremony as a moſt invaluable relic. He is ſaid to have recovered from an ill ſtate of health by the pleaſure he found in reading this hiſtory: and therefore, out of gratitude, put upon doing extraordinary honours to the memory of the writer. Panormita alſo, who was a native of Palermo in Sicily, and one of the ableſt men of the 15th century, ſold an eſtate to purchaſe this hiſtorian.

The hiſtory of Livy, like other great works of antiquity, is tranſmitted down to us exceedingly mutilated and imperfect. Its books were originally an hundred and forty-two, of which are extant only thirty-five. The epitomes of it, from which we learn their number, all remain, except thoſe of the 136th and 137th books. Livy's books have been divided into decades, which ſome will have to have been done by Livy himſelf, becauſe there is a preface to every decade; while others ſuppoſe it to be a modern contrivance, ſince nothing about it can be gathered from the ancients. The firſt decade, beginning with the foundation of Rome, is extant, and treats of the affairs of 460 years. The ſecond decade is loſt; the years of which are ſeventy-five. The third decade is extant, and contains the ſecond Punic war, including eighteen years. It is reckoned the moſt excellent part of the hiſtory, as giving an account of a very long and ſharp war, in which the Romans gained ſo many advantages, that no arms could afterwards withſtand them. The fourth decade contains the Macedonian war againſt Philip, and the Aſiatic war againſt Antiochus, which takes up the ſpace of about 23 years. The five firſt books of the fifth decade were found at Worms, by Simon Grynæus, in 1431, but are very defective; and the remainder of Livy's hiſtory, which reaches to the death of Druſus in Germany in 746, together with the ſecond decade, are ſupplied by Freinſhemius.

Never man perhaps was furniſhed with greater advantages for writing a hiſtory than Livy. Beſides his own great genius, which was in every reſpect admirably formed for the purpoſe, he was trained as it were in a city, at that time the empreſs of the world, and in the politeſt reign that ever was; having ſcarcely had any other ſchool than the court of Auguſtus. He had acceſs to the very beſt materials, ſuch as the Memoirs of Sylla, Cæſar, Labienus, Pollio, Auguſtus, and others, written by themſelves. "What writers of memorials (ſays Lord Bolingbroke), what compilers of the Materia Hiſtorica were theſe! What genius was neceſſary to finiſh up the pictures that ſuch maſters had ſketched! Rome afforded men that were equal to the taſk. Let the remains, the precious remains of Salluſt, of Livy, and of Tacitus, witneſs this truth.——What a ſchool of public and private virtue had been opened to us at the reſurrection of learning, if the latter hiſtorians of the Roman commonwealth, and the firſt of the ſucceeding monarchy, had come down to us entire! The few that are come down, though broken and imperfect, compoſe the beſt body of hiſtory that we have; nay, the only body of ancient hiſtory that deſerves to be an object of ſtudy. It fails us indeed moſt at that remarkable and fatal period, where our reaſonable curioſity is raiſed the higheſt. Livy employed forty-five books to bring his hiſtory down to the end of the ſixth century, and the breaking out of the third Punic war: but he employed ninety-five to bring it down from thence to the death of Druſus; that is, through the courſe of 120 or 130 years. Appian, Dion Caſſius, and others, nay, even Plutarch included, make us but poor amends for what is loſt of Livy." Speaking then of Tully's orations and letters, as the beſt adventitious helps to ſupply this loſs, he ſays, that "the age in which Livy flouriſhed, abounded with ſuch materials as theſe: they were freſh, they were authentic: it was eaſy to procure them; it was ſafe to employ them. How he did employ them in executing the ſecond part of his deſign, we may judge from his execution of the firſt; and, I own, I ſhould be glad to exchange, if it were poſſible, what we have of this hiſtory for what we have not. Would you not be glad, my lord, to ſee in one ſtupendous draught, the whole progreſs of that government from liberty to ſervitude; the whole ſeries of cauſes and effects, apparent and real, public and private?" &c.

The encomiums beſtowed upon Livy, by both ancients and moderns, are great and numerous. He not only entertains like Herodotus; he alſo inſtructs and intereſts in the deepeſt manner. But the great probity, candour and impartiality, are what have diſtinguiſhed Livy above all hiſtorians: for neither complaiſance to the times, nor his particular connections with the emperor, could reſtrain him from ſpeaking well of Pompey; ſo well, as to make Auguſtus call him a *Pompeian*. This we learn from Cremutius Cordus, in Tacitus; who relates alſo, much to the emperor's honour, that this gave no interruption to their friendſhip. But whatever eulogies Livy

may have received as an hiſtorian, he has not eſcaped cenſure as a writer. In the age wherein he lived, Aſinius Pollio charged him with Patavinity; which Patavinity has been variouſly explained by various writers, but is generally ſuppoſed to relate to his ſtyle. The moſt common is, that this noble Roman, accuſtomed to the delicacy of the language ſpoken in the court of Auguſtus, could not bear with certain provincial idioms, which Livy, as a Paduan, uſed in divers places of his hiſtory. Pignorius is of another mind, and believes that this Patavinity regarded the orthography of certain words, wherein Livy uſed one letter for another, according to the cuſtom of his country, writing *ſibe* and *quaſe* for *ſibi* and *quaſi*; which he attempts to prove by ſeveral ancient inſcriptions. The expreſſions, however, or the orthography of words, are not loaded with obſcurity, and the perfect claſſic is as familiarly acquainted with thoſe ſuppoſed provincialiſms as with the pureſt Latinity.—Livy has been cenſured too, and perhaps with juſtice, for being too credulous, and burdening his hiſtory with vulgar notions and ſuperſtitious tales. He may diſguſt when he mentions that milk and blood were rained from heaven, or that an ox ſpoke, or a woman changed her ſex; yet he candidly confeſſes that he recorded only what made an indelible impreſſion upon the minds of a credulous age.

Is it worth while to mention here the capricious and tyrannic humour of the emperor Caligula, who accuſed Livy of being a negligent and wordy writer, and reſolved therefore to remove his works and ſtatues out of all libraries, where he knew they were curiouſly preſerved? Or the ſame humour in Domitian, another prodigy of nature, who put to death Metius Pompoſianus, becauſe he made a collection of ſome orations of kings and generals out of Livy's hiſtory? Pope Gregory the great, alſo, would not ſuffer Livy in any Chriſtian library, becauſe of the Pagan ſuperſtition wherewith he abounded: but the ſame reaſon held good againſt all ancient authors; and indeed Gregory's zeal was far from being levelled at Livy in particular, the pontiff having declared war againſt all human learning.

Though we know nothing of Livy's family, yet we learn from Quintilian, that he had a ſon, to whom he addreſſed ſome excellent precepts in rhetoric. An ancient inſcription ſpeaks alſo of one of his daughters, named *Livia Quarta:* the ſame, perhaps, that eſpouſed the orator Lucius Magius, whom Seneca mentions; and obſerves, that the applauſes he uſually received from the public in his harangues, were not ſo much on his own account, as for the ſake of his father-in-law.

Our author's hiſtory has been often publiſhed with and without the ſupplement of Freinſhemius. The beſt editions are, that of Gronovius, *cum notis variorum & ſuis*, Lugd. Bat. 1679, 3 vol. 8vo; that of Le Clerc, at Amſterdam, 1709, 10 vol. 12mo; and that of Crevier, at Paris, 1735, 6 vol. 4to. Theſe have the ſupplements.—Learning perhaps never ſuſtained a greater loſs, in any ſingle author, than by the deſtruction of the latter and more intereſting part of Livy. Several eminent moderns have indulged the pleaſing expectation that the entire work of this noble hiſtorian might yet be recovered. It has been ſaid to exiſt in an Arabic verſion: and even a complete copy of the original is ſuppoſed to have been extant as late as the year 1631, and to have periſhed at that time in the plunder of Magdeburgh. The munificent patron of learning, Leo X. exerted the moſt generous zeal to reſcue from oblivion the valuable treaſure, which one of his moſt bigoted predeceſſors, above mentioned, had expelled from every Chriſtian library. Bayle has preſerved, under the article Leo, two curious original letters of that pontiff, concerning his hopes of recovering Livy; which afford moſt honourable proofs of his liberality in the cauſe of letters.—A lately diſcovered fragment of Livy's hiſtory was publiſhed in 1773 by Dr. Bruns.

Livius (Andronicus), a comic poet, who flouriſhed at Rome about 240 years before the Chriſtian æra. He was the firſt who turned the perſonal ſatires and feſcennine verſes, ſo long the admiration of the Romans, into the form of a proper dialogue and regular play. Though the character of a player, ſo valued and applauded in Greece, was reckoned vile and deſpicable among the Romans, Andronicus acted a part in his dramatical compoſitions, and engaged the attention of his audience, by repeating what he had laboured after the manner of the Greeks. Andronicus was the freedman of M. Livius Salinator, whoſe children he educated. His poetry was grown obſolete in the age of Cicero, whoſe nicety and judgment would not even recommend the reading of it.

LIVONIA, a large province of the Ruſſian empire, with the title of a duchy. It is bounded on the north by the gulph of Finland, on the weſt by that of Riga, on the ſouth by Courland, and on the eaſt, partly by Pleſcow, and partly by Novogorod. It is about 250 miles from north to ſouth, and 150 from eaſt to weſt. The land is ſo fertile in corn, that it is called the *granary of the north*, and would produce a great deal more, if it was not ſo full of lakes. The fiſh that abound here are ſalmons, carps, pikes, flat fiſh, and many others. In the foreſts there are wolves, bears, elks, rein-deer, ſtags, and hares. The domeſtic animals are very numerous; but the ſheep bear very bad wool. Here are a great number of foreſts, which conſiſt of birch-trees, pines, and oaks; and all the houſes of the inhabitants are built with wood. The merchandizes which they ſend abroad are flax, hemp, honey, wax, leather ſkins, and potaſhes. The Swedes were formerly poſſeſſed of this province, but were obliged to abandon it to the Ruſſians after the battle of Pultowa; and it was ceded to them by the peace of the North, concluded in 1722, which was confirmed by another treaty in 1742. It is divided into two provinces, viz. Letonia and Eſtonia; and two iſlands called *Oeſel* and *Dagho*, which are again ſubdivided into ſeveral diſtricts.

LIVONICA-TERRA, a kind of fine bole uſed in the ſhops of Germany and Italy. It is found in Livonia, from whence it takes its name, and alſo in ſome other parts of the world. It is generally brought to us in little cakes, ſealed with the impreſſion of a church and an eſcutcheon, with two croſs keys.

LIVRE, a French money of account, containing 20 ſols, and deemed ten-pence in value in Engliſh money.

LIXA, or Lixus (anc. geog.) a town on the Atlantic near the river Lixus; made a Roman colony by Claudius Cæſar; famous in mythology for the palace of Anteus and his encounter with Hercules (Pliny). Now *Laraçhe*, ſixty-five leagues to the ſouth of the ſtraits of Gibraltar.

LIXIVIUM, in pharmacy, &c. a ley obtained by pouring ſome liquor upon the aſhes of plants; which is more or leſs powerful, as it has imbibed the fixed ſalts contained in the aſhes.

LIXNAW, a barony in the county of Kerry and province of Munſter in Ireland, which gives title of Baron to the earls of Kerry; the village here of this name being their ancient ſeat, where the caſtle was erected. This ſeat ſtands agreeably on the river Brick, which is here cut into ſeveral pleaſant canals, that adorn its plantations and gardens; the improvements are extenſive, moſt of the viſtoes and avenues terminating by different buildings, ſeats, and farm-houſes. The tide flows up to the gardens, whereby boats of a conſiderable burden may bring up goods to the bridge near the houſe: here are two ſtone-bridges over the Brick, the oldeſt of which was built by Nicholas the third baron Lixnaw, who was the firſt perſon that made cauſeways to this place, the land being naturally wet and marſhy. W. lon. 9. 15. N. lat. 52. 15.

LIZARD, in zoology. See Basiliscus.

Lizard, in geography, a cape or promontory of Cornwall, ſituated, according to the moſt common computation, in W. long. 5. 47. N. lat. 49. 50.

LLOYD (Nicholas), a learned Engliſh writer in the 17th century, was born in Flintſhire in Wales, and educated at Wadham college, Oxford. He was rector of Newington St. Mary near Lambeth in Surry, till his death, which happened in 1680. His *Dictionarium Hiſtoricum* is a valuable work, to which Hoffman and Moreri are greatly indebted.

Lloyd (William), a moſt learned Engliſh writer and biſhop, was born in Berkſhire in England in 1627. He was educated under his father, rector of Sonning, and vicar of Tyle-hurſt in Berkſhire; then went to Oxford, and took orders. In 1660 he was made prebendary of Rippon; and in 1666 chaplain to the king. In 1667 he took the degree of doctor of divinity; in 1672 he was inſtalled dean of Bangor; and in 1680 was conſecrated biſhop of St. Aſaph. He was one of the ſix biſhops who, with archbiſhop Sancroft, were committed priſoners to the Tower of London, for ſubſcribing a petition to the king againſt diſtributing and publiſhing his declaration for liberty of conſcience. Soon after the revolution he was made almoner to king William and queen Mary: in 1692 he was tranſlated to the biſhopric of Litchfield and Coventry; and in 1699, to the ſee of Worceſter, where he ſat till his death, which happened in 1717, the 91ſt year of his age. Dr. Burnet gives him an exalted character, and his works are highly eſteemed.

LOACH, in ichthyology. See Cobitis.

LOAD, or Lode, in mining, a word uſed eſpecially in the tin-mines, for any regular vein or courſe, whether metallic or not; but moſt commonly load means a metallic vein. It is to be obſerved, that mines in general are veins or cavities within the earth, whoſe ſides receding from or approaching to each other, make them of unequal breadths in different places, ſometimes forming large ſpaces, which are called *boles*; theſe holes are filled like the reſt with ſubſtances, which, whether metallic, or of any other nature, are called *loads*. When the ſubſtances forming theſe loads are reducible to metal, the loads are by the Engliſh miners ſaid to be alive, otherwiſe they are termed dead loads.

In Cornwall and Devonſhire the loads all hold their courſe from caſtward to weſtward, though in other parts of England they frequently run from north to ſouth. The miners report, that the ſides of the load never bear in a perpendicular, but always overhang either to the north or ſouth above. The mines ſeem to have been ſo many channels through which the waters paſs within the earth; and like rivers they have their ſmall branches opening into them in all directions: theſe are by the miners termed the feeders of the load. Moſt mines have ſtreams of water running through them; and when they are found dry, it ſeems owing to the water having changed its courſe, which it ſeems ſometimes to have been compelled to by the load's having filled up the courſe, and ſometimes to have fallen into other more eaſy channels.

The load is frequently intercepted by the croſſing of a vein of earth or ſtone, or ſome other metalline ſubſtance; in which caſe it generally happens, that one part of the load is moved to a conſiderable diſtance on one ſide. This tranſient load is, by the miners, termed a *flooking*; and the part of the load which is moved, is by them ſaid to be *heaved*. This fracture or heave of a load, according to Mr. Price, is produced by a ſubſidence of the ſtrata from their primary poſitions, which he ſuppoſes to have been horizontal or parallel to the ſurface of the earth, and therefore ſhould more properly be called a depreſſion than a heave. This heaving of the load would be an inexpreſſible loſs to the miner, did not experience teach him, that as the loads always run on the ſides of the hills, ſo the part heaved is always moved toward the deſcent of the hill; ſo that the miner, working toward the aſcent of the hill, and meeting a flooking, conſiders himſelf as working in the heaved part; wherefore, cutting through the flooking, he works upon its back up the aſcent of the hill, till he recovers the load, and *vice verſa*.

Load is alſo uſed for nine diſhes of ore, each diſh being about half a hundred weight.

LOADSTONE. See Magnet.

LOAMS, in natural hiſtory, are defined to be earths compoſed of diſſimilar particles, ſtiff, denſe, hard, and rough to the touch; not eaſily broke while moiſt, readily diffuſible in water, and compoſed of ſand and a tough viſcid clay. Of theſe loams ſome are whitiſh and others brown and yellow. See Agriculture.

LOAN, any thing given to another, on condition of return or payment. Such are *Public* Loans, reſpecting which ſee Funds.

LOANDA, a province of the kingdom of Angola in Africa. It is an iſland about 15 miles in length, and three in breadth; remarkable chiefly for the capital of Angola ſituated upon it, in E. long. 12. 25. S. lat. 8. 45. This town was built by the Portugueſe in 1578, under the direction of the firſt Portugueſe governor in theſe parts. It is large, populous, and pleaſantly ſeated on the declivity of a hill near the ſea-coaſt, and facing the ſouth-weſt. The iſland is ſupplied with freſh water from wells dug in it; and which are not ſunk below the depth of three feet when they are filled with excellent water. It is remarkable, however, that the water of theſe wells continues good only during the time of high-tide; for, as that ſinks, the water becomes more and more brackiſh, till at laſt it is quite ſalt, almoſt as much as the ſea itſelf. On the coaſt of this iſland are fiſhed the zimbis, or ſhells uſed in ſeveral parts of Africa inſtead of money; and with theſe ſhells inſtead of coin, is carried on a great part of the traffic of this country.

LOANGO, a kingdom of Africa, extending itſelf about 180 geographical miles in length from ſouth to north; that is, from cape St. Catharine under the ſecond degree of ſouth latitude, to a ſmall river called *Lovanda Louiſia*, on the 5th degree of the ſame. From weſt to eaſt it extends from Cape Negro on the coaſt of Ethiopia towards the *Buchumalcan* mountains, ſo called on account of their vaſt quantity of ivory and great droves of elephants, about 300 miles. It is divided into four principal provinces, viz. thoſe of Lovangiri, Loangomongo, Chilongo, and Piri.

The inhabitants are very black, well-ſhaped, and of a mild temper. The men wear long petticoats, from the waiſt downwards, and have round their waiſt a piece of cloth half an ell or a quarter broad, over which they wear the ſkin of a leopard, or ſome other wild beaſt, hanging before them like an apron. On their head they wear a cap made of graſs, and quilted, with a feather a-top of it; and on their ſhoulder, or in their hand, they carry a buffalo's tail, to drive away the muſkettos. The womens petticoats are made only of ſtraw, about an ell ſquare, with which they cover their privities, but leave the greateſt part of their thighs and buttocks bare: the reſt of their body is quite bare, except that on their legs they wear little ſtrings of beads made of ſhells, and ſmall bracelets of ivory on their arms. They anoint themſelves with palm-oil, mixed with a kind of red wood reduced to powder. This country abounds with poultry, oxen, cows, ſheep, goats, elephants, tigers, leopards, civet-cats, and other animals; ſo that here are great quantities of elephants teeth, and fine furs, to be traded for.

The capital city, where the king reſides, is called *Loango*,

or *Banza-Loangeri*, and, in the language of the negroes, *Boaric*. This city is ſituated in South lat. 4½ degrees, a league and a half from the ſea-coaſt. It is a pretty large city, ſhaded and adorned with bananas, palm, and other trees. The king, who reſides in a large palace in the middle of it, has about 1500 concubines. If any of them is ſurpriſed in adultery, ſhe and her paramour are inſtantly conveyed to the top of a very high hill, whence they are hurled down headlong from the ſteepeſt place. Every man marries as many wives here as he pleaſes, who are obliged to get their huſbands a livelihood, as is the practice all along the African coaſt inhabited by blacks. The women, therefore, cultivate the land, ſow and reap, while the lazy huſbands loiter away their time in idleneſs.

The king's revenue conſiſts in elephants teeth, copper, and a kind of petticoats made of palm-tree leaves, and called *lavogus*: he has whole ſtore-houſes full of theſe lavogus; but his greateſt riches conſiſt in ſlaves of both ſexes.

LOBBY, in architecture, is a ſmall hall or waiting-room: it is alſo an entrance into a principal apartment, where there is a conſiderable ſpace between that and a portico or veſtibule, and the length or dimenſions will not allow it to be conſidered as a veſtibule or an anti-room. See ANTICHAMBER.

LOBE, in anatomy, any fleſhy protuberant part, as the lobes of the lungs, the lobes of the ears, &c.

LOBELIA, CARDINAL-FLOWER: A genus of the monogamia order, belonging to the ſyngeneſia claſs of plants; and in the natural method ranking under the 29th order, *Campanaceæ*. The calyx is quinquefid; the corolla monopetalous, and irregular; the capſule inferior, bilocular, or trilocular. There is a great number of ſpecies, but only four of them are cultivated in our gardens; two of which are hardy herbaceous plants for the open ground, and two ſhrubby plants for the ſtove. They are all fibrous rooted perennials, riſing with erect ſtalks from two to five or ſix feet high, ornamented with oblong, oval, ſpear-ſhaped, ſimple leaves; and ſpikes of beautiful monopetalous, ſomewhat ringent, five-parted flowers, of ſcarlet, blue, and violet colours. They are eaſily propagated by ſeeds, offsets, and cuttings of their ſtalks. The tender kinds require the common treatment of other exotics. They are natives of America; from which their ſeeds muſt be procured.

The root of a ſpecies called the *ſiphilitica* is an article of the materia medica. This ſpecies grows in moſt places in Virginia, and bears our winters. It is perennial, has an erect ſtalk three or four feet high, blue flowers, a milky juice, and a rank ſmell. The root conſiſts of white fibres about two inches long, reſembles tobacco in taſte, which remains on the tongue, and is apt to excite vomiting. It is uſed by the North American Indians as a ſpecific in the venereal diſeaſe. The form is that of decoction; the doſe of which is ordered to be gradually increaſed till it bring on very conſiderable purging, then to be intermitted for a little, and again uſed in a more moderate degree till the cure be completed. The ulcers are alſo waſhed with the decoction, and the Indians are ſaid to ſprinkle them with the powder of the inner bark of the ſpruce tree. The ſame ſtrictneſs of regimen is ordered as during a ſalivation or mercurial courſe. The benefit to be derived from this article has not, as far as we know, been confirmed either in Britain or by the practitioners in Virginia: for there, as well as in this country, recourſe is almoſt univerſally had to the uſe of mercury; and it is probably from this reaſon that the London college have not received it into their liſt. It, however, ſeems to be an article which, in ſome caſes at leaſt, deſerves a trial.

LOBETUM, anciently a town of the Hither Spain: ſaid to have been built by the Libyan Hercules (Pliny). Now *Albarazin*, a town of Arragon on the confines of New Caſtile, on the river Guadalavir. E. long. 2. N. lat. 40. 40.

LOBINEAU (GUY ALEXIS), a Benedictine monk, born at Rennes in 1666, ſpent his whole life in the ſtudy of hiſtory, and the writing of ſeveral works; the principal of which are, the hiſtory of Brittany, 2 vols. folio; and a continuation of Felibien's hiſtory of Paris, 9 vols. folio. He died in 1727.

LOBO (RODRIGUEZ FRANCIS), a celebrated Portugueſe poet, was born at Leiria, a ſmall town of Eſtramadura. He wrote an heroic poem, ſome eclogues, and a piece intitled *Euphroſyne*, which is the favourite comedy of the Portugueſe. His works were collected and printed together in Portugueſe in 1721, in folio. He flouriſhed about 1610.

LOBO (Jerome), a famous Portugueſe Jeſuit, born at Liſbon, went into Ethiopia, and dwelt there for a long time. At his return he was made rector of the college of Coimbra, where he died in 1678. He wrote an hiſtorical account of Abyſſinia, which is by ſome eſteemed a very accurate performance.

LOBSTER, in zoology, a ſpecies of cancer. See CANCER.

LOCARNO, a town of Swiſſerland, capital of a bailiwick of the ſame name, ſeated at the north end of the lake Maggiore, near the river Magie. It carries on a great trade; and the country abounds in paſtures, wine, and fruits. E. long. 8. 41. N. lat. 46. 6.

LOCHABER, a diſtrict of the ſhire of Inverneſs in Scotland. It is bounded by Moydart on the weſt, Glengary on the north, Badenoch on the eaſt, and Lorn on the ſouth. It derives its name from the lake or loch Aber; and extends about 20 miles from eaſt to weſt, and 30 from north to ſouth. The country is barren, bleak, mountainous, and rugged.

LOCHIA, in midwifery, a flux from the uterus, conſequent to delivery. See MIDWIFERY.

LOCK, a well-known inſtrument uſed for faſtening doors, cheſts, &c. generally opened by a key. The lock is reckoned the maſter-piece in ſmithery; a great deal of art and delicacy being required in contriving and varying the wards, ſprings, bolts, &c. and adjuſting them to the places where they are to be uſed, and to the various occaſions of uſing them. From the various ſtructure of locks, accommodated to their different intentions, they acquire various names. Thoſe placed on outer doors are called *ſtock-locks*; thoſe on chamber-doors, *ſpring-locks*; thoſe on trunks, *trunk-locks*, *padlocks*, &c.—Of theſe the ſpring-lock is the moſt conſiderable, both for its frequency and the curioſity of its ſtructure. Its principal parts are, the main-plate, the cover-plate, and the pin-hole: to the main-plate belong the key-hole, top-hook, croſs-wards, bolt-toe or bolt-knab, drawback-ſpring tumbler, pin of the tumbler, and the ſtaples; to the cover-plate belong the pin, main-ward, croſs-ward, ſtep-ward or dap-ward; to the pin-hole belong the hook-ward, main croſs-ward, ſhank, the pot or bread, bow-ward, and bit.

A treatiſe upon this ſubject has been publiſhed by Mr. Joſeph Bramah, who begins with obſerving, that the principle on which all locks depend, is the application of a lever to an interior bolt, by means of a communication from without; ſo that, by means of the latter, the lever acts upon the bolt, and moves it in ſnch a manner as to ſecure the lid or door from being opened by any pull or puſh from without. The ſecurity of locks in general therefore depends on the number of impediments we can interpoſe betwixt the lever (the key) and the bolt which ſecures the door; and theſe impediments are well known by the name of *wards*, the number and intricacy of which alone are ſuppoſed to diſtinguiſh a good lock from a bad one. If theſe wards, however, do not in an effectual manner preclude the acceſs of *all* other inſtruments beſides the proper key, it is ſtill poſſible for a mechanic of equal ſkill with the lock-maker to open it without the key, and thus to elude the labour of the other. "As nothing (ſays Mr. Bramah) can be more oppoſite in principle to *fixed wards* than a lock which

derives its properties from the *motion* of all its parts, I determined that the conſtruction of ſuch a lock ſhould be the ſubject of my experiment." In the proſecution of this experiment he had the ſatisfaction to find, that the leaſt perfect of all his models fully aſcertained the truth and certainty of his principle. The excluſion of wards made it neceſſary to cut off all communication between the key and the bolt; as the ſame paſſage, which (in a lock *ſimply* conſtructed) would admit the key, might give admiſſion likewiſe to other inſtruments. The office, therefore, which in other locks is performed by the extreme point of the key, is here aſſigned to a lever, which cannot approach the bolt till every part of the lock has undergone a change of poſition. The neceſſity of this change to the purpoſes of the lock, and the abſolute impoſſibility of effecting it otherwiſe than with the proper key, are the points to be aſcertained; and this our author does in the following manner:

Fig. 1. pl. 8. ſhows Mr. Bramah's firſt attempt to conſtruct a lock upon this principle: which, to his ſurpriſe, turned out complete and perfect. A, repreſents a common axis on which the ſix levers, croſſing the face of the lock, are united as on a joint. Each of theſe reſts upon a ſeparate ſpring ſufficiently ſtrong to bear its weight; or, if depreſſed by a ſuperior force, to reſtore it to its proper poſition when that force is removed. B repreſents a frame through which the levers paſs by ſeparate grooves, exactly fitted to their width, but of ſufficient depth to allow them a free motion in a perpendicular direction. The part which projects from the oppoſite ſide of the joint A, and is inſerted in the bolt C, is a lever to which two offices are aſſigned; one to keep the bolt in a fixed poſition, in the abſence of the key; the other, to give it its proper motion upon the application of the key. D is a circular platform turning upon a centre. On this the joint or carriage of the levers, and the ſprings on which they reſt, are fixed; and the motion of this platform impels the bolt, in either direction, by means of the lever which is projected from the joint A. The inviolable reſtraint upon this lock, by which means it is ſubjected only to the action of the key, is lodged in the part E, which is a thin plate, bearing at each extremity on a block, and having of courſe a vacant ſpace beneath, equal in height to the thickneſs of the blocks on which it reſts. By this plate the motion of the machine is checked or guided in the following manner: On the edge of the plate which faces the movement there are ſix notches, which receive the ends of the levers projecting beyond the frame B; and while they are confined in this manner, the motion of the machine is ſo totally ſuſpended as to defy every power of art to overcome.

To underſtand in what manner the proper key of this lock overcomes theſe obſtacles, it muſt be obſerved, that each lever has a notch on its extremity, and that thoſe notches are diſpoſed as irregularly as poſſible. To give the machine a capacity of motion, theſe notches muſt be brought parallel to each other, and by a diſtinct but unequal preſſure upon the levers, be formed into a groove in a direct line with the edge of the plate E, which the notches are exactly fitted to receive. The leaſt motion of the machine, while the levers are in this poſition, will introduce the edge of the plate into the groove; which, controuling the power of the ſprings, will give liberty to the levers to move in an horizontal direction as far as the ſpace between the blocks which ſupport the plate E will admit, and which is ſufficient to give the machine a power of acting on the bolt. The impoſſibility of thus bringing the notches on the points of the levers into a direct line, ſo as to tally with the edge of the plate E by any other means than the motion and impulſe of the key, is that which conſtitutes the principal excellency of this lock.

The key (fig. 2.) exhibits ſix different ſurfaces, againſt which the levers are progreſſively admitted in the operation of opening the lock: the irregularity of theſe ſurfaces ſhows the unequal and diſtinct degree of preſſure which each lever requires to bring them to their proper bearings, in order to put the machine in motion. Hence it appears, that unleſs the various heights of the ſurfaces expreſſed on the bit of the key are exactly proportioned to the ſeveral diſtances neceſſary to bring the notches into a ſtraight line with each other, they muſt remain immoveable; "and (ſays our author) as one ſtroke of a file is ſufficient to cauſe ſuch a diſproportion as will prove an unſurmountable impediment to their motion, I may ſafely aſſert, that it is not in art to produce a key or other inſtrument, by which a lock, conſtructed upon this principle, can be opened."

On this principle it would even be a matter of great difficulty for any workman, however ſkilful, to conſtruct a key for the lock when open to his inſpection: "for the levers being raiſed, by the ſubjacent ſprings, to an equal height in the frame B, preſent a *plane* ſurface; and conſequently convey no direction that can be of any uſe in forming a tally to the *irregular* ſurface which they preſent when acting in ſubjection to the key. Unleſs therefore we can contrive a method to bring the notches on the points of the levers in a direct line with each other, and to retain them in that poſition till an exact impreſſion of the irregular ſurface, which the levers will then exhibit, can be taken; the workman will be unable to fit a key to the lock, or to move the bolt. This proceſs muſt be rendered extremely troubleſome by means of the ſprings; and if ſuch difficulties occur, even when the lock is open to the inſpection of a ſkilful workman, much more muſt we ſuppoſe it out of the power of one who has not acceſs to the internal parts to make a falſe key to a lock of this kind.

Theſe difficulties render it neceſſary in making locks of this kind not to fit the key to the lock, as is uſual in other locks, but to fit the lock to the key. In this kind of lock, therefore, the key muſt be made firſt; and the inequalities upon the ſurface of the bit worked as chance or fancy may direct, without any reference to the lock. The key being thus completed, and applied to the ſurface of the levers, will, by a gentle preſſure, force them to unequal diſtances from their common ſtation in the frame B, and ſink their points to unequal depths into the ſpace beneath the plate E. While the levers are in this poſition, the edge of the plate E will mark the preciſe point at which the notch on each lever muſt be expreſſed. The notches being cut by this direction, the irregularity which appears when the levers reſume their ſtation in the frame B, and the inequality of the receſſes on the bit of the key, will appear as a ſeal and its correſponding impreſſion.

The following is a lock contrived upon the ſame principle, but more curious; and, in our author's opinion, more extenſively uſeful. Fig. 3. repreſents a circular block of metal divided from the centre into eight compartments, each containing a cell which forms a paſſage through the block, as is repreſented by the ſmall circles deſcribed on the flat ſurface A. In each of theſe cells two grooves are cut at oppoſite points, which open a communication with the centre at one point, and with the ſpherical ſurface of the block or barrel at the other. The ſmall circle, which marks the centre of the flat ſurface A, is the key-hole, which likewiſe forms a paſſage through the barrel in a parallel line with the cells which ſurround it. This figure repreſents the frame in which the active parts of the lock are depoſited.

Fig. 4. ſhows a ſpiral ſpring lodged in the bottom of each cell, and occupying one half of the ſpace, the other being filled with a ſlider reſting upon the ſpring, and repreſented by fig. 5. the office of theſe ſliders exactly correſponding with that of the levers in the lock already deſcribed. Thus, when lodged in their reſpective cells, they are ſuſtained, like the levers, by the elaſticity of the ſprings upon which they reſt, till a ſuperior

power be applied; and they are again reſtored to their ſtations by the reaction of the ſprings when the weight is removed. The ſide B of each ſlider is projected beyond the circular ſurface, as repreſented fig. 6. in a manner ſimilar to the projection of the levers in the former lock beyond the curved frame in which they move. The point C is projected through the interior groove into the ſpace which forms the centre or key-hole, expreſſed on the flat ſurface A.

Fig. 7. repreſents the key. When this is applied, it muſt of courſe encounter theſe interior projections; and when preſſed forward, the indented ſpaces on its point being unequal, will force the ſliders to unequal diſtances from their bearers; bringing the notches expreſſed on their exterior projections in a direct line with each other, in a manner ſimilar to that by which the effect is produced upon the levers in the former lock. When the key is withdrawn, and the ſliders reſume their ſtations by the preſſure of the ſprings, the diſpoſition of the notches muſt be irregular in the ſame proportion that the indentations on the point of the key are unequal; and they muſt neceſſarily fall again into a ſtraight line when acted upon by the key.

Fig. 6. ſhows the barrel completely fitted for action. Its interior end is capped with a plate, which unites its compartments, and confines the ſprings and ſliders within the cells to which they belong. From that plate proceeds the point A, which repreſents the lever by which the bolt is projected or withdrawn, according to the direction in which the machine performs its revolution.

Fig. 8. ſhows the flat ſurface of a thin plate, correſponding in its office with the part C of the former lock. The ſpace cut in its centre is exactly fitted to the ſpherical ſurface of the barrel; the circle deſcribing its circumference, and the notches cut on its edge, coinciding with the projections of the ſliders. The barrel, when encircled with this plate at the middle of its ſpherical ſurface, has its motion totally ſuſpended till the notches on the projections of the ſliders are forced, by the preſſure of the key, into a line with each other: a groove being thus formed on the ſpherical ſurface of the barrel parallel to, and coinciding with the edge of the plate, the machine is at liberty to perform a revolution in any direction, but returns to its confined ſtate when the key is withdrawn.

The parts of the movement being thus united, the interior end of the barrel is depoſited in a bed repreſented fig. 9. To this it is faſtened at the angles of the plate repreſented fig. 8. by which the barrel is encircled. The ſtation of the bolt is at A; the lever which acts upon it being projected on the other ſide. Fig. 10. is a cap or maſk which covers the face of the movement, and completes the lock.

On this lock our author obſerves, that it is excellent for ſtreet-doors: "for no method of robbery (ſays he) is more practiſed, than gaining admittance into houſes by thoſe keys, which, as is well known, may be procured at the old iron ſhops to fit almoſt any lock in uſe. Such robberies are generally committed where the ſervants are allowed to take the key with them when ſent on errands, it being impracticable while the key is fixed in the lock. The variations, by which the production of correſpondent keys is avoided, have two ſources: the one ariſing from the changes that may be made in the diſpoſition of the levers; the other, from the number of points contained on the projected ſurface of each lever; by which the poſition of its notch may, in the ſmalleſt degree, be varied.

"The variations, producible in the diſpoſitions of ſix figures only, are 720: theſe, being progreſſively multiplied by additional figures, will increaſe by aſtoniſhing degrees; and eventually ſhow, that a lock containing twelve levers will admit of 479,001,500 changes; which, with the addition of another lever, will increaſe to 6,229,019,500. Theſe being again multiplied by the number of changes which the projected ſurface of the levers will admit in the diſpoſition of the notches, their amount will exceed numeration, and may therefore be properly ſaid to be infinite. The ſlighteſt inſpection will at once ſhow, that their conſtruction precludes all poſſibility of obtaining an impreſſion of their internal parts, which is neceſſary for the fabrication of a falſe key; for it will be eaſily ſeen, that the poſitions into which the levers are forced by the preſſure of the key in opening the lock, can no more be aſcertained when the key is withdrawn, than the ſeal can be copied from its impreſſion on a fluid, or the courſe of a ſhip be diſcovered by tracing it on the ſurface of the waves. But inviolable ſecurity is not the only excellence they poſſeſs: the ſimplicity of their principle gives them likewiſe a great advantage over locks that are more complicated, in point of duration; for their eſſential parts being ſubject to no friction, nor expoſed to any poſſible accident from without, they will be leſs affected by uſe, and leſs liable to ſtand in need of repair."

Lock, or *weir*, in inland navigations, the general name for all thoſe works of wood or ſtone made to confine and raiſe the water of a river: the banks alſo which are made to divert the courſe of a river, are called by theſe names in ſome places. But the term *lock* is more particularly appropriated to expreſs a kind of canal incloſed between two gates; the upper called by workmen the ſluice-gate, and the lower called the flood-gate. Theſe ſerve in artificial navigations to confine the water, and render the paſſage of boats eaſy in paſſing up and down the ſtream See Canal.

LOCKE (John), a moſt eminent Engliſh philoſopher and writer in the latter end of the 17th century, was ſon of Mr. John Locke of Penſford in Somerſetſhire, and born at Wrington near Briſtol in 1632. He was ſent to Chriſt-church in Oxford; but was highly diſſatisfied with the common courſe of ſtudies then purſued in the univerſity, where nothing was taught but the Ariſtotelian philoſophy; and had a great averſion to the diſputes of the ſchools then in uſe. The firſt books which gave him a reliſh for philoſophy, were the writings of Des Cartes: for though he did not always approve of his notions, yet he thought he wrote with great perſpicuity. He applied himſelf with vigour to his ſtudies, particularly to phyſic, in which he gained a conſiderable knowledge, though he never practiſed it. In 1694 he went to Germany as ſecretary to Sir William Swan, envoy from the Engliſh court to the elector of Brandenburgh and ſome other German princes. In leſs than a year, he returned to England; where, among other ſtudies, he applied himſelf to that of natural philoſophy, as appears from a regiſter of the changes of the air, which he kept at Oxford from June 24, 1666, to March 28, 1667. There he became acquainted with the lord Aſhley, afterwards earl of Shafteſbury, who introduced him into the converſation of ſome of the moſt eminent perſons of that time. In 1670 he began to form the plan of his *Eſſay on Human Underſtanding*; but his employments and avocations prevented him from finiſhing it then. About this time he became a member of the Royal Society. In 1672, his patron, now earl of Shafteſbury, and lord chancellor of England, appointed him ſecretary of the preſentations, which place he held till the earl reſigned the great ſeal. In 1673 he was made ſecretary to a commiſſion of trade, worth 500l. a year; but that commiſſion was diſſolved in 1674. The earl of Shafteſbury being reſtored to favour, and made preſident of the council in 1679, ſent for Mr. Locke to London: but that nobleman did not continue long in his poſt, being ſent priſoner to the tower; and after his diſcharge retired to Holland in 1682.

Mr. Locke followed his patron thither. He had not been abſent from England a year, when he was accuſed at court of having written certain tracts againſt the government, which were afterwards diſcovered to be written by another perſon;

and in November 1684 he was deprived of his place of ſtudent in Chriſt-church. In 1685 the Engliſh envoy at the Hague demanded him and 83 other perſons to be delivered up by the States General: upon which he lay concealed till the year following; and during this time formed a weekly aſſembly with Mr. Limborch, Mr. Le Clerc, and other learned men at Amſterdam. In 1689 he returned to England in the fleet which conveyed the princeſs of Orange; and endeavoured to procure his reſtoration to his place of ſtudent of Chriſt-church, that it might appear from thence that he had been unjuſtly deprived of it: but when he found the college would admit him only as a ſupernumerary ſtudent, he deſiſted from his claim.

Being eſteemed a ſufferer for revolution principles, he might eaſily have obtained a more profitable poſt; but he contented himſelf with that of commiſſioner of appeals, worth 200l. a year, which was procured for him by the lord Mordaunt, afterwards earl of Monmouth, and next of Peterborough. About the ſame time he was offered to go abroad in a public character; and it was left to his choice, whether he would be envoy at the court of the emperor, that of the elector of Brandenburgh, or any other where he thought the air moſt ſuitable to him: but he waved all theſe, on account of the infirm ſtate of his health; which diſpoſed him gladly to accept another offer that was made by Sir Francis Maſham and his lady, of an apartment in their country-ſeat at Oates in Eſſex, about 25 miles from London.

This place proved ſo agreeable to him in every reſpect, that it is no wonder he ſpent the greateſt part of the remainder of his life at it. The air reſtored him almoſt to a miracle, in a few hours after his return at any time from the town, quite ſpent and unable to ſupport himſelf. Beſides this happineſs here, he found in lady Maſham a friend and companion exactly to his heart's wiſh; a lady of a contemplative and ſtudious complexion, and particularly inured, from her infancy, to deep and refined ſpeculations in theology, metaphyſics, and morality. In this family Mr. Locke lived with as much eaſe as if the whole houſe had been his own: and he had the additional ſatisfaction of ſeeing this lady breed up her only ſon exactly upon the plan which he had laid down for the beſt method of education: the ſucceſs of which was ſuch as ſeemed to give a ſanction to his judgment in the choice of that method. In effect, it is to the advantage of this ſituation that he derived ſo much ſtrength as to continue exerting thoſe talents which the earl of Shafteſbury had obſerved to be in him for political ſubjects. Hence we find him writing in defence of the revolution in one piece; and conſidering the great national concern at that time, the ill ſtate of the ſilver coin, and propoſing remedies for it, in others. Hence he was made a commiſſioner of trade and plantations in 1695, which engaged him in the immediate buſineſs of the ſtate; and with regard to the church, he publiſhed a treatiſe the ſame year, to promote the ſcheme which king William had much at heart, of a comprehenſion with the diſſenters. This, however, drew him into one controverſy; which was ſcarcely ended, when he entered into another in defence of his eſſay, which held till 1698: ſoon after which the aſthma, his conſtitutional diſorder, increaſing with his years, began to ſubdue him; and he became ſo infirm, that in 1700 he reſigned his ſeat at the board of trade, becauſe he could no longer bear the air of London ſufficient for a regular attendance upon it. After this reſignation he continued altogether at Oates; in which retirement he employed the remaining laſt years of his life entirely in the ſtudy of the holy Scriptures.

He died in 1704, aged 73. His writings will immortalize his name. The earl of Shafteſbury, author of the Characteriſtics, though in one place he ſpeaks of Mr. Locke's philoſophy with ſeverity; yet obſerves, concerning his Eſſay on the Human Underſtanding, in general, "that it may qualify men as well for buſineſs and the world, as for the ſciences and the univerſity." Whoever is acquainted with the barbarous ſtate of the philoſophy of the human mind when Mr Locke undertook to pave the way to a clear notion of knowledge, and the proper methods of purſuing and advancing it, will be ſurpriſed at this great man's abilities; and plainly diſcover how much we are beholden to him for any conſiderable improvements that have been made ſince. His Diſcourſes on Government, Letters on Toleration, and his Commentaries on ſome of St. Paul's Epiſtles, are juſtly held in the higheſt eſteem.

LOCKED JAW. See MEDICINE.

LOCKMAN, an officer in the Iſle of Man, who executes the orders of government, much like our under-ſheriff.

LOCKMAN, an eaſtern philoſopher. See LOKMAN.

LOCLE, a ſmall town in a diſtrict of the ſame name in Switzerland, adjacent to Neufchatel and Vallengin, and united with another named *La Ghaux de Fond*. Both theſe diſtricts occupy ſome valleys formed by the mountains of Jura; the greateſt part of which not many years ago was one continued foreſt, though now converted into fine paſture-ground fitted with flouriſhing villages. The increaſe of population in theſe diſtricts is particularly evident from the following circumſtance, *viz.* that formerly the produce of the country was more than ſufficient to ſerve the inhabitants; but now, though conſiderably better cultivated, it ſcarce furniſhes an eighth part of the neceſſary conſumption. This great increaſe of numbers is owing to the early marriages of the inhabitants; to the liberty allowed to every ſtranger, who brings a certificate of his good behaviour, to ſettle in the diſtrict; to follow any trade without reſtriction, and without an apprenticeſhip; and to the want of taxes, and an unbounded freedom of commerce. The induſtry and genius of the people in theſe diſtricts is very ſurpriſing. They carry on an extenſive commerce in lace, ſtockings, cutlery, and other merchandiſe of their own manufacture; and particularly excel in every branch of watch and clock making. They make all the utenſils neceſſary in theſe arts, and have invented ſeveral new ones. There are alſo in theſe diſtricts painters, gilders, enamellers, engravers, and other artiſts neceſſary for completing the buſineſs of watch making; by which means that buſineſs is carried on to ſo great an extent, that 40,000 watches are computed to be annually made. Beſides theſe arts already mentioned, the people are extremely ingenious in other branches of mechanics, and have invented ſeveral aſtronomical and mathematical inſtruments. One of the moſt eminent in this way is Jaquet Droz, now at Paris; and whoſe ſon exhibited ſeveral ſurpriſing automatical figures in England. One of theſe played upon a harpſichord; another drew landſcapes; and a third copied any word preſented to it, or wrote down whatever was dictated by any of the company.

The inhabitants of theſe diſtricts are very courteous to ſtrangers who viſit them: they are in general well informed in ſeveral branches of knowledge; and as they commonly employ their leiſure hours in reading, they have circulating libraries in many of their villages. Their houſes are plaſtered, white waſhed, well built, and commodious, though ſmall; being beſides furniſhed with a degree of neatneſs and even elegance peculiarly ſtriking in theſe ſequeſtered mountains. "Such perfect eaſe and plenty (ſays Mr. Coxe) reigns throughout theſe mountains, that I ſcarcely ſaw one object of poverty: the natural effects of induſtry under a mild and equitable government."

LOCRI, or LOCRI *Epizephyrii* (anc. geog.), a town of the Bruttii, on the Ionian ſea: a colony of the Locri Ozolæ (Strabo); rather of the Epicnemidii (Virgil), who calls it *Narycii Locri*, from Narycus a town of the Locri Epicnemedii. The epithet *Epizephyrii* is from its ſituation near the promontory Zephyrium (Strabo); *Locri* and *Locrenſes*, the people.

They are ſaid to be the firſt who uſed a code or body of written laws, compiled by Zaleucus from the laws of the Cretans, Lacedemonians, and the Areopagitæ, adding an expreſs penalty to each law, which was before diſcretionary, at the option of the judge (Strabo). Adultery was puniſhed with the loſs of both eyes. His own ſon being convicted of this crime; to maintain at the ſame time the authority of the law, and to pay ſome regard to the interceſſion of the people in favour of his ſon, Zaleucus ſuffered the loſs of an eye, his ſon loſing another (Ælian, Val. Maximus).

LOCRIS, the diſtrict or territory of Locri in the Bruttii in Italy.

Locris, a country of Achaia in Greece; twofold, and divided by mount Parnaſſus. The Hither was occupied by the Locri Ozolæ, called alſo *Zephyrii*, or Weſtern, contained between Ætolia and Phocis, beginning at Naupactum, and running in a narrow ſlip of land, ſcarce 200 ſtadia, along the ſea to the borders of the Phocenſes. The farther Locris lay beyond Parnaſſus, running out towards Thermopylæ, and reaching to the Euripus of Eubœa; occupied by the Locri Opuntii, who dwelt on the Eubœan ſea; and the Epicnemidii, who occupied mount Cnemis (Strabo); and theſe two were the Eaſtern Locri.

LOCULAMENTA, and Loculi, in botany; cells or pockets: The internal diviſions of a capſule, or other dry ſeed-veſſel, ſo termed.—Theſe cells contain or incloſe the ſeeds; and are different in number in different plants. The term *loculus* is alſo ſometimes uſed to expreſs the minute diviſions in ſome ſpecies of *antheræ*, which contain the fine impalpable powder ſuppoſed by the ſexualiſts to be the principal agent in the generation of plants.

LOCUS geometricus, denotes a line by which a local or indeterminate problem is ſolved. A *locus* is a line, any point of which may equally ſolve an indeterminate problem. Thus if a right line ſuffice for the conſtruction of the equation, it is called *locus ad rectum*; if a circle, *locus ad circulum*; if a parabola, *locus ad parabolam*; if an ellipſis, *locus ad ellipſin*: and ſo of the reſt of the conic ſections.

LOCUST, in zoology. See Gryllus.

Locust *Eaters*. See Acridophagi.

American Locust, or *Frog hopper*. See Cicada.

Locust-*Tree*. See Hymenæa and Gleditsia.

LOCUTIUS, in mythology, the god of ſpeech among the Romans, called by Livy *Aius Locutius*.

LOCUTORIUM. The monks and other religious in monaſteries, after they had dined in their common hall, had a withdrawing-room, where they met and talked together among themſelves, which room, for that ſociable uſe and converſation, they called *locutorium*, *a loquendo*; as we call ſuch a place in our houſes parlour, from the French *parler*; and they had another room, which was called *locutorium forinſecum*, where they might talk with laymen.

LODE, in mining. See Load.

LODGMENT, in military affairs, a work made by the beſiegers in ſome part of a fortification (after the beſieged have been driven out), to maintain it, and be covered from the enemy's fire.—When a lodgment is to be made on the glacis, covert-way, or in a breach, there muſt be a great proviſion made of faſcines, ſand-bags, gabions, wool-packs, &c. in the trenches; and during the action, the pioneers, under the direction of an engineer, with faſcines, ſand-bags, &c. ſhould be making the lodgment, in order to form a covering, while the grenadiers are ſtorming the covert-way.

LOG, in the Jewiſh antiquities, a meaſure which held a quarter of a cab, and conſequently five-ſixths of a pint. There is mention of a log, 2 Kings vi. 25. under the name of a *fourth part of a cab*. But in Leviticus the word log is often met with, and ſignifies that meaſure of oil which lepers were to offer at the temple after they were cured of their diſeaſe. Dr. Arbuthnot ſays, that the log was a meaſure of liquids, the ſeventy-ſecond part of the bath or ephah, and twelfth part of the hin, according to all the accounts of the Jewiſh writers.

Log, a ſea term, ſignifying a ſmall piece of timber *a* (fig. 3. pl. 8.) of a triangular, ſectoral, or quadrantal figure, on board a ſhip, generally about a quarter of an inch thick, and five or ſix inches from the angular point to the circumference. It is balanced by a thin plate of lead, nailed upon the arch, or circular ſide, ſo as to ſwim perpendicular in the water, with about two-thirds immerſed under the ſurface.

Log-Line, a little cord, or line, about a hundred and fifty fathoms long, faſtened to the log by means of two legs *ab* (fig. 4. pl. 8.) one of which paſſes through a hole at the corner, and is knotted on the oppoſite ſide, while the other leg is attached to the arch by a pin fixed into another hole, ſo as to draw out occaſionally. By theſe legs the log is hung in equilibrio; and the line thus annexed to it is wound round a reel fixed for that purpoſe in the gallery of the ſhip.

This line, from the diſtance of about ten, twelve, or fifteen fathoms off the log, has certain knots or diviſions, which ought to be at leaſt fifty feet from each other; though it was the common practice at ſea not to have them above forty-two feet aſunder.

The length of each knot ought to be the ſame part of a ſea-mile as half a minute is of an hour, and admitting the meaſurement of Mr. Norwood, who makes a degree on a great circle of the earth to contain 367,200 Engliſh feet, or about $69\frac{1}{2}$ Engliſh ſtatute miles, and, therefore, $\frac{1}{60}$th part of it, or a nautical mile, will be 6120 feet; $\frac{1}{120}$th of 6120, or 51 feet, ſhould be the length of each knot. But becauſe it is ſafer to have the reckoning rather before the ſhip than after it, therefore fifty feet may be taken as the proper length of each knot. The knots are ſometimes made to conſiſt only of forty-two feet each, even in the preſent practice; and this method of dividing the log-line was founded on the ſuppoſition that ſixty miles, each of 5000 Engliſh feet, made a degree; for $\frac{1}{120}$ of 5000 is $41\frac{2}{3}$, or, in round numbers, 42 feet. Mariners, rather than quit the old way, though known to be erroneous, uſe glaſſes for half minute ones, that run but 24 or 25 ſeconds. They have alſo uſed a line of 45 feet to 30 ſeconds, or a glaſs of 28 ſeconds to 42 feet. When this is the caſe, the diſtance between the knots ſhould be corrected by the following proportion: As 30 is to 50, ſo is the number of ſeconds of the glaſs to the diſtance between the knots upon the line. The heat or moiſture of the weather has often a conſiderable effect upon the glaſs, ſo as to make it run ſlower or faſter; it ſhould, therefore, be frequently tried by the pendulum in the following manner. On a round nail hang a ſtring that has a muſket-ball fixed to one end, carefully meaſuring between the centre of the ball and the ſtring's loop over the peg $39\frac{1}{8}$ inches, being the length of a ſecond pendulum; then ſwing it, and count one for every time it paſſes under the peg, beginning at the ſecond time it paſſes; and the number of ſwings made during the time the glaſs is running out ſhows the ſeconds it contains. The line is alſo liable to relax and ſhrink, and ſhould therefore be occaſionally meaſured.

The uſe of the log and line is to keep account and make an eſtimate of the ſhip's way or diſtance run; which is done by obſerving the length of line unwound in half a minute's time, told by a half-minute glaſs; for ſo many knots as run out in that time, ſo many miles the ſhip ſails in an hour. Thus, if there be four knots veered out in half a minute, the ſhip is computed to run four miles an hour.

The author of this device for meaſuring the ſhip's way is not known; and no mention of it occurs till the year 1607, in an Eaſt-India voyage publiſhed by Purchas; but from that time its name occurs in other voyages among his collections; and

henceforward it became famous, being taken notice of both by our own authors and by foreigners; as by Gunter in 1623, Snellius in 1624, Metius in 1631, Oughtred in 1633, Herigone in 1634, Saltonſtall in 1636, Norwood in 1637, Fournier in 1643, and almoſt by all the ſucceeding writers on navigation of every country.

To Heave the Log, as they call it, they throw it into the water on the lee-ſide, letting it run till it comes without the eddy of the ſhip's wake; then one, holding a half-minute glaſs, turns it up juſt as the firſt knot, or the mark from which the knots begin to be reckoned, turns off the reel (fig. 2.) or paſſes over the ſtern. As ſoon as the glaſs is out, the reel is ſtopped, and the knots run off are told, and their parts eſtimated.

It is uſual to heave the log once every hour in ſhips of war and Eaſt-India men, and in all other veſſels once in two hours; and if at any time of the watch the wind has increaſed or abated in the intervals, ſo as to effect the ſhip's velocity, the officer generally makes a ſuitable allowance for it at the cloſe of the watch.

The log is a very precarious way of computing, and muſt always be corrected by experience and good ſenſe; there being a great deal of uncertainty in the yawing of the ſhip going with the wind aft, or upon the quarter in the heaving of it, by its coming home, or being drawn after the ſhip, on account of the friction of the reel and lightneſs of the log in the courſe of the current, and in the ſtrength of the wind, which ſeldom keeps the ſame tenor for two hours together; which is the interval between the times of uſing the log in ſhort voyages, though in longer ones they heave it every hour. Yet this is a much more exact way of computing than any other in uſe; much preferable certainly to that of the Spaniards and Portugueſe, who gueſſed at the ſhip's way by the running of the froth or water by the ſhip's ſide; or to that of the Dutch, who uſed to heave a chip over-board, and to number the paces they walk on the deck while the chip ſwims between any two marks, or bulk-heads on the ſide.

Compound Log. The above-mentioned errors, and particularly the log's being ſubject to drive with the motion which the water may have at its ſurface, whereas the experiment requires it to be fixed in the place where it is when the mark commencing the knots goes off the reel, have been conſidered by writers, and many methods have been propoſed to remove, or at leaſt to leſſen them. The late M. Bouguer propoſed a method, which has been thought deſerving of particular attention, in the Mem. Acad. Sc. 1747; afterwards in his Treatiſe on Navigation, publiſhed at Paris in 1753, and ſince reprinted in 1760, by the abbé de la Caille. For this purpoſe, take for the log a conical piece of wood, which fix to the log-line paſſed through or along its axis, at about 40, 50, or 60, or more feet, from one end; and to this end fix the diver, which is a body formed of two equal ſquare pieces of tin, or of thin iron plate, fixed at right angles to one another along their diagonals; and its ſize ſo fitted to that of the cone, that the whole may float. A cone of three inches diameter in the baſe, and of ſix inches in the ſlant height, is propoſed by M. Bouguer to ſuit a diver made of plates about $9\frac{1}{2}$ inches ſquare; the interſection of the diagonals is joined to the log-line, and the loop and peg fixed as in the common log. However, it has been found, that no kind of wood uſed in Britiſh dock-yards, when formed into a cone of the above dimenſions, will float a diver made of ſtout tin plates, one ſide of the ſquare being $9\frac{3}{4}$ inches. Such a diver weighing 1 lb. averdupoiſe, required to float it a cone of five inches diameter and twelve inches on the ſlant ſide, ſo as the point of the cone, which was made of light fir, ſhould juſt appear above the water. Now ſuppoſing one ſide of ſuch a ſquare tin diver to be about ten inches, and made of plates only two-thirds of the thickneſs of the former, ſuch a diver would weigh, with its ſolder, about 20 ounces, and can be floated by a light fir cone of four inches diameter in the baſe, and ten inches in the ſlant height or length; and ſuch a compound log might perhaps be found on trial to be affected by about as much again as that propoſed by M. Bouguer; and conſequently the difference between the numbers given by the common log and compound log, muſt be augmented by two-thirds of itſelf for the neceſſary correction, as below. When the compound log of Bouguer, above deſcribed, is hove overboard, the diver will ſink too deep to be much affected by the current or motion of water at the ſurface, and the log will thereby keep more ſteadily in the place where it firſt fell; and conſequently the knots run off the reel will ſhow more accurately the ſhip's rate of ſailing. As the common log is affected by the whole motion of the current, ſo this compound log will feel only a part thereof, viz. ſuch a part nearly as the reſiſtance of the cone is to the reſiſtance of the diver; then the reſiſtances of the above cone and diver are about as 1 to 5; and conſequently this log will drive but one fifth part of what the common log would do; and ſo the ſhip's true run will be affected by one-fifth only of the motion of the waters. To obtain the true rate of ſailing, it will be proper to heave alternately, hour and hour, the common log and this compound log; then the difference of their knots run off, augmented by its one-fourth part, is the correction; which applied to the knots of the common log, will give the ſhip's true rate of ſailing at the middle time between the hours when theſe logs were hove. The correction is additive when the compound log's run is the greateſt, otherwiſe it is ſubtractive. To find the courſe made good, increaſe the obſerved angle between the log-lines by one fourth-part; and this gives the correction to be applied to the apparent courſe, or the oppoſite of that ſhown by the common log; the correction is to be applied to the $\left\{\begin{matrix}\text{right}\\\text{left}\end{matrix}\right\}$ of the apparent courſe, when the bearing of the common log is to the $\left\{\begin{matrix}\text{left}\\\text{right}\end{matrix}\right\}$ of the compound log. Or thus: the lengths run off both logs, together with their bearings, being known; in a card or compaſs apply the knots run off, taken from a ſcale of equal parts along their reſpective bearings from the centre; join the ends; and in this line produced, on the ſide next the compound log's length, take one fourth of the interval; then a line drawn from the end, thus produced, to the centre of the card, will ſhow the true courſe and diſtance made good. When a current, ſuch as a tide, runs to any depth, the velocity of that current may be much better aſcertained by the compound log than by the common one, provided the diver does not deſcend lower than the run of the current; for, as thoſe ſhips which are deepeſt immerged drive faſteſt with the tide; ſo the diver, by being acted on below, as well as the log on the ſurface, their joint motion will give the total effect of the current's motion better than what could be derived from the motion at the ſurface only. Alſo, by ſuch a compound log, the depth to which any current runs may be eaſily tried.

Other Logs. We have an account in the Voyage to the North Pole, p. 97, of two other logs, which were tried by Captain Phipps: one invented by Mr. Ruſſel, the other by Foxon; both conſtructed upon this principle, that a ſpiral, in proceeding its own length in the direction of its axis through a reſiſting medium, makes one revolution round the axis: if, therefore, the revolutions of the ſpiral are regiſtered, the number of times it has gone its own length through the water will be known. In both theſe the motion of the ſpiral in the water is communicated to the clock-work within board, by means of a ſmall line faſtened at one end to the ſpiral, which tows it after the ſhip, and at the other to a ſpindle, which ſets the clock-work in motion. That invented by Mr. Ruſſel has a half ſpiral of two threads, made of copper, and a ſmall dial with clock-work, to

regiſter the number of turns of the ſpiral. The other log has a whole ſpiral of wood with one thread, and a larger piece of clock-work with three dials, two of them to mark the diſtance, and the other divided into knots and fathoms, to ſhew the rate by the half-minute glaſs, for the convenience of comparing it with the log. This kind of log will have the advantage of every other in ſmooth water and moderate weather; and it will be uſeful in finding the trim of a ſhip when alone, in ſurveying a coaſt in a ſingle ſhip, or in meaſuring diſtances in a boat between head-lands and ſhoals; but it is ſubject to other inconveniences, which will not render it a proper ſubſtitute for the common log.

Perpetual Log. A machine ſo called by its inventor, Mr. Gottlieb of Houndſditch, London. It is intended by it to keep a conſtant and regular account of the rate of the ſhip's velocity through the water; whereas the common log hitherto uſed does not indicate the variation in her velocity in the interval of heaving the log, and conſequently does not aſcertain the true diſtance that the ſhip has run in any given length of time.

Fig. 1. pl. 8. is a repreſentation of the whole machine; the lower part of which, EFG, is fixed to the ſide of the keel; H repreſenting only the boundary line of the ſhip's figure. EF are the ſection of a wooden external caſe, left open at the ends KL, to admit the paſſage of the water during the motion of the ſhip. At M is a copper grating, placed to obſtruct the entrance of any dirt, &c. into the machine. I, is a ſection of a water-wheel, made from 6 to 12 inches in diameter, as may be neceſſary, with float-boards upon its circumference, like a common water-wheel, that turn by the reſiſtance of the water paſſing through the channel LK. It turns upon a ſhouldered axis, repreſented by the vertical ſection at K. When the ſhip is in motion, the reſiſtance of the water through the channel LK turns round the wheel I. This wheel, by means of a pinion, is connected with and turns the rod contained in the long copper tube N. This rod, by a pinion fixed at its upper extremity, is connected with and turns upon the whole ſyſtem of wheels contained in the dial of the caſe ABCD. This dial, by means of the copper tube N, may be fixed to any convenient place aboard the ſhip. In the front of the dial are ſeveral uſeful circular graduations, as follow: The reference by the dotted line A has an hand which is moved by the wheels within, which points out the motion of the ſhip in fathoms of 6 feet each. The circle at B has an hand ſhowing the knots, at the rate of 48 feet for each knot; and is to be obſerved with the half-minute glaſs at any time. The circle at C has a ſhort and a long hand; the former of which points out the miles in land meaſure, and the latter or longer the number of knots contained in each mile, viz. 128, which is in the ſame proportion to a mile as 60 minutes to the hour in the reckoning. At *e*, a ſmall portion of a circle is ſeen through the front-plate called the *regiſter*; which ſhows, in the courſe of 24 hours (if the ſhip is upon one tack), the diſtance in miles that ſhe has run; and in the 24 hours the mariner need take but one obſervation, as this regiſter ſerves as an uſeful check upon the fathoms, knots, and miles, ſhown upon the two other circles. *f*, Is a plate ſhowing 100 degrees or 6000 miles, and alſo acts as another regiſter or check; and is uſeful in caſe of any miſtake being made in obſerving the diſtance run by the other circles. The reckoning by theſe circles, without fear of miſtake, may therefore be continued to nearly 12,000 miles. A communication from this machine may eaſily be made to the captain's bed ſide, where by touching a ſpring only, a bell in the head ABCD will ſound as many times in an half minute as the ſhip ſails miles in an hour.

Mr. Gottlieb has applied this machine to the Carteret and Weſtmoreland packets. He is very ſanguine in the hopes of its ſucceſs and utility; and conceives that the mariner will, by this contrivance, be better enabled than heretofore to keep the veſſel and his reckoning together; it being well known that the moſt experienced navigator is too frequently erroneous in this reſpect, the ſhip being ſometimes a-head, or ſometimes aſtern, off the reckoning. He alſo obſerves, that the conſtruction of the log is ſuch, that if the veſſel was to be aground, ſtrike a rock, or ſtrip off her falſe keel, the parts would not be deranged: and further, ſhould ſhe be laid up for repairs, &c. ſix months, in half an hour after coming again into the water, the lower immerged part of the log would clear itſelf, and be in proper action.

Log-*Board*, a ſort of table, divided into ſeveral columns, containing the hours of the day and night, the direction of the winds, the courſe of the ſhip, and all the material occurrences that happen during the 24 hours, or from noon to noon; together with the latitude by obſervation. From this table the different officers of the ſhip are furniſhed with materials to compile their journals, wherein they likewiſe inſert whatever may have been omitted, or reject what may appear ſuperfluous in the log-board.

Log-*Book*, a book into which the contents of the log-board is daily copied at noon, together with every circumſtance deſerving notice that may happen to the ſhip, or within her cognizance, either at ſea or in a harbour, &c. The intermediate diviſions or watches of the log-book, containing four hours each, are uſually ſigned by the commanding officer in ſhips of war or Eaſt-Indiamen. See NAVIGATION.

LOGARITHMS.

LOGARITHMS, (from λογος *ratio*, and αριθμος *number*), the indices of the ratios of numbers to one another; being a ſeries of numbers in arithmetical progreſſion, correſponding to others in geometrical progreſſion; by means of which, arithmetical calculations can be made with much more eaſe and expedition than otherwiſe.

SECT. I. *Hiſtory of Logarithms.*

THE invention of logarithms firſt occurred to thoſe verſant in the conſtruction of trigonometrical tables, in which immenſe labour was required by large multiplications, diviſions, and extraction of roots. The aim propoſed was, to reduce as much as poſſible the multiplications and diviſions to additions and ſubtractions: and for this purpoſe, a method was invented by Nicholas Raymer Urſus Dithmarſus, which ſerves for one caſe of the ſines, viz. when the radius is the firſt term in proportion, and the ſines of two arcs the ſecond and third terms. In this caſe the fourth term is found by only taking half the ſum or difference of the ſines of the other two arcs, and the complement of the greater. This method was firſt publiſhed in 1588, and a few years afterward was greatly improved by Clavius, who uſed it in all proportions in the ſolution of ſpherical triangles; adapting it to ſines, tangents, verſed ſines, and ſecants; and this, whether the radius was the firſt term in the proportion or not.

This method, however, though now become much more

generally useful than before, was still found, attended with trouble in some cases; and as it depended upon certain properties of lines belonging to the circle, was rather of a geometrical than arithmetical nature; on which account the calculators about the end of the 16th and beginning of the 17th century, finding the solution of astronomical problems extremely troublesome, by reason of the tedious multiplications and divisions they required, continued their endeavours to lessen that labour, by searching for a method of reducing their operations to addition and subtraction. The first step towards this was, the consideration, that as in multiplication the ratio of the multiplier to unity is the same as that of the product to the multiplicand, it will follow, that the ratio of the product to unity must be equal to the sum of the two ratios of the multiplier to unity, and of the multiplicand to unity. Could a set of numbers therefore be found, which would represent the ratios of all other numbers to unity, the addition of two of the former set of numbers would be equivalent to the multiplication of the two numbers together, the ratios of which they denoted; and the sum arising from this addition would denote the ratio of their product to unity; whence the product itself might be found by looking for the corresponding natural number in the table.

The next thing was to fall upon a method of calculating such a table as was wanted, which indeed appeared an Herculean labour. The first observation was, that whatever numbers might be made use of to represent the ratios of others, the ratio of equality, or that of unity to unity, must be 0; for that ratio has properly no magnitude, neither increasing nor diminishing any other ratio to which it is adapted, or from which it is subtracted.

2. The second observation was, that though any number might be chosen at pleasure to represent the ratio of any other number to unity, yet when once this choice was made, all the other numbers representing the different ratios must be determined by it. Thus, if the ratio of 10 to 1 be represented by 1, then the ratio of 100 to 1 must be 2, and that of 1000 to 1 must be 3, &c.; or if 2 was chosen to represent the ratio of 10 to 1, then that of 100 to 1 must be 4, that of 1000 to 1 must be 6, &c.; and no other numbers could possibly be used.

3. As those artificial numbers represented, or were proportional to, the ratios of the natural numbers to unity, they must be expressions of the numbers of some smaller equal ratios contained in the former and larger ones. Thus, if we make 1 the representative of the ratio of 10 to 1; then 3, which represents the ratio of 1000 to 1, will likewise express the number of ratios of 10 to 1, which are contained in that of 1000 to 1. If instead of 1, we make 1000 to be the ratio of 10 to 1; then 3000 will express the ratio of 1000 to 1, and this number 3000 will express the number of small ratios of the 1000th root of 10 to 1 contained in the ratio of 1000 to 1; and so on for any larger number, as 10,000, 100,000, or 10,000,000, &c. Thus, if instead of 1000 we make 10,000,000 the representative of the ratio of 10 to 1, then the unit will represent a very small ratio, of which there are 10,000,000 contained betwixt 1 and 10, and which ratio could not really be had without extracting a root which involved in itself 10,000,000 of times would only make up 10; which root may perhaps be most intelligibly expressed thus, $^{10,000,000}\sqrt{10}$. If the ratio of 10 to 1 contained 10,000,000 of these roots, it is evident that the ratio of 100 to 1 must contain 20,000,000, that of 1000 would have 30,000,000, &c.; of consequence, the ratio of 100 to 1 will be expressed by 20,000,000, of 1000 to 1 by 30,000,000, &c.—Hence, as these artificial numbers represent the ratios of natural numbers to unity, or are proportional to them, they are very properly called the *logarithms* of these numbers, or the *numbers* of their *ratios*; because they really do express this number of ratios.

The relation of logarithms to natural numbers may perhaps more intelligibly be explained by two series of numbers, one in an arithmetical, and the other in geometrical, progression. Thus,

Logarithms,	0	1	2	3	4	5	6	7	8
Nat. numb.	1	2	4	8	16	32	64	128	256

Or,

Logarithms,	0	1	2	3	4	5	6
Nat. numb.	1	10	100	1000	10,000,	100,000,	1,000,000

In either of these series it is evident, that by adding any two terms of the upper line together, a number will be had which indicates that produced by multiplying the corresponding terms of the lower line. Thus, in the first two series, suppose we wish to know the product of 4×32. In the upper line we find 2 standing over the number 4, and 5 over 32; adding therefore 5 to 2 we find 7, the sum of this addition, standing over 128, the product of the two numbers. In like manner, if we wish to divide 256 by 8, from the number which stands over 256, viz. 8, subtract that which stands over 8, viz. 3; the remainder 5, which stands over 32, shows that the latter is the quotient of 256 divided by 8. Let it be required to involve 4 as high as the biquadrate or 4th power: Multiply 2, the number which stands over 4, by the index of the power to which the number is to be involved; which index is 4; the product 8, standing over 256, shows that this last number is the biquadrate of 4 required. Lastly, let it be required to extract the cube root of 64; divide the number 6, which stands over 64, by 3, the index of the root you wish to extract; the quotient 2, standing over 4, shows that 4 is the root sought.

These examples are sufficient to show the great utility of logarithms in the most tedious and difficult parts of arithmetic. But though it is thus easy to frame a table of logarithms for any series of numbers going on in geometrical progression, yet it must be far more difficult to frame a general table in which the logarithms of every possible series of geometricals shall correspond with each other. Thus, though in the above series we can easily find the logarithm of 4, 8, &c. we cannot find that of 3, 6, 9, &c.; and if we assume any random numbers for them, they will not correspond with those which have already been assumed for 4, 8, 16, &c. In the construction of every table, however, it was evident, that the arithmetical or logarithmic series ought to begin with 0; for if it began with unity, then the sum of the logarithms of any two numbers must be diminished by unity before we could find the logarithm of the product. Thus,

Logar.	1	2	3	4	5	6	7	8	9
Nat. N.	1	2	4	8	16	32	64	128	256

Here let it be required to multiply 4 by 16; the number 3 standing over 4, added to 5 which stands over 16, gives 8 which stands over 128: but this is not just; so that we must diminish the logarithm by 1, and then the number 7 standing over 64 shows the true product. In like manner it appears, that as we descend below unity in a logarithmic table, the logarithms themselves must begin in a negative series with respect to the former; and thus the logarithm of 0 will always be infinite; negative, if the logarithms increase with the natural numbers; but positive, if they decrease. For as the geometrical series must diminish by infinite divisions by the common ratio, the arithmetical one must decrease by infinite subtractions, or increase by infinite additions of the common difference.

This property of numbers was not unknown to the ancient mathematicians. It is mentioned in the works of Euclid; and Archimedes made great use of it in his *Arenarius*, or treatise on the number of the sands: and it is probable that logarithms would have been much sooner invented, had the real

neceſſity for them been ſooner felt; but this did not take place till the end of the 16th century, when the conſtruction of trigonometrical tables, and ſolution of perplexed aſtronomical problems, rendered them abſolutely indiſpenſable.

About this time it is probable that many people wiſhed to ſee ſuch tables of numbers, and were making attempts to conſtruct them; but the invention is certainly due to lord Napier, baron of Merchiſtoun in Scotland. The invention is by ſome indeed aſcribed to Longomontanus; but with very little probability, as he never publiſhed any thing of the kind, nor laid claim to the invention, though he lived to ſee the publication of baron Napier's tables. Concerning this invention we are told, that "one Dr. Craig, a Scotchman, coming out of Denmark into his own country, called upon baron Napier, and told him of an invention of Longomontanus in Denmark, to ſave the trouble of the tedious multiplication and diviſion in aſtronomical calculations; but could give no further account of it than that it was by proportionable numbers. From this ſlight hint the baron immediately ſet about the work; and by the time that Dr. Craig returned to call upon him, he had prepared a rude draught of it, which he called *Canon mirabilis Logarithmorum*; and this draught, with ſome alterations, was printed in 1614.

According to Kepler, one Juſte Byrge, aſſiſtant aſtronomer to the landgrave of Heſſe, either invented or projected logarithms long before baron Napier, and compoſed a table of ſines for every two ſeconds of the quadrant; though, by reaſon of his natural reſervedneſs, he never publiſhed any thing to the world. But whatever might have been in this, it is certain that the world is indebted for logarithms to baron Napier, who died in the year 1618. This nobleman likewiſe made conſiderable improvements in trigonometry; and the frequent numerical computations he had occaſion for in this branch, undoubtedly contributed to his invention of the logarithms, that he might ſave part of the trouble in theſe calculations. His book publiſhed in 1614 was entitled *Mirifici Logarithmorum Canonis deſcriptio*. At this time he did not publiſh his method of conſtructing the numbers until the ſenſe of the learned ſhould be known. In other reſpects the work is complete, containing all the logarithms of the natural numbers to the uſual extent of logarithmic tables; with the logarithmic ſines, tangents, and ſecants, for every minute of the quadrant, directions for uſing the tables, &c.

This work was publiſhed in Latin; but was afterwards tranſlated into Engliſh by Mr. Edward Wright, inventor of the principles of what has been falſely called *Mercator's Sailing*. The tranſlation was ſent to his lordſhip at Edinburgh, and returned with his approbation and ſome few additions. It was publiſhed in 1616, after Mr. Wright's death, with a dedication to the Eaſt India company, by his ſon Samuel Wright, and a preface by Mr. Briggs, who afterwards diſtinguiſhed himſelf ſo much in bringing logarithms to perfection. In this tranſlation Mr. Briggs alſo gave the deſcription and draught of a ſcale invented by Mr. Wright, as well as other methods invented by himſelf, for finding the intermediate proportional numbers; the logarithms already found having been only printed for ſuch numbers as were the natural ſines of each minute.

Mr. Wright's tranſlation was reprinted in 1618, with a new title-page and the addition of 16 pages of new matter, "ſhowing the method of calculating triangles, as well as a method of finding out ſuch lines and logarithms as are not to be found in the canons."

Next year John Speidell publiſhed his New Logarithms, in which were ſome remedies for the inconveniences attending lord Napier's method. The ſame year alſo, Robert Napier, the baron's ſon, publiſhed a new edition of his father's book, entitled *Canonis Logarithmorum Deſcriptio*; with another concerning the method of conſtructing them, which the baron had promiſed: together with ſome other miſcellaneous pieces, which his father had likewiſe compoſed along with Mr. Briggs. In 1620, alſo, a copy of theſe works was printed at Lyons in one volume, by Bartholomew Vincent a bookſeller there; but this publication ſeems to have been but little known, as Wingate, who carried logarithms to France four years after, is ſaid to be the firſt who introduced them into that country.

The *Curſus Mathematicus* publiſhed at Cologn in 1618 or 1619 by Benjamin Urſinus, mathematician to the elector of Brandenburg, contains a copy of Napier's logarithms, together with ſome tables of proportional parts. In 1624 he publiſhed his *Trigonometria*, with a table of natural ſines and their logarithms, according to lord Napier's method, to every ten ſeconds in the quadrant. The ſame year a book on logarithms was publiſhed at Marpurg by the celebrated Kepler, of the ſame kind with thoſe of Napier. Both of theſe begin at 90° or the end of the quadrant; and, while the ſines decreaſe, the logarithms gradually increaſe; till at the beginning of the quadrant, or 0, the logarithm is infinite. The only difference betwixt the logarithms of Napier and Kepler is, that in the former the arc is divided into equal parts, differing by one minute each; and conſequently their ſines to which the logarithms are adapted are interminate numbers repreſented only by approximating decimals: but in Kepler's table, the radius is divided into equal parts; which are conſidered as perfect and terminate ſines, having equal differences, and to which the logarithms are here adapted. A treatiſe of ſome extent was prefixed to the work, in which the conſtruction and uſe of logarithms are pretty largely treated of. In the year 1627 the ſame author introduced logarithms into his Rudolphine tables, together with ſeveral others, viz. 1. A table ſimilar to that already mentioned, only that the column of ſines or abſolute numbers is omitted, and another added in its ſtead, ſhowing what part of the quadrant each arc is equal to, viz. the quotient ariſing from the diviſion of the whole quadrant by each given arc, and expreſſed in integers and ſexageſimal parts. 2. Napier's table of logarithmic ſines to every minute of the quadrant; as alſo two other ſmaller tables adapted for the calculation of eclipſes and the latitude of planets. In this work Juſtus Byrgius is mentioned as having invented logarithms before Napier.

The kind of logarithms now in uſe were invented by Mr. Henry Briggs, profeſſor of geometry in Greſham college, London, at the time they were firſt diſcovered by Napier. As ſoon as the logarithms of Napier were publiſhed, Mr. Briggs directed his attention to the ſtudy and improvement of them; and his employment in this way was announced in a letter to Mr. Uſher, afterwards the celebrated archbiſhop, in the year 1615. By him the ſcale was changed, and 0 was made the logarithm of 1; but lord Napier informed Mr. Briggs that he had already thought of ſuch a ſcheme, but choſe rather to publiſh the logarithmic tables he had completed, and to let thoſe alone until he ſhould have more leiſure as well as better health. At an interview betwixt lord Napier and Mr. Briggs, the preſent plan ſeems to have been ſettled; and in conſequence of his lordſhip's advice, Mr. Briggs made ſome alteration in the method of conſtructing his tables from that which he had begun. A correſpondence alſo took place betwixt his lordſhip and Mr. Briggs, which continued during the lifetime of the former. It appears, however, that, whether Mr. Briggs thought of this alteration before lord Napier or not, he certainly was the perſon who firſt publiſhed it to the world; and ſome reflections have been thrown upon his lordſhip for not making any mention of the ſhare which Mr. Briggs had in it.

In 1617 Mr. Briggs publiſhed his firſt thouſand logarithms under the title of *Logarithmorum Chilias Prima*; and in 1620

Mr. Edward Gunter publiſhed his Canon of Triangles, containing the artificial or logarithmic ſines and tangents for every minute, to ſeven places of figures beſides the index; the logarithm of the radius being 10.000, &c. Theſe were the firſt tables of logarithmic ſines, tangents, &c. which made their appearance upon the preſent plan; and in 1623 they were reprinted in his book de *Sectore et Radio*, along with the *Chilias Prima* of Mr. Briggs. The ſame year Mr. Gunter applied theſe logarithms of numbers, ſines, and tangents, to ſtraight lines drawn on a ruler; and with theſe the proportions in common numbers, as well as in trigonometry, were ſolved by the mere application of a pair of compaſſes; a method founded upon this property, that the logarithms of the terms of equal ratios are equally different. The inſtrument is now well known by the name of the two-feet Gunter's Scale. By the ſame methods he alſo greatly improved the ſector. He was alſo the firſt who uſed the word *coſine* for the ſine of the complement of an arc; and he introduced the uſe of arithmetical complements into the logarithmical arithmetic. He is ſaid alſo to have firſt ſuggeſted the idea of the logarithmic curve, ſo called becauſe the ſegments of its axis are the logarithms of the correſponding ordinates.

The logarithmic lines were afterwards drawn in many other ways. Wingate, in 1627, drew them upon two ſeparate rulers ſliding by each other, in order to ſave the uſe of compaſſes in reſolving proportions. In 1627, alſo, they were applied by Mr. Oughtred to concentric circles; about 1659, in a ſpiral form, by one Mr. Milburne of Yorkſhire; and in 1657, they were applied on the preſent ſliding-rule by Mr. Seth Partridge.

The knowledge of logarithms was diffuſed in France by Mr. Edmund Wingate, as before related, though not carried originally thither by him. Two ſmall tracts were publiſhed by him in French, and afterwards an edition in Engliſh, all printed in London. In the firſt of theſe he mentions the uſe of Gunter's Ruler, and in the other that of Briggs's Logarithms, with the canon of artificial ſines and tangents. There are likewiſe tables of theſe ſines, tangents, and logarithms, copied from Gunter.

From the time that Mr. Briggs firſt began to ſtudy the nature of logarithms, he applied to the conſtruction of tables with ſuch aſſiduity, that by the year 1624 he publiſhed his *Arithmetica Logarithmica*, containing the logarithms of 30,000 natural numbers to 14 places of figures beſides the index; viz. from 1 to 20,000, and from 90,000 to 100,000, together with the differences of the logarithms. According to ſome, there was another chiliad, viz. from 100,000 to 101,000; but this does not ſeem to be well authenticated. In the preface to this work he gives an account of the alteration made in the ſcale by lord Napier and himſelf; and earneſtly ſolicits other perſons to undertake the taſk of filling up the intermediate numbers; offering to give inſtructions, and to afford paper ready ruled for the purpoſe. He gives alſo inſtructions at large in the preface for the conſtruction of logarithmic tables. Thus he hoped to get the logarithms of the other 70,000 natural numbers completed, while he himſelf, being now pretty far advanced in years, might be at liberty to apply to the canon of logarithmic ſines, &c. which was as much wanted by mathematicians as the others. His wiſhes were accompliſhed by Adrian Vlacq or Flack of Gouda in Holland, who completed the numbers from 20 to 90,000; and thus the world was furniſhed with the logarithms of all natural numbers from 1 to 100,000; but thoſe of Vlacq were only done to 10 places of figures. To theſe was added a table of artificial ſines, tangents, and ſecants, to every minute of the quadrant. Beſides the great work already mentioned, Mr. Briggs completed a table of logarithmic ſines and tangents for the 100th part of every degree, to 14 places of figures beſides the index; and a table of natural ſines for the ſame parts to 15 places, with the tangents and ſecants to 10 places, and the methods of conſtructing them. He deſigned alſo to have publiſhed a treatiſe concerning the uſes and application of them, but died before this could be accompliſhed. On his death-bed he recommended this work to Henry Gellibrand, profeſſor of aſtronomy in Greſham college, in which office he had ſucceeded Mr. Gunter. Mr. Briggs's tables above mentioned were printed at Gouda, and publiſhed in 1633; and the ſame year Mr. Gellibrand added a preface with the application of logarithms to plane and ſpherical trigonometry, the whole being denominated *Trigonometria Britannica*: and beſides the arcs in degrees and hundredth parts, has another table containing the minutes and ſeconds anſwering to the ſeveral hundredth parts in the firſt column.

The *Trigonometria Artificialis* of Vlacq contains the logarithmic ſines and tangents to 10 places of figures, to which is added Briggs's firſt table of logarithms from 1 to 20,000, beſides the index: the whole preceded by a deſcription of the tables, and the application of them to plane and ſpherical trigonometry, chiefly extracted from Briggs's *Trigonometria Britannica* already mentioned. In 1635 Mr. Gellibrand alſo publiſhed a work, entitled *An Inſtitution Trigonometrical*, containing the logarithms of the firſt 10,000 numbers, with the natural ſines, tangents, and ſecants; and the logarithmic ſines and tangents for degrees and minutes, all to ſeven places of figures beſides the index; likewiſe other tables proper for navigation, with the uſes of the whole. Mr. Gellibrand died in 1636, in the 40th year of his age.

A number of other people have publiſhed books on logarithms, which we cannot now particularly enumerate. Some of the principal are:

1. A treatiſe concerning Briggs's logarithms of common numbers from 1 to 20 000, to 11 places of figures, with the logarithmic ſines and tangents but only to eight places. By D. Henrion, at Paris, 1626.

2. Briggs's logarithms, with their differences to 10 places of figures, beſides the index for all numbers to 100,000; as alſo the logarithmic ſines, tangents, and ſecants, for every minute of the quadrant, with the explanation and uſes in Engliſh. By George Miller, Lond. 1631.

3. *Trigonometria*, by Richard Norwood, 1631; containing Briggs's logarithms from 1 to 10,000, as well as for the ſines, tangents, and ſecants, to every minute, both to ſeveral places of figures beſides the index. The author complains very much of the unfair practices of both the former authors.

4. *Directorium Generale Uranometricum*; by Francis Bonaventure Cavalerius. Bologna, 1632. In this are Mr. Briggs's tables of logarithmic ſines, tangents, ſecants, and verſed ſines each to eight places of figures for every ſecond of the firſt 5 minutes, for every 5 ſeconds from 5 to 10 minutes, for every 20 ſeconds from 20 to 30 minutes, for every 30 ſeconds from 30 minutes to $1\frac{1}{2}$ degree, and for every minute in the reſt of the quadrant. It contains alſo the logarithms of natural numbers from 1 to 10,000, with the firſt table of verſed ſines that ever was publiſhed. The author likewiſe gives the firſt intimation of the method of finding the arcs or ſpherical ſurface contained by various arcs deſcribed on the ſurface of a ſphere.

5. In 1643 appeared the *Trigonometria* of the ſame author, containing the logarithms of the natural numbers from 1 to 1000, with their differences to eight places of figures; likewiſe a table of natural and logarithmic ſines, tangents, and ſecants; the former to ſeven, the latter to eight, places of figures; viz. to every 10″ of the firſt 30′, to every 30″ from 30′ to 1°, and the ſame for their complements, or backwards.

through the laſt degree of the quadrant; the intermediate 88° being only to every minute.

6. *Tabulæ Logarithmicæ*; by Mr. Nathaniel Rowe, paſtor of Benaire in Suffolk: Lond. 1633. In this work are contained Briggs's logarithms of natural numbers from 1 to 100,000, to eight places of figures; likewiſe the logarithmic ſines and tangents to every 100th part of degrees to ten places.

7. *Clavis Univerſa Trigonometriæ*; Hamburg, 1634: containing tables of Briggs's logarithms from 1 to 2000; and of ſines, tangents, and ſecants, for every minute, both for ſeven places.

8. *Trigonometria Britannica*, by John Newton, London, 1658. In this the logarithmic tables of natural numbers were reduced to their moſt convenient form; the author having availed himſelf of the labours of Wingate and Roe, uniting their ſeveral methods, and diſpoſing of the whole as in the beſt logarithmic tables uſed at preſent. It contains likewiſe the logarithmic ſines and tangents to eight figures beſides the index; for every hundredth part of a degree, with the differences, and for thouſandth parts in the firſt three degrees. He cenſures the unfair practices of ſome former publiſhers of logarithms, particularly of Vlacq already mentioned.

9. *Matheſis Nova*, by John Caramual, 1670. This contained 1000 logarithms, both of the forms of Napier and Briggs, as well as 1020 of what he calls *perfect logarithms*, viz. thoſe of Briggs's firſt method of conſtruction; which differs from the laſt only in this, that the laſt increaſes, whilſt the firſt decreaſes; the radix or logarithm of the ratio of 10 to 1 being the very ſame in both.

10. Sherwin's Mathematical Tables, publiſhed in 8vo, form the moſt complete collection of any; containing, beſides the logarithms of all numbers to 101,000, the ſines, tangents, ſecants, verſed ſines both natural and logarithmic, to every minute of the quadrant. The firſt edition was printed in 1706; but the third, publiſhed in 1742 and reviſed by Gardiner, is looked upon to be ſuperior to any other. The fifth and laſt edition, publiſhed in 1771, is ſo incorrect, that no dependence can be placed upon it.

10. Tables of logarithms from 1 to 102,100, and for the ſines and tangents to every 10 ſeconds of each degree in the quadrant; as alſo for the ſines of the firſt 72 minutes to every ſingle ſecond, with other uſeful and neceſſary tables. By Gardiner, London, 1742. This work contains a table of logiſtical logarithms, and three ſmaller tables to be uſed for finding the logarithms of numbers to 20 places of figures. Only a ſmall number of theſe tables was printed, and that by ſubſcription; and they are now in the higheſt eſteem for accuracy and uſefulneſs. An edition of theſe tables was printed at Avignon in France in 1770, with the addition of ſines and tangents for every ſingle ſecond in the firſt four degrees, and a ſmall table of hyperbolic logarithms, taken from a treatiſe upon fluxions by the late Mr. Thomas Simſon. The tables are to ſeven places of figures, but ſomewhat leſs correct than thoſe publiſhed by Gardiner himſelf.

11. An Antilogarithmic Canon for readily finding the number correſponding to any logarithm, was begun by the algebraiſt Mr. Harriot, who died in 1621; and completed by Mr. Walter Warner, the editor of Harriot's works, before 1640, but never was publiſhed for want of encouragement to print it. In 1714 a ſmall ſpecimen of ſuch a canon appeared in the Philoſophical Tranſactions for that year by Mr. Long of Oxford; and in 1742 a complete Antilogarithmic Canon appeared by Mr. James Dodſon, in which the numbers correſponding to each logarithm from 1 to 100,000 are computed to 11 places of figures.

12. In 1783 were publiſhed M. Callet's tables at Paris; which for the elegance of the workmanſhip are much ſuperior to any thing of the kind that ever appeared, though their accuracy is not eſteemed equal to that of ſome others. The work is a neat volume ſmall 8vo. It contains a treatiſe on logarithms, with their uſes and application to various ſciences; as trigonometry, aſtronomy, and navigation; a table of logarithms from 1 to 10,960, with the differences; a table of ſines and tangents for every ſingle ſecond of the firſt two degrees, and for every 10 ſeconds of the reſt of the quadrant; with tables of logiſtical and hyperbolic logarithms, and ſome others for determining the longitude at ſea.

Sect. II. *Different methods of conſtructing Logarithms.*

§ 1. Napier's *method.*

The logarithms firſt thought of by lord Napier were not adapted to the natural ſeries of arithmetical numbers 1, 2, 3, &c. becauſe he did not then intend to adapt them to every kind of arithmetical calculation, but only to that particular operation which had called for their immediate conſtruction, viz. the ſhortening of trigonometrical operations: he explained the generation of logarithms, therefore, in a geometrical way. Both logarithms, and the quantities to which they correſpond, in his way, may be ſuppoſed to proceed from the motion of a point; which, if it moves over equal ſpaces in equal times, will produce a line increaſing equally: but if, inſtead of moving over equal ſpaces in equal times, the point deſcribes ſpaces proportional to its diſtances from a certain term, the line produced by it will then increaſe proportionably. Again, if the point moves over ſuch ſpaces in equal times, as are always in the ſame conſtant ratio to the lines from which they are ſubducted, or to the diſtance of that point at the beginning of the lines, from a given term in that line, the line ſo produced will decreaſe proportionably. Thus, (pl. 9. fig. 1, 2,) let *ac* be to *ao*, *cd* to *co*, *ef* to *fo*, and *fg* to *fo*, always in a certain ratio, viz. that of Q R to Q S, and let us ſuppoſe the point P to ſet *f* out from *a*, deſcribing the diſtances *ac*, *cd*, *de*, &c. in equal ſpaces of time, then will the line *ao* decreaſe proportionably.

In like manner, the line *o a*, (fig. 12.) increaſes proportionally, if the point *p*, in equal times, deſcribes the ſpaces *a c*, *c d*, *de*, *fg*, &c. ſo that *ac* is to *ao*, *cd* to *co*, *de* to *do*, &c. in a conſtant ratio. If we now ſuppoſe a point P deſcribing the line AG (fig. 4.) with an uniform motion, while the point *p* deſcribes a line increaſing or decreaſing proportionally, the line AP, deſcribed by P, with this uniform motion, in the ſame time that *oa*, by increaſing or decreaſing proportionally, becomes equal to *op*, is the logarithm of *op*. Thus AC, AD, AE, &c. are the logarithms of *oc*, *od*, *oe*, &c. reſpectively: and *oa* is the quantity whoſe logarithm is ſuppoſed equal to nothing.

We have here abſtracted from numbers, that the doctrine may be the more general; but it is plain, that if AC, AD, AE, &c. be ſuppoſed 1, 2, 3, &c. in arithmetic progreſſion; *oc*, *od*, *oe*, &c. will be in geometric progreſſion; and that the logarithm of *oa*, which may be taken for unity, is nothing.

Lord Napier, in his firſt ſcheme of logarithms, ſuppoſes, that while *op* increaſes or decreaſes proportionally, the uniform motion of the point P, by which the logarithm of *op* is generated, is equal to the velocity of *p* at *a*; that is, at the term of time when the logarithms begin to be generated. Hence logarithms, formed after this model, are called *Napier's Logarithms*, and ſometimes *Natural Logarithms*.

When a ratio is given, the point *p* deſcribes the difference of the terms of the ratio at the ſame time. When a ratio is duplicate of another ratio, the point *p* deſcribes the difference of the terms in a double time. When a ratio is triplicate of another, it deſcribes the difference of the terms in a triple time; and ſo on. Alſo, when a ratio is compounded of two or more ratios, the point *p* deſcribes the difference of the terms of that ratio in

a time equal to the ſum of the times in which it deſcribes the differences of the terms of the ſimple ratios of which it is compounded. And what is here ſaid of the times of the motion of p when op increaſes proportionally, is to be applied to the ſpaces deſcribed by P, in thoſe times, with its uniform motion.

Hence the chief properties of logarithms are deduced. They are the meaſures of ratios. The exceſs of the logarithm of the antecedent above the logarithm of the conſequent, meaſures the ratio of thoſe terms. The meaſure of the ratio of a greater quantity to a leſſer is poſitive; as this ratio, compounded with any other ratio, increaſes it. The ratio of equality, compounded with any other ratio, neither increaſes nor diminiſhes it; and its meaſure is nothing. The meaſure of the ratio of a leſſer quantity to a greater is negative; as this ratio, compounded with any other ratio, diminiſhes it. The ratio of any quantity A to unity, compounded with the ratio of unity to A, produces the ratio of A to A, or the ratio of equality; and the meaſures of thoſe two ratios deſtroy each other when added together; ſo that when the one is conſidered as poſitive, the other is to be conſidered as negative. By ſuppoſing the logarithms of quantities greater than oa (which is ſuppoſed to repreſent unity) to be poſitive, and the logarithms of quantities leſs than it to be negative, the ſame rules ſerve for the operations by logarithms, whether the quantities be greater or leſs than ao. When op increaſes proportionally, the motion of p is perpetually accelerated; for the ſpaces ac, cd, de, &c. that are deſcribed by it in any equal times that continually ſucceed after each other, perpetually increaſe in the ſame proportion as the lines oa, oc, od, &c. When the point p moves from a towards o, and op decreaſes proportionally, the motion of p is perpetually retarded; for the ſpaces deſcribed by it in any equal times that continually ſucceed after each other, decreaſe in this caſe in the ſame proportion as op decreaſes.

If the velocity of the point p be always as the diſtance op, then will this line increaſe or decreaſe in the manner ſuppoſed by lord Napier; and the velocity of the point p being the fluxion of the line op, will always vary in the ſame ratio as this quantity itſelf. This, we preſume, will give a clear idea of the geneſis or nature of logarithms; but for more of this doctrine, ſee Maclaurin's Fluxions.

The conſtruction of his tables of logarithms was firſt publiſhed in his poſthumous work of 1619. The conſtruction of his canon was chiefly effected by generating, in an eaſy manner, a ſeries of proportional numbers, and their arithmeticals or logarithms; and then finding by proportion the logarithms of the natural ſines from thoſe of the neareſt numbers among the original proportionals. Beginning then at the radius 10,000,000, he firſt conſtructs ſeveral deſcending geometrical ſeries, of ſuch a nature that they are quickly formed by an eaſy addition or ſubtraction, or diviſion by 2, 10, 100, &c. His firſt table conſiſts of proportionals in the ratio of 10,000,000 to 9,999,999; the method of doing which may be eaſily underſtood from the following example: Suppoſe it were required to find a ſeries of deſcending proportionals in the ratio of 100 to 99; it may be done by adding two cyphers to each of the two firſt terms, and continually adding 1 to the decimal place fartheſt to the right hand. Thus the firſt term will be 100.00, the ſecond 99.00, the third 98.01, the fourth 98.03, &c. Napier's firſt table contained 100 terms of a ſeries, as we already mentioned, in the proportion of 10,000,000 to 9,999,999. The firſt term of which ſeries was 10,000,000.0000000; the ſecond 9,999,999,0000000; the third was 9,999,998.0000001, and ſo on till the 100th term, which was 9,999,900.0004950. The ſecond table conſiſted of 50 numbers nearly in the proportion of 100,000 to 99,999; and this was formed by ſubſtituting the units 1, 3, &c. in the third decimal place inſtead of the laſt place towards the right hand. The reaſon of conſtructing this table was, that he might have a ſeries in the proportion of his firſt term of the former to the laſt term of it, *viz.* of 100,000 to 99,999; and the laſt of the ſecond ſeries was 9995001.222927. In all theſe ſeries the method of finding the terms is exactly the ſame. Thus in the firſt example, where we begin with 100, each term decreaſes by the 100th part of the former; and this 100th part is found by removing the number two places of figures lower, and ſubtracting them from the former terms. Thus 99 is leſs than 100 by unity, which is the 100th part of the latter; the next term is leſs than 99 by the 100th part of 99, and is therefore 98.01. But the diviſion by 100 can be performed without any trouble, only ſetting the decimal point two places farther forward, as that by 10 is performed by ſetting it one place farther forward; thus $9 \div 10 = .9$; $99 \div 100 = .99$. Now by ſubtracting 99 from 100, we have 98.01 for the third term of the ſeries. To find the fourth term then, remove the decimal point two figures farther to the right hand, and ſubtract it from the former; and we have then 97.0299 for the fourth term of the ſeries. Thus we ſee, that the number of decimal places muſt continually increaſe; but as in this ſeries we want no more than two decimal places inſtead of 97.0299, the term is made 97.03, as the neareſt number which has only two decimal places, and differs from the truth only by one thouſandth part. In like manner, in the long ſtring of ciphers, the fourth term of the ſeries differs ſomewhat, but very little, from the truth: and this muſt always be the caſe while the radius is ſuppoſed to conſiſt of any finite number of parts; though, by going on for a very long time in this way, the error, by being continually repeated and augmented at every term, would at laſt become perceptible; and therefore none of theſe ſeries are carried on to a very great length.

His next ſtep was to conſtruct a third table conſiſting of 69 columns, and each column of 21 numbers or terms in the continual proportion of 10000 to 9995; that is, nearly as the firſt term of the ſecond table is to its laſt term. As this proportion is the 2000th of the whole, the method of finding the terms will be by dividing each upper number by 2, and removing the figures of the quotient three places lower, and then ſubtracting them. In this way, however, it is proper to collect only the firſt column of 21 numbers, the laſt of which will be 9900473.5780: but the firſt, ſecond, and third, &c. numbers in all the other columns are in the continual proportion of 100 to 99, or nearly of the firſt to the laſt in the firſt column; whence theſe are to be found by removing the figures two places lower, and then ſubtracting them, as has already been explained.

By theſe three tables, his lordſhip was furniſhed with about 1600 proportionals, nearly coinciding with all the natural ſines from 90 to 30 degrees. To obtain the logarithms of thoſe proportionals, he demonſtrated and applied ſome of the properties and relations of the numbers and logarithms; the principal of which are, 1. That the logarithm of any ſine is greater than the difference between that ſine and the radius, but leſs than that difference when increaſed in the proportion of the ſine to the radius. 2. That the difference between the logarithms of two ſines is leſs than the difference of the ſines increaſed in the proportion of the leſſer ſine to the radius, but greater than the difference of the ſines increaſed in the proportion of the greater ſine to the radius. Theſe properties now ſerved him as theorems for finding the logarithms themſelves in an eaſy manner. From the firſt of them it appeared, that the radius being 10,000,000, the firſt term of the table, the logarithm of 9,999,999, the ſecond term, muſt be greater than the difference betwixt that term and the radius, which is 1, but leſs than the difference when increaſed in the proportion of the ſine to the radius;

but this proportion is only one ten millionth part, for $9,999,999 \times 1.0000001 = 10,000,000$; whence the logarithm of the radius or 10,000,000 being 0, the logarithm of 9,999,999 the ſecond term will be between 1 and 1.0000001, or very nearly 1.00000005, this being the arithmetical mean betwixt 1 and 1.0000001. This will alſo be the common difference betwixt every two ſucceeding terms in the firſt table; becauſe all the terms there are in the ſame proportion of 10,000,000 to 9,999,999. Hence by the continual addition of this logarithm we have the logarithms of the whole ſeries, and therefore that of the laſt term of the ſeries, *viz.* 9999900.0004950, will be 100.00005.

The ſecond table, as we have already ſaid, conſiſts of a ſeries of numbers in the continual proportion of 100000 to 99999, whence the firſt term being 10,000,000 the ſecond will be 9,999,900; the difference betwixt this and the laſt term of the former ſeries is .0004950. But by the ſecond theorem, the difference between the logarithms of 9,999,900.0004950 and 9,999,900, the ſecond term of the ſecond table, will be leſs than .0004950, increaſed in the proportion of 99999 to 100000, but greater than .0004950, increaſed in the proportion of 9,999,900.0004950; that is to ſay, if we augment .0004950 by one hundred thouſandth part, it will be greater than the difference betwixt the logarithms of the two terms. The limits, therefore, are here ſo extremely ſmall, that we may account the difference betwixt the two terms and that of the logarithms themſelves the ſame: adding therefore this difference .0004950 to 100.000005, we have 100.0005000 for the logarithm of the ſecond term, and likewiſe for the common difference of all the logarithms of the terms of the ſecond table. —Again, by the ſame theorem, the difference between the logarithms of this laſt proportional of the ſecond table and the ſecond term in the firſt column of the third table, will be found to be 1.2235287; which added to the laſt logarithm, gives 5001.2485387 for the logarithm of 9,995,000, the ſecond term of the third table: and in a ſimilar manner, by the ſame theorem, he finds the logarithms of all the other terms of the reſt of the columns.

Thus our author completed what he calls his radical table, from which he found his logarithmic ſines by taking, according to the ſecond theorem, the ſum and difference of each tabular ſine, and the neareſt number in the radical table. Annex then ſeven ciphers to the difference; divide the number by the ſum, and half the quotient will be the difference between the logarithms of the tabular ſine and radical number; and conſequently, by adding or ſubtracting this difference to or from the logarithm of the natural number, we have the logarithmic ſine required.

In this manner were completed the logarithmic ſines from radius or ſine of 90° to the half of it, or ſine of 30°. To complete the other 30°, he obſerves, that the logarithm of the ratio of 2 to 1, or of one half the radius, is 6931469.22; that of the ratio of 4 to 1 is double of it; that of 8 to 1, triple of it, &c.; and thus going on to compute the logarithms of the ratio between 1 and 40, 80, 100, &c. to 10,000,000: then multiplying any given ſine for an arc leſs than 30° by ſome of theſe numbers, he finds the product nearly equal to ſome number in the table; and then finds the logarithm by the ſecond theorem, as already directed.

Another, and much eaſier method, however, of performing the ſame thing is founded upon the following proportion, which he demonſtrates, *viz.* that as half the radius is to the ſine of half an arc, ſo is the coſine of the half arc to the ſine of the whole arc; or as one half the radius is to the ſine of any arc, ſo is the coſine of that arc to the ſine of double the arc. Hence the logarithmic ſine of an arc is found by adding the logarithms of half the radius and the ſine of double the arc, and then ſubtracting the logarithmic coſine from the ſum. In this way, he obſerves that the ſines for full one half of the quadrant may be found, and the remainder by one eaſy diviſion, or addition and ſubtraction for each, as already directed.

§ 2. *Kepler's method of conſtruction.*

This was founded upon principles nearly ſimilar to that of Napier. He firſt of all erects a ſyſtem of proportions, and the meaſures of proportions, founded upon principles purely mathematical; after which he applies theſe principles to the conſtruction of his table, containing only the logarithms of 1000 numbers. The propoſitions on which his method is founded are in ſubſtance the following:

1. All equal proportions equal among themſelves are expreſſed by the ſame quantity, be the terms many or few; as the proportion of 2, 4, 8, &c. in geometrical progreſſion is expreſſed by 2; and of 2, 6, 18, 54, &c. by 3.

2. Hence the proportion of the extremes is compoſed of all the proportions of the intermediate terms; thus the proportion of 2 to 8 is compounded of that of 2 to 4, and of 4 to 8.

3. The mean proportional betwixt two terms divides that proportion into two equal ones. Thus the proportion between 2 and 32 is divided by the mean proportional 8 into two equal proportions of 4; for 2 is to 8, as 8 is to 32.

4. In any number of proportionals regularly increaſing, the means divide the proportion of the extremes into one more than their own number. Thus, in the ſeries 2, 4, 8, 16, the proportion of the extremes 2 and 16 is by the *two* means 4 and 8, divided into *three* proportions, viz. that betwixt 2 and 4, 4 and 8, 8 and 16. In like manner, in the ſeries 3, 6, 18, 54, 162, 486, the proportion betwixt 3 and 486 is divided by the four means into the five proportions of 3 to 6, 6 to 18, 18 to 54, 54 to 162, and 162 to 486.

5. The proportion betwixt any two terms is diviſible into any number of parts, until theſe become leſs than any aſſignable quantity. Thus the proportion of 2 to 8 is diviſible, by multiplying the two together and extracting the ſquare root, into two parts by the number 4: by multiplying 2 and 4 together, and extracting the ſquare root, and doing the ſame with 4 and 8, the proportion would be divided into four parts, viz. $2.\sqrt{8}.4.\sqrt{32}.8$; or in numbers, 2 : 2.813, &c. : 4 : 5.655 &c. : 8.

6. By dividing the ratios in this manner, the elementary part will become at laſt ſo ſmall, that it may be denominated by the mere difference of terms of that element. This is evident from the diminution of the ratios or proportions already inſtanced: for the proportion between 2 and 2.813 is only 1.406, &c. and if we were to find a mean proportional betwixt 2 and 2.813, the ratio betwixt that proportional and 2 would be much leſs. But it muſt always be remembered, that ſuch *evaneſcent* quantities, as they are called, cannot give us any concluſion with abſolute exactneſs, however they may anſwer every uſeful purpoſe to us: for it is evident that neither mean proportional nor ratio can ever be found exactly; and therefore the error accumulated in all the operations muſt become very conſiderable, if any circumſtance ſhall happen to make it appear.

7. In three continued proportionals, the difference of the two firſt has to the difference between the two laſt the ſame proportion that the firſt term has to the ſecond, or the ſecond to the third. Thus, in the three terms, 4, 8, 16, the difference between the two firſt terms 4 and 8, viz. 4, is in proportion to 8; and the difference between the two laſt, as 4 is to 8, or 8 to 16.

8. In continued proportionals, the greateſt terms have the greateſt differences, and *vice verſa*. Thus the difference between 8 and 16 is evidently greater than between 2 and 4 or 4 and 8.

9. If the difference betwixt the two greateſt terms be made the

meaſure of the proportion between them, the difference between any two others will be leſs than the true meaſure of their proportion. Thus in the ſeries 4, 2, 1, $\frac{1}{2}$, $\frac{1}{4}$, where the difference 2 betwixt the two greateſt terms expreſſes their true proportion, it is plain, that the difference 1 betwixt 2 and 1 is leſs than their ratio, as well as between $\frac{1}{2}$ and $\frac{1}{4}$, &c.

10. In any ſeries of proportionals, if the difference betwixt the greateſt term and one not immediately next to it, be taken as the meaſure of the proportion, then the proportion betwixt the greateſt term and any other greater than the term before taken, will be leſs than the difference of thoſe terms; but the proportion which is between the greateſt term and any one leſs than that firſt taken, will be greater than their difference. As proportionals of this kind do not readily occur, we ſhall, in order to avoid obſcurity, ſhow once for all, that there is a poſſibility of finding geometrical proportionals of ſuch a nature, that the ratio may be equal to the difference betwixt the greateſt and third, or any other term diſtant from it. Thus let us begin with any two numbers we pleaſe, ſuppoſe 9 and 10: though theſe are in the natural arithmetical proportion, yet if we make the ratio 1.111, they will alſo be geometrically proportional, and the ſeries will run thus:

1ſt term	2d term	3d term	4th term	5th term	6th term
10:	9:	8.099:	7.289:	6.560:	5.904, &c.

Here the difference betwixt the firſt and third terms is 1.901, which is greater than the ratio; that betwixt the ſecond and fourth, viz. 1.711, is ſtill greater, but nearer to it than the former; the difference between the third and fifth terms, viz. 1.539, ſtill approximates, as does that between the fourth and ſixth, viz. 1.385: and indeed by continuing this ſeries only for two terms longer, the difference will become ſmaller than the ratio. It is not worth while, however, to ſeek for ſeries of this kind, as the preſent propoſition will now be ſufficiently intelligible without any further illuſtration.

11. If quantities be arranged according to the order of their magnitudes, and if any two ſucceſſive proportions of theſe be equal, the three ſucceſſive terms which conſtitute them will alſo be equal. Thus, if the two quantities 12 and 8 conſtitute the proportion $\frac{12}{8}$, and each of them be leſſened by 6, the half of 12, we have the proportion $\frac{6}{2}$; which is more than double the original proportion; for $\frac{6}{2} = 3$, and $\frac{12}{8} \times \frac{12}{8}$, $= \frac{9}{4} = 2\frac{1}{4}$.

12. When quantities are placed in the order of their magnitudes, if the intermediate magnitudes lying between any two terms be not among the mean proportionals which can be interpoſed betwixt theſe two terms, then theſe intermediates will not divide the proportion of thoſe two terms into commenſurable proportions. Thus in the magnitudes 343 : 216 : 125 : 64 : 27 : 8, neither of the two intermediate terms 125 and 64 are mean proportionals betwixt 27 and 216, nor do they divide the proportion betwixt theſe into commenſurable parts.

13. All the proportions taken in order, which are between expreſſible terms that are in arithmetical proportion, are incommenſurable to one another; as between 8, 13, and 18.

14. When quantities are placed in the order of their magnitude, if the difference between the two greateſt be made the meaſure of their proportion, the difference between any two others will be leſs than the meaſure of *their* proportion; and if the difference between the two leaſt terms be made the meaſure of their proportion, the differences of the reſt will be greater than the meaſure of the proportion between their terms.

15. If the meaſure of proportion between the greateſt exceed their difference, then the proportion of this meaſure to the difference will be leſs than that of a following meaſure to the difference of its terms; becauſe proportionals have the ſame ratio.

16. If three equi-different quantities are taken in order, the proportion between the extremes is more than double that betwixt the two greater terms. Hence it follows, that half the proportion of the extremes is greater than the proportion between the greateſt terms, but leſs than the proportion of the two leaſt.

17. If two quantities conſtitute a proportion, and each be leſſened by half the greater, the remainder will conſtitute a proportion more than double the former.

18. If 1000 numbers follow one another in the natural order, 1000, 999, 998, &c. and by continual multiplication and extraction of the ſquare root we find mean proportionals, and thus *biſect* as it is called, the ratio between the two greateſt, ſo that the parts into which the ratio is divided become ultimately ſmaller than the exceſs of proportion betwixt the next two over the former (for 998 bears a greater proportion to 999 than 999 bears to 1000); the meaſure of this very ſmall part or element of the proportion may be ſuppoſed to be the difference between 1000 and that mean proportional which is the other term of the element. Thus, for the ſake of an eaſy explanation, let us ſuppoſe the numbers to be 10, 9, 8, &c. the ratio of 9 to 10 is 1.11, that of 9 to 8 is 1.125, the difference between which is .014, which we may call the elementary part of the ratios. By ſix extractions of the ſquare root we have the mean proportional 9.985, &c. differing from 10 by no more than .015, which is very near the element juſt mentioned. The number of parts into which the ratio is thus divided is expreſſed by the 6th power of 2 or 64. Dividing therefore the ratio between 9 and 10 or 1.11 by 64, we have .017 for the elementary part thus obtained; which near coincidence with the real element, and the difference between 10 and the mean proportional itſelf, ſhows that in large numbers we may take the difference between the mean proportional and greateſt term for the elementary part without any ſenſible error.

Suppoſe now, that the proportion between 1000 and 998 be divided into twice the number of parts that the former was, it will be equally plain that the difference betwixt 1000 and the next mean proportional will be the meaſure of that element. Proceeding in like manner with the other numbers 1000 and 997, 1000 and 996, &c. it is evident, that by dividing into a proper number of parts, all the elements will be reduced to an equal degree of *fineneſs*, if we may ſo call it, and in calculations may be made uſe of without any fear of error.

19. The number of elementary parts being thus known which are contained in any proportion, it will be eaſy to find the ratios between thoſe numbers which are in continued proportion to the firſt term of the ſeries. Thus, having found the proportion between 1000 and 900,

we know alſo that of 1000 to 810, and 729;
And from 1000 to 800, alſo 1000 to 640, and to 512;
And from 1000 to 700, alſo 1000 to 490, and to 343;
And from 1000 to 600, alſo 1000 to 360, and to 216;
And from 1000 to 500, alſo 1000 to 250, and to 125.

Corol. Hence ariſes the precept for ſquaring, cubing, &c. as alſo for extracting the ſquare root, cube root, &c. out of the firſt figures of numbers. For it will be, As the greateſt number of the chiliad as a denominator, is to the number propoſed as a numerator, ſo is this to the ſquare of the fraction, and ſo is this to the cube.

20. *Prop.* The proportion of a number to the firſt, or 1000, being known; if there be two other numbers in the ſame proportion to each other, then the proportion of one of theſe to 1000 being known, there will alſo be known the proportion of the other to the ſame 1000.

Corol. 1. Hence from the 15 proportions mentioned in prop. 18. will be known 120 others below 1000, to the ſame 1000.

For ſo many are the proportions, equal to ſome one or other of the ſaid 15, that are among the other integer numbers which are leſs than 1000.

Corol. 2. Hence ariſes the method of treating the Rule-of-Three, when 1000 is one of the given terms.

For this is effected by adding to, or ſubtracting from, each other, the meaſures of the two proportions of 1000 to each of the other two given numbers, according as 1000 is, or is not, the firſt term in the Rule-of-Three.

21. *Prop.* When four numbers are proportional, the firſt to the ſecond as the third to the fourth, and the proportions of 1000 to each of the three former are known, there will alſo be known the proportion of 1000 to the fourth number.

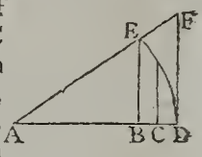
Corol. 1. By this means other chiliads are added to the former.

Corol. 2. Hence ariſes the method of performing the Rule-of-Three, when 1000 is not one of the terms. Namely, from the ſum of the meaſures of the proportions of 1000 to the ſecond and third, take that of 1000 to the firſt, and the remainder is the meaſure of the proportion of 1000 to the fourth term.

Definition. The meaſure of the proportion between 1000 and any leſs number, as before deſcribed, and expreſſed by a number, is ſet oppoſite to that leſs number in the chiliad, and is called its *logarithm*, that is, the number (αριθμος) indicating the proportion (λογον) which 1000 bears to that number, to which the logarithm is annexed.

22. *Prop.* If the firſt or greateſt number be made the radius of a circle, or *ſinus totus*; every leſs number conſidered as the coſine of ſome arc, has a logarithm greater than the verſed ſine of that arc, but leſs than the difference between the radius and ſecant of the arc; except only in the term next after the radius, or greateſt term, the logarithm of which by the hypotheſis is made equal to the verſed ſine.

That is, if CD be made the logarithm of AC, or the meaſure of the proportion of AC to AD; then the meaſure of the proportion of AB to AD, that is, the logarithm of AB, will be greater than BD, but leſs than EF. And this is the ſame as Napier's firſt rule in page 44.



23. *Prop.* The ſame things being ſuppoſed; the ſum of the verſed ſine and exceſs of the ſecant over the radius, is greater than double the logarithm of the coſine of an arc.

Corol. The logarithm coſine is leſs than the arithmetic mean between the verſed ſine and the exceſs of the ſecant.

Precept 1. Any ſine being found in the canon of ſines, and its defect below radius to the exceſs of the ſecant above radius; then ſhall the logarithm of the ſine be leſs than half that ſum, but greater than the ſaid defect or coverſed ſine.

Let there be the ſine 99970.1490 of an arc;
Its defect below radius is 29.8510 the coverſ. and leſs than logarithm ſine;
Add the exceſs of the ſecant 29.8599

Sum 59.7109
its half or 29.8555 greater than the logarithm.
Therefore the logarithm is between { 29.8510 and / 29.8555.

Precept 2. The logarithm of the ſine being found, you will alſo find nearly the logarithm of the round or integer number which is next leſs than your ſine with a fraction, by adding that fractional exceſs to the logarithm of the ſaid ſine.

Thus the logarithm of the ſine 99970.149 is found to be about 29.854; if now the logarithm of the round number 99970,000 be required, add 149 the fractional part of the ſine to its logarithm, obſerving the point, thus,

29.854
149 } is the logarithm of the round number 999700.000 nearly.
the ſum. 30.003

24. *Prop.* Of three equi-different quantities, the meaſure of the proportion between the two greater terms, with the meaſure of the proportion between the two leſs terms, will conſtitute a proportion which will be greater than the proportion of the two greater terms, but leſs than the proportion of the two leaſt.

Thus if AB, AC, AD, be three quantities having the equal differences BC, CD; and if the meaſure of the proportion of AD, AC be cd, and that of AC, AB, be bc; then the proportion of cd to cb will be greater than the proportion of AC to AD, but leſs than the proportion of AB to AC.

1 1 1 1
A B C D
1 1 1
b c d

25. *Prop.* The ſaid proportion between the two meaſures is leſs than half the proportion between the extreme terms: that is, the proportion between bc, cd, is leſs than half the proportion between AB, AD.

Corol. Since therefore the arithmetical mean divides the proportion into unequal parts, of which the one is greater and the other leſs than half the whole; if it be enquired what proportion is between theſe proportions, the anſwer is, that it is a little leſs than the ſaid half.

An example of finding nearly the limits, greater and leſs, to the meaſure of any propoſed proportion.—It being known that the meaſure of the proportion between 1000 and 900 is 10536.05, required the meaſure of the proportion 900 to 800, where the terms 1000, 900, 800, have equal differences. Therefore as 9 to 10, ſo 10536.05 to 11706.72, which is leſs than 11778.30, the meaſure of the proportion 9 to 8. Again, as the mean proportional between 8 and 10 (which is 8.9442719) is to 10, ſo 10536.05 to 11779.66, which is greater than the meaſure of the proportion between 9 and 8.

Axiom. Every number denotes an expreſſible quantity.

26. *Prop.* If the 1000 numbers, differing by 1, follow one another in the natural order, and there be taken any two adjacent numbers, as the terms of ſome proportion; the meaſure of this proportion will be to the meaſure of the proportion between the two greateſt terms of the chiliad, in a proportion greater than that which the greateſt term 1000 bears to the greater of the two terms firſt taken, but leſs than the proportion of 1000 to the leſs of the ſaid two ſelected terms.

So of the 1000 numbers taking any two ſucceſſive terms, as 501 and 500, the logarithm of the former being 69114.92, and of the latter 69314.72, the difference of which is 199.80. Wherefore by the definition, the meaſure of the proportion between 501 and 500 is 199.80. In like manner, becauſe the logarithm of the greateſt term 1000 is 0, and of the next 999 is 100.05, the difference of theſe logarithms, and the meaſure of the proportion between 1000 and 999, is 100.05. Couple now the greateſt term 1000 with each of the ſelected terms 501 and 500; couple alſo the meaſure 199.80 with the meaſure 100.05; ſo ſhall the proportion between 199.80 and

100.05 be greater than the proportion between 1000 and 501, but leſs than the proportion between 1000 and 500.

Corol. 1. Any number below the firſt 1000 being propoſed, as alſo its logarithm, the differences of any logarithms antecedent to that propoſed, towards the beginning of the chiliad, are to the firſt logarithm (viz. that which is aſſigned to 999) in a greater proportion than 1000 to the number propoſed; but of thoſe which follow towards the laſt logarithm, they are to the ſame in a leſs proportion.

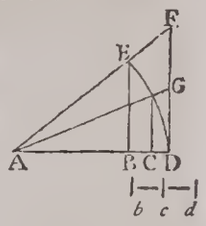
Corol. 2. By this means the places of the chiliad may eaſily be filled up, which have not yet had logarithms adapted to them by the former propoſitions.

27. *Prop.* The difference of two logarithms, adapted to two adjacent numbers, is to the difference of theſe numbers in a proportion greater than 1000 bears to the greater of thoſe numbers, but leſs than that of 1000 to the leſs of the two numbers.

This 27th propoſition is the ſame as Napier's ſecond rule.

28. *Prop.* Having given two adjacent numbers of the 1000 natural numbers, with their logarithmic indices, or the meaſures of the proportions which thoſe abſolute or round numbers conſtitute with 1000 the greateſt; the increments or differences of theſe logarithms will be to the logarithm of the ſmall element of the proportions, as the ſecants of the arcs whoſe coſines are the two abſolute numbers is to the greateſt number, or the radius of the circle: ſo that, however, of the ſaid two ſecants, the leſs will have to the radius a leſs proportion than the propoſed difference has to the firſt of all, but the greater will have a greater proportion, and ſo alſo will the mean proportional between the ſaid ſecants have a greater proportion.

Thus if BC, CD be equal, alſo *ld* the logarithm of AB, and *cd* the logarithm of AC; then the proportion of *bc* to *cd* will be greater than the proportion of AG to AD, but leſs than that of AF to AD, and alſo leſs than that of the mean proportional between AF and AG to AD.



Corol. 1. The ſame obtains alſo when the two terms differ, not only by the unit of the ſmall element, but by another unit which may be ten fold, a hundred fold, or a thouſand fold of that.

Corol. 2. Hence the differences will be obtained ſufficiently exact, eſpecially when the abſolute numbers are pretty large, by taking the arithmetical mean between two ſmall ſecants, or (if you will be at the labour) by taking the geometrical mean between two larger ſecants, and then by continually adding the differences, the logarithms will be produced.

Corol. 3. *Precept.* Divide the radius by each term of the aſſigned proportion, and the arithmetical mean (or ſtill nearer the geometrical mean) between the quotients will be the required increment, which being added to the logarithm of the greater term, will give the logarithm of the leſs term.

EXAMPLE.

Let there be given the logarithm of 700, viz. 35667.4948, to find the logarithm to 699.

Here radius divided by 700 gives 1428571, &c.
and divided by 699 gives 1430672, &c.
the arithmetic mean is 142.962
which added to 35667.4948

gives the logarithm to 699 35810.4568

Corol. 4. *Precept* for the logarithms of ſines.

The increment between the logarithms of two ſines is thus found: Find the geometrical mean between the coſecants, and divide it by the difference of the ſines, the quotient will be the difference of the logarithms.

EXAMPLE.

0° 1′	ſine 2909 coſec.	343774682
0 2	ſine 5818 cofec.	171887319

dif. 2909 geom. mean. 2428 nearly.

The quotient 80,000 exceeds the required increment of the logarithms, becauſe the ſecants are here ſo large.

Appendix. Nearly in the ſame manner it may be ſhown, that the ſecond differences are in the duplicate proportion of the firſt, and the third in the duplicate of the ſecond. Thus, for inſtance, in the beginning of the logarithms, the firſt difference is 100.00000, viz. equal to the difference of the numbers 100000.00000 and 99900.00000; the ſecond, or difference of the differences, 10000; the third 20 Again, after arriving at the number 50000.00000, the logarithms have for a difference 200.00000, which is to the firſt difference as the number 100000.00000 to 50000.00000; but the ſecond difference is 40000, in which 10000 is contained four times; and the third 328, in which 20 is contained ſixteen times. But ſince, in treating of new matters, we labour under the want of proper words, therefore, leſt we ſhould become too obſcure, the demonſtration is omitted untried.

29. *Prop.* No number expreſſes exactly the meaſure of the proportion between two of the 1000 numbers conſtituted by the foregoing method.

30. *Prop.* If the meaſures of all proportions be expreſſed by numbers or logarithms; all proportions will not have aſſigned to them their due portion of meaſure, to the utmoſt accuracy.

31. *Prop.* If to the number 1000, the greateſt of the chiliad, be referred others that are greater than it, and the logarithm of 1000 be made 0, the logarithms belonging to thoſe greater numbers will be negative.

This concludes the firſt or ſcientific part of the work; the principles of which Kepler applies, in the ſecond part, to the actual conſtruction of the firſt 1000 logarithms, which is pretty minutely deſcribed This part is entitled *A very compendious method of conſtructing the Chiliad of Logarithms*; and it is not improperly ſo called, the method being very conciſe and eaſy. The fundamental principles are briefly theſe: That at the beginning of the logarithms, their increments or differences are equal to thoſe of the natural numbers: that the natural numbers may be conſidered as the decreaſing coſines of increaſing arcs: and that the ſecants of thoſe arcs at the beginning have the ſame differences as the coſines, and therefore the ſame differences as the logarithms. Then, ſince the ſecants are the reciprocals of the coſines, by theſe principles and the third corol. to the twenty-eighth propoſition, he eſtabliſhes the following method of conſtituting the 100 firſt or ſmalleſt logarithms to the 100 largeſt numbers, 1000, 999, 998, 997, &c. to 900, viz. Divide the radius 1000, increaſed with ſeven ciphers, by each of theſe numbers ſeparately, diſpoſing the quotients in a table, and they will be the ſecants of thoſe arcs which have the diviſors for their coſines; continuing the diviſion to the 8th figure, as it is in that place only that the arithmetical and geometrical means differ. Then, by adding ſucceſſively the arithmetical means between every two ſuc-

ceſſive ſecants, the ſums will be the ſeries of logarithms. Or, by adding continually every two ſecants, the ſucceſſive ſums will be the ſeries of the double logarithms.

Beſides theſe 100 logarithms thus conſtructed, he conſtitutes two others by continual biſection or extractions of the ſquare root, after the manner deſcribed in the ſecond poſtulate. And firſt he finds the logarithm which meaſures the proportion between 100000.00 and 97656.25, which latter term is the third proportional to 1024 and 1000, each with two ciphers; and this is effected by means of twenty-four continual extractions of the ſquare root, determining the greateſt term of each of twenty-four claſſes of mean proportionals; then the difference between the greateſt of theſe means and the firſt or whole number 1000, with ciphers, being as often doubled, there ariſes 2371.6526 for the logarithm ſought, which made negative is the logarithm of 1024. Secondly, the like proceſs is repeated for the proportion between the numbers 1000 and 500, from which ariſes 69314.7193 for the logarithm of 500; which he alſo calls the logarithm of duplication, being the meaſure of the proportion of 2 to 1.

Then from the foregoing he derives all the other logarithms in the chiliad, beginning with thoſe of the prime numbers 1, 2, 3, 5, 7, &c. in the firſt 100. And firſt, ſince 1024, 512, 256, 128, 64, 32, 16, 8, 4, 2, 1, are all in the continued proportion of 1000 to 500, therefore the proportion of 1024 to 1 is decuple of the proportion of 1000 to 500, and conſequently the logarithm of 1 would be decuple of the logarithm of 500, if 0 were taken as the logarithm of 1024; but ſince the logarithm of 1024 is applied negatively, the logarithm of 1 muſt be diminiſhed by as much: diminiſhing therefore 10 times the logarithm of 500, which is 693147.1928, by 2371.6526, the remainder 690775.5422 is the logarithm of 1, or of 100,00 what is ſet down in the table.

Nos.	Logarithms.
100	230258.5141
10	460517.0282
1	690775.5422
.1	921034.0563
.01	1151292.5703
.001	1381551. 844
.0001	1611809.5985

And becauſe 1, 10, 100, 1000, are continued proportionals, therefore the proportion of 1000 to 1 is triple of the proportion of 1000 to 100, and conſequently $\frac{1}{3}$ of the logarithm of 1 is to be put for the logarithm of 100, viz. 230258.5141, and this is alſo the logarithm of decuplication, or of the proportion of 10 to 1. And hence multiplying this logarithm of 100 ſucceſſively by 2, 3, 4, 5, 6, and 7, there ariſe the logarithms to the numbers in the decuple proportion, as under.

Log. of 1	690775.5422
of 2 to 1	69314.7193
log. of 2	921460.8229
log. of 10	4605 7.028
of 5 to 1	1609 3.7948
log. of 5	529831.7474

Alſo if the logarithm of duplication, or of the proportion of 2 to 1, be taken from the logarithm of 1, there will remain the logarithm of 2; and from the logarithm of 2 taking the logarithm of 10, there remains the logarithm of the proportion of 5 to 1; which taken from the logarithm of 1, there remains the logarithm of 5. See the margin.

For the logarithms of other prime numbers, he has recourſe to thoſe of ſome of the firſt or greateſt century of numbers, before found, viz. of 999, 998, 997, &c. And firſt, taking 960, whoſe logarithm is 4082.2001; then by adding to this logarithm the logarithm of duplication, there will ariſe the ſeveral logarithms of all theſe numbers, which are in duplicate proportion continued from 960, namely 480, 240, 120, 60, 30, 15. Hence the logarithm of 30 taken from the logarithm of 10, leaves the logarithm of the proportion of 3 to 1; which taken from the logarithm of 1, leaves the logarithm of 3, viz. 580914.3106. And the double of this diminiſhed by the logarithm of 1, gives 4710, 53.0790 for the logarithm of 9.

Next, from the logarithm of 990, or $9 \times 10 \times 11$, which is 1005.0321, he finds the logarithm of 11; namely, ſubtract the ſum of the logarithms of 9 and 10 from the ſum of the logarithm of 990, and double the logarithm of 1, there remains 45986.0176 the logarithm of 11.

Again, from the logarithm of 980, or $2 \times 10 \times 7 \times 7$, which is 2020.2711, he finds 49184.5228 for the logarithm of 7.

And from 5129.3302 the logarithm of 950 or $5 \times 10 \times 19$, he finds 396331.6392 for the logarithm of 19.

In like manner the logarithm

to 998 or $4 \times 13 \times 19$, gives the logarithm of 13;
to 969 or $3 \times 17 \times 19$, gives the logarithm of 17;
to 986 or $2 \times 17 \times 29$, gives the logarithm of 29;
to 966 or $6 \times 7 \times 23$, gives the logarithm of 23;
to 930 or $3 \times 10 \times 31$, gives the logarithm of 31.

And ſo on for all the primes below 100, and for many of the primes in the other centuries up to 900. After which he directs to find the logarithms of all numbers compoſed of theſe, by the proper addition and ſubtraction of their logarithms, namely, in finding the logarithm of the product of two numbers, from the ſum of the logarithms of the two factors take the logarithm of 1, the remainder is the logarithm of the product. In this way he ſhows, that the logarithms of all numbers under 500 may be derived, except thoſe of the following 36 numbers; namely, 127, 149, 167, 173, 179, 211, 223, 251, 257, 263, 269, 271, 277, 281, 283, 293, 337, 347, 349, 353, 359, 367, 373, 379, 383, 389, 397, 401, 409, 419, 421, 431, 433, 439, 443, 449. Alſo, beſides the compoſite numbers between 500 and 900, made up of the products of ſome numbers whoſe logarithms have been before determined, there will be 59 primes not compoſed of them; which with the 36 above mentioned make 95 numbers in all not compoſed of the products of any before them, and the logarithms of which he directs to be derived in this manner; namely, by conſidering the differences of the logarithms of the numbers interſperſed among them; then by that method by which were conſtituted the differences of the logarithms of the ſmalleſt 100 numbers in a continued ſeries, we are to proceed here in the diſcontinued ſeries, that is, by prop. 28th. corol. 3d. and eſpecially by the appendix to it, if it be rightly uſed, from whence thoſe differences will be very eaſily ſupplied.

§ 3. *Mr. Briggs's Method.*

The methods principally made uſe of by this gentleman were publiſhed in Napier's poſthumous work. Having ſuppoſed 0 to be the logarithm of 1, and 1 with any number of ciphers annexed, ſuppoſe 10, to be the logarithm of 10, this number is to be divided ten times by 5, which in a logarithmic number is equivalent to the extraction of the root of the fifth power; by which means he obtains the following numbers, viz. 2 with 9 ciphers to it; 4 with eight ciphers; 8 with ſeven ciphers; 16 with 6 ciphers; 32 with 5 ciphers; 64 with four; 128000, 25600, 5120, and 1024. Dividing this laſt logarithm ten times by 2, we have a geometrical ſeries of ten numbers; the firſt of which is 512, and the laſt 1. Thus 20 logarithms are obtained: but the labour of finding the numbers belonging to them is ſo exceſſive, that it is ſurpriſing how it could be undergone by any body. To obtain thoſe correſponding to the firſt ten logarithms, the fifth root muſt be extracted ten times, and the ſquare root as often, to obtain the numbers correſponding to the others. The power from which theſe extractions is made, muſt originally be 1, with a number of ciphers annexed. Other logarithms might be formed from theſe by adding them, and multiplying their correſponding numbers; but as this method, beſides its exceſſive labour, would produce only an *antilogarithmic* canon like that of Mr. Dodſon already mentioned, other more eaſy and proper methods were thought of.

The next was by finding continually geometrical means, firſt between 10 and 1, and then between 10 and that mean, and ſo on; taking the arithmetical means between their correſponding logarithms. The operation is alſo facilitated by various properties of numbers and their logarithms, as that the products and quotients of numbers correſpond to the ſums and differences of their logarithms; that the powers and roots of numbers anſwer to the products and quotients of the logarithms by the index of the power or root. Thus having the logarithm of 2, we can have thoſe of 4, 16, 256, &c. by multiplying the logarithms by 2, and ſquaring the numbers to as great an extent in that ſeries as we pleaſe. If we have alſo that of 3, we can not only have thoſe of 9, 81, 8561, &c. but of 6, 18, 27, and all poſſible products of the powers of 2 and 3 into one another, or into the numbers themſelves. The following property may alſo be of uſe, viz. that if the logarithms of any two numbers are given, and each number be raiſed to the power denoted by the index of the other, the products will be equal. Thus,

Log.	0	1	2	3	4	5	6
Nat. numb.	1	2	4	8	16	32	64

Let the two numbers be 4 and 16; it is plain, that if we raiſe 4 to the fourth power and 16 to the ſquare, the products will be the ſame; for $16 \times 16 = 256$, and $4 \times 4 = 16$; $16 \times 4 = 64$; and $64 \times 4 = 256$.

Another method mentioned by Mr. Briggs depends upon this property, that the logarithm of any number in this ſcale is 1 leſs than the number of places or figures contained in that power of that number whoſe exponent is the logarithm of 10, at leaſt as to integral numbers; for Mr. Briggs has ſhown that they really differ by a fraction. To this Mr. Hutton adds the following; viz. that of any two numbers, as the greater is to the leſs, ſo is the velocity of the increment or decrement of the logarithms at the greater: "that is (ſays he), in our modern notation, as X. Y : y : x; where x and y are the fluxions of X and Y.

In the treatiſe written upon the conſtruction of logarithms by Mr. Briggs himſelf, he obſerves, that they may be conſtructed chiefly by the two methods already mentioned, concerning which he premiſes ſeveral lemmata concerning the powers of numbers and their indices, and how many places of figures are in the products of numbers. He obſerves, that theſe products will conſiſt of as many figures as there are in both factors, unleſs the firſt figures in each factor be expreſſed in one figure only, which ſometimes happens, and then there will commonly be one figure leſs in the product than in the two factors. He obſerves, alſo, that if in any ſeries of geometricals, we take two terms, and raiſe one to the power denoted by the index of the other, or any number raiſed to the power denoted by the logarithm of the other, the product will be equal to this latter number raiſed to the power denominated by the logarithm of the former. Hence, if one of the numbers be 10, whoſe logarithm is 1 with any number of ciphers, then any number raiſed to the power whoſe index is the logarithm of that number, that is, the logarithm of any number in this ſcale where 1 is the logarithm of 10, is the index of that power of 10, which is equal to the given number. But the index of any integral power of 10 is one leſs than the number of places of figures it contains. Thus the ſquare of 10, or 100, contains three places of figures, which is more by one, than the index of the power; 1000, the cube of 10, contains four places, which is one more than the index, 3, of the power. Hence as the number of places of the powers of 10 are always exactly one more than the indices of thoſe powers, it follows that the places of figures in the powers of any other number which is no integral power of 10, will not always be exactly one leſs in number than the indices of the powers. From theſe two properties is deduced the following rule for finding the logarithms of many prime numbers.

Find the 10th, 100th, 1000th, or any other power of a number, ſuppoſe 2, with the number of places of figures in it, then that number of figures ſhall always exceed the logarithm of 2, although the exceſs will be conſtantly leſs than 1; whence by proceeding to very high powers we ſhall at laſt be able to obtain the logarithm of the number to great exactneſs.

Thus, the logarithm of 2, found by other methods, is known to be 3010299956·38), &c. The tenth power of 2 is 1024; which containing four places of figures, gives 4 for the logarithm of 2, which exceeds it, though not quite by 1. The 20th power of 2, conſiſting of the 10th power multiplied into itſelf, by its number of places ought to give the logarithm of 4; and, according to the rule already laid down, ſhould contain eight places of figures: but by reaſon of the cipher which ſtands in the ſecond place, it is eaſy to ſee that it muſt contain only ſeven; which therefore gives ſeven for the logarithm of four. The logarithm of 16 is then expreſſed by the number of places of figures in the product of the 20th power of 2 into itſelf; and is therefore denominated by 13. That of 256 is denoted by the 80th power of 2, containing 25 places of figures. The logarithm of 2, therefore, having been already expreſſed by the 10th power of 2, will be again expreſſed by the 100th power. Adding, therefore, the number of places contained in the 80th power, viz. 25 to 7, the number of places contained in the 20th, we have 32 for the next expreſſion of that logarithm. On account of the cipher which ſtands in the ſecond place of one of the factors, however, we muſt deduct one from the number; and thus we have 31 for the logarithm of 2, which is a conſiderable approximation. Proceeding in this manner, at the 1000th power of 2, we have 302 for the logarithm of 2; at the 10,000th power we have 3011; at the 100,000th power, 30103; at the 1,000,000th, we have 301030; and at the 10,000,000th power, we obtain 3010300; which is as exact as is commonly expreſſed in the tables of logarithms; but by proceeding in the ſame manner we may have it to any degree of exactneſs we pleaſe. Thus, at the 100,000,000th power, we have 30103000; and at the 1,000,000,000th, the logarithm is 301029996, true to eight places of figures.

The only difficulty in this method is to find the number of places of figures in the different powers without multiplying them; but this may be determined by only multiplying the firſt five; or even the firſt three of the products will be ſufficient to determine this; and the logarithms may thus be found with very great facility.

When the logarithms, however, are required to a very great degree of exactneſs, our author thinks that the method of mean proportionals is moſt eligible. This conſiſts in finding a great number of mean proportionals betwixt 1 and the number propoſed; that is, firſt extracting the ſquare root of the number itſelf, then extracting the root of that root, &c. until the laſt root ſhall exceed 1 only by a very ſmall decimal. Finding then the logarithm of this number by methods hereafter to be deſcribed, he multiplies it by the index of the power of 2, denoted by the number of extractions of the ſquare root; and the reſult is the required logarithm of the given number. In this method, the number of decimal places contained in the laſt root ought to be double the number of true places required in the logarithm itſelf, and the firſt half of them ought to be ciphers; the integer being 1. To find out the firſt ſmall number and its logarithm, our author begins with 10 and its logarithm 1; continually extracting the root of the former, and biſecting the latter, till he comes to the 54th root, and then finds, that at the 53d and 54th roots both natural numbers

and logarithms bear the ſame proportion to each other, viz. that of 2 to 1. Thus,

Numbers.

53 | 1.00000,00000,00000,25563,82986,40064,70
54 | 1.00000,00000,00000,12781,91493,20032,35

Logarithms.

53 | 0.00000,00000,00000,11102,23024,62515,65404
54 | 0.00000,00000,00000,05551,11512,31257,82702

If now by continual extraction and biſection we find any other ſmall number, it will then be, as 12781, &c. is to 5551, &c. ſo is that other ſmall decimal to the correſpondent ſignificant figures of its logarithm. To avoid, however, the exceſſive labour of ſuch long multiplications and diviſions, he reduces this ratio to another, the antecedent of which is 1. Thus, as 12781, &c. is to 5551, &c. ſo is 1 with as many ciphers annexed as precede the logarithms above-mentioned, viz. 15, with another unit annexed to a 4th number, which will be the ſignificant figures of the logarithm of the third term. The proportions then will be

12781 &c. : 5551 &c. : : 1,00000,00000,00000,1 : 434294481903251804;

this laſt number, with 17 ciphers prefixed, being the logarithm of the one immediately preceding it. Having therefore found by continual extraction any ſuch ſmall decimal as the above, multiply it by 4342, &c. and the product will be the correſponding logarithm of the laſt root.

Still, as the labour of ſo many extractions muſt be intolerably tedious, it became neceſſary to fall upon ſome contrivances to ſhorten ſuch operations; and of theſe the following is an example.

Let the number of which we ſeek the logarithm be involved to ſuch an height that the index of the power may be one, with either one or more ciphers next to it. Divide this power then by 1 with as many ciphers annexed as the power has ſignificant figures after the firſt; or, ſuppoſing all the figures after the firſt to be decimals, the roots are extracted continually from this power, till the decimal becomes ſufficiently ſmall, as when the firſt 15 places are ciphers; then, multiplying the decimal by 43429, &c. we have the logarithm of this laſt root; which logarithm, multiplied by the like power of the number 2, gives the logarithm of the firſt number of which the extraction was begun. To this logarithm if we prefix 1, 2, 3, &c. according as this number was found by dividing the power by 10, 100, 1000, &c. and laſtly, dividing the reſult by the index of that power, the quotient will be the required logarithm of the given prime number.

Thus to find by this method the logarithm of 2. Raiſe it firſt to the 10th power, which is 1024; then cutting off for decimals the laſt three figures, we continually extract the ſquare root from 1,024 forty-ſeven times, which gives

1.00000,00000,00000,16851,60570,53949,77; the decimal part of which multiplied by 43429, &c. gives

0.00000,00000,00000,07318,55936,90623,9368 for its logarithm; which being continually doubled 47 times, or multiplied at once by the 47th power of 2, viz. 140737488355328, gives for the logarithm of the number

10240.01029,99566,39811,95265,27744, true to 17 or 18 places of decimals; then prefixing to this number 3, becauſe the diviſion was made by 1000 (for cutting off the three places of decimals is the ſame as dividing by 1000), we have for the logarithm of 1024,3.010299566, &c. as above. Laſtly, dividing by 10, becauſe 1024 is the 10th power of 2, we have the logarithm of 2 itſelf; viz. 0 30102, &c.

The involving of any number to a very high power is by no means a matter of ſuch difficulty as might at firſt ſight be imagined. A number multiplied by itſelf produces the *ſquare*; the ſquare multiplied by itſelf produces the *biquadrate*; the biquadrate multiplied by itſelf gives the eighth power, and the eighth power multiplied by the ſquare produces the tenth. The tenth power multiplied by itſelf gives the 20th, and the 20th multiplied by itſelf the 40th. The eighth power divided by the original number gives the ſeventh; and the 40th power multiplied by the ſeventh gives the 47th power required.

The *differential* method of conſtructing logarithms was likewiſe invented by our author, and greatly ſhortens the labour of finding the mean proportionals. Mr. Briggs, in the courſe of his calculations, had obſerved, that theſe proportionals, found by continual extraction of roots, gradually approach nearer and nearer to the halves of the preceding root; and that as many ſignificant figures as there are ciphers before them, agree exactly in this proportion. Subtracting therefore each of theſe decimal parts, which he called A, or the firſt differences, from half the next preceding one, and by comparing together the remainders or ſecond differences, called B, he found that the ſucceeding were always nearly equal to $\frac{1}{4}$ of the next preceding ones; then taking the difference between each ſecond difference and $\frac{1}{4}$ of the preceding one, he found that theſe third differences, called C, were nearly in the continual ratio of 8 to 1; again taking the difference between each C and $\frac{1}{8}$ of the next preceding, he found that theſe fourth differences, called D, were nearly in the continual ratio of 16 to 1; and ſo on, the 5th (E), 6th (F), &c. differences, being nearly in the continual ratio of 32 to 1, of 64 to 1, &c.: theſe plain obſervations being made, they very naturally and clearly ſuggeſted to him the notion and method of conſtructing all the remaining numbers from the differences of a few of the firſt, found by extracting the roots in the uſual way. This will evidently appear from the annexed ſpecimen of a few of the firſt numbers in the laſt example for finding the logarithm of 6; where after the 9th number the reſt are ſuppoſed to be conſtructed from the preceding differences of each, as here ſhown in the 10th and 11th. And it is evident that, in proceeding, the trouble will become always leſs and leſs; the differences gradually vaniſhing, till at laſt only the firſt differences remain. And that generally each leſs difference is ſhorter than the next greater, by as many places as there are ciphers at the beginning of the decimal in the number to be generated from the differences.

	1,00076,96	
1	1,00387,72833,36962,45663,84655,1	
2	1,00193,67661,36946,61675,87022,9	
3	1,00096,79146,39099,01728,89072,0	
4	1,00048,38402,68846,62985,49253,5	A
5	1,00024,18908,78824,68563,80872,7	A
	24,19201,34423,31492,74626,7	$\frac{1}{2}$A
	292,55598,62928,93754,0	B
6	1,00012,09381,26397,13459,43919,4	A
	12,09454,39412,34281,90436,3	$\frac{1}{2}$A
	73,13015,20822,46516,9	B
	73,13899,65732,23438,5	$\frac{1}{4}$B
	884,44909,76921,5	C
7	1,00006,04672,35055,30968,01600,5	A
	6,04690,63198,56729,71959,7	$\frac{1}{2}$A
	18,28143,25761,70359,2	B
	18,28253,80205,61629,2	$\frac{1}{4}$B
	110,54443,91270,0	C
	110,55613,72115,2	$\frac{1}{8}$C
	1169,80845,2	D
8	1,00003,02331,60505,65775,96479,4	A
	3,02336,17527,65484,00800,2	$\frac{1}{2}$A
	4,57021,99708,04320,8	B
	4,57035,81440,42589,8	$\frac{1}{4}$B
	13,81732,38269,0	C
	13,81805,48908,5	$\frac{1}{8}$C
	73,10639,7	D
	73,11302,8	$\frac{1}{16}$D
	663,1	E

9	,00001,,116 ,65999,05672,95048,8	A
	1,51165,80252,82887,9[illegible]239,7	$\frac{1}{2}$A
	1,14253,77215,03190,9	B
	Hitherto the 1,14255,49927,01080,2	$\frac{1}{4}$B
	finaller differences 1,72711,97889,3	C
	are found by fub- 1,72716,54783,6	$\frac{1}{8}$C
	tracting the larger from 4,56894,3	D
	the parts of the like pre- 4,56915,0	$\frac{1}{16}$D
	ceding ones 20,7	E
	20,7	$\frac{1}{32}$E
	Here the greater differences 65	$\frac{1}{32}$E
	remain after fubtracting 28555,89	$\frac{1}{16}$D
	the fmaller from the parts 28555,24	D
	of the difference of 21583,99736,16	$\frac{1}{8}$C
	the next preceding 21588,71180,92	C
	number 28563,44303,75797,72	$\frac{1}{4}$B
	28563,22715,04616,80	B
	75582,32999,52836,47524,40	$\frac{1}{2}$A
10	1,00000,75582,04436,20121,42907,60	A
	2	$\frac{1}{32}$E
	1784,70	$\frac{1}{16}$D
	1784,68	D
	2698,58897,62	$\frac{1}{8}$C
	2698,57112,94	C
	7140,80678,76154,20	$\frac{1}{4}$B
	7140,77980,19041,26	B
	37791,02218,15060,71453,80	$\frac{1}{2}$A
11	1,00000,37790,95077,37080,52412,51	A

He then concludes this chapter with an ingenious, but not obvious method of finding the differences B, C, D, E, &c. belonging to any number, as fuppofe the 9th, from that number itfelf, independent of any of the preceding 8th, 7th, 6th, 5th, &c. and it is this: Raife the decimal A to the 2d, 3d, 4th, 5th, &c. powers; then will the 2d (B), 3d (C), 4th (D), &c. differences be as here below.

$B = \frac{1}{2}A^2$,

$C = \frac{1}{2}A^3 + \frac{1}{8}A^4$,

$D = \frac{7}{8}A^4 + \frac{7}{8}A^5 + \frac{7}{16}A^6 + \frac{7}{16}A^7 + \frac{7}{64}A^8$,

$E = 2\frac{5}{8}A^5 + 7A^6 + 10\frac{15}{16}A^7 + 12\frac{5}{128}A^8 + 11\frac{11}{64}A^9 + 7\frac{105}{128}A^{10}$,

$F = 13\frac{5}{16}A^6 + 81\frac{3}{4}A^7 + 296\frac{87}{2}A^8 + 834\frac{43}{128}A^9 + 1953\frac{255}{512}A^{10}$, &c.

$G = 122\frac{1}{16}A^7 + 1510\frac{67}{128}A^8 + 11475\frac{73}{128}A^9 + 68372\frac{79}{64}A^{10}$, &c.

$H = 1937\frac{95}{128}A^8 + 47151\frac{93}{128}A^9 + 706845\frac{1493}{1024}A^{10}$, &c.

$I = 54902\frac{99}{128}A^9 + 2558465\frac{2387}{2768}A^{10}$, &c.

$K = 2805527A^{10}$, &c.

&c.

Thus in the 9th number of the foregoing example, omitting the ciphers at the beginning of the decimals, we have

$A^1 = 1,51164,65999,05672,95048,8$

$A^2 = 2,28507,54430,06381,6726$

$A^3 = 3,45422,65239,48546,2$

$A^4 = 5,22156,97802,288$

$A^5 = 7,89316,8205$

$A^6 = 11,93168,1$

&c.

Consequently

$A^{\frac{1}{2}2} = 1,14253,77215,03190,8363$		$= B$
$\frac{1}{2}A^3$	1,72711,32619,74273	
$\frac{1}{8}A^4$	65269,62225	
$\frac{1}{2}A^3 + \frac{1}{8}A^4$	1,72711,97889,36498	$= C$
$\frac{7}{8}A^4$	4,56887,35577	
$\frac{7}{8}A^5$	6,90652	
$\frac{7}{16}A^6$	5	
$\frac{7}{8}A^4 + \frac{7}{8}A^5 + \frac{7}{16}A^6$	4,56894,26234	$= D$
$2\frac{5}{8}A^5$	20,71957	
$7A^6$	83	
$2\frac{5}{8}A^5 + 7A^6$	00,72040	$= E$

which agree with the like differences in the foregoing fpecimen.

§ 4. *Of Curves related to Logarithms.*

Several other ingenious methods and improvements are laid down by our author in his treatife upon this fubject; but as all thefe were attended with great labour, mathematicians ftill continued their efforts to facilitate the work; and it was foon perceived that fome curves had properties analogous to logarithms. Edmund Gunter, it has been faid, firft gave the idea of a curve, whofe abfciffes are in arithmetical progreffion, while the correfponding ordinates are in geometrical progreffion, or whofe abfciffes are the logarithms of their ordinates; but it is not noticed in any part of his writings. The fame curve was afterwards confidered by others, and named the *logarithmic* or *logiftic* curve by Huygens in his *Differtatio de Caufa Gravitatis*, where he enumerates all the principal properties of this curve, fhowing its analogy to logarithms. Many other learned men have alfo treated of its properties; particularly Le Seur and Jacquier in their comment on Newton's Principia; Dr. John Kiell in the elegant little tract on

logarithms ſubjoined to his edition of Euclid's Elements; and Francis Maſeres, Eſq. curſitor baron of the exchequer, in his ingenious treatiſe on Trigonometry; in which books the doctrine of logarithms is copiouſly and learnedly treated, and their analogy to the logarithmic curve, &c. fully diſplayed. It is indeed rather extraordinary that this curve was not ſooner announced to the public; ſince it reſults immediately from Baron Napier's manner of conceiving the generation of logarithms, by only ſuppoſing the lines which repreſent the natural numbers to be placed at right angles to that upon which the logarithms are taken. This curve greatly facilitates the conception of logarithms to the imagination, and affords an almoſt intuitive proof of the very important property of their fluxions, or very ſmall increments, *viz.* that the fluxion of the number is to the fluxion of the logarithm, as the number is to the ſubtangent; as alſo of this property, that, if three numbers be taken very nearly equal, ſo that their ratios to each other may differ but a little from a ratio of equality; as for example, the three numbers 10,000,000, 10,000,001, 10,000,002, their differences will be very nearly proportional to the logarithms of the ratios of thoſe numbers to each other: all which follows from the logarithmic arcs being very little different from their chords, when they are taken very ſmall. And the conſtant ſubtangent of this curve is what was afterwards by Cotes called the *modulus* of the ſyſtem of logarithms: and ſince, by the former of the two properties above mentioned, this ſubtangent is a fourth proportional to the fluxion of the number, the fluxion of the logarithm, and the number, this property afforded occaſion to Mr. Baron Maſeres to give the following definition of the *modulus*, which is the ſame in effect as Cotes's, but more clearly expreſſed; namely, that it is the limit of the magnitude of a fourth proportional to theſe three quantities, viz. the difference of any two natural numbers that are very nearly equal to each other, either of the ſaid numbers and the logarithm or meaſure of the ratio they have to each other. Or we may define the *modulus* to be the natural number at that part of the ſyſtem of logarithms, where the fluxion of the number is equal to the fluxion of the logarithm, or where the numbers and logarithms have equal differences. And hence it follows, that the logarithms of equal numbers or of equal ratios, in different ſyſtems, are to one another as the *moduli* of thoſe ſyſtems. Moreover, the ratio whoſe meaſure or logarithm is equal to the *modulus*, and thence by Cotes called the *ratio modularis*, is by calculation found to be the ratio of 2·718281828459, &c. to 1, or of 1 to ·367879441171, &c.: the calculation of which number may be ſeen at full length in Mr. Baron Maſeres's Treatiſe on the Principles of Life-annuities, pp. 274 and 275.

The hyperbolic curve alſo afforded another ſource for developing and illuſtrating the properties and conſtruction of logarithms. For the hyperbolic areas lying between the curve and one aſymptote, when they are bounded by ordinates parallel to the other aſymptote, are analogous to the logarithms of their abſciſſes or parts of the aſymptote. And ſo alſo are the hyperbolic ſectors; any ſector bounded by an arc of the hyperbola and two radii being equal to the quadrilateral ſpace bounded by the ſame arc, the two ordinates to either aſymptote from the extremities of the arc and the part of the aſymptote intercepted between them. And although Napier's logarithms are commonly ſaid to be the ſame as hyperbolic logarithms, it is not to be underſtood that hyperbolas exhibit Napier's logarithms only, but indeed all other poſſible ſyſtems of logarithms whatever. For, like as the right-angled hyperbola, the ſide of whoſe ſquare inſcribed at the vertex is 1, gives us Napier's logarithms; ſo any other ſyſtem of logarithms is expreſſed by the hyperbola whoſe aſymptotes form a certain oblique angle, the ſide of the rhombus inſcribed at the vertex of the hyperbola in this caſe alſo being ſtill 1, the ſame as the ſide of the ſquare in the right-angled hyperbola. But the areas of the ſquare and rhombus, and conſequently the logarithms of any one and the ſame number or ratio, will differ according to the ſine of the angle of the aſymptotes. And the area of the ſquare or rhombus, or any inſcribed parallelogram, is alſo the ſame thing as what was by Cotes called the *modulus of the ſyſtem of logarithms*; which modulus will therefore be expreſſed by the numerical meaſure of the ſine of the angle formed by the aſymptotes, to the radius 1; as that is the ſame with the number expreſſing the area of the ſaid ſquare or rhombus, the ſide being 1; which is another definition of the modulus to be added to thoſe we before remarked above in treating of the logarithmic curve. And the evident reaſon of this is, that in the beginning of the generation of theſe areas from the vertex of the hyperbola, the naſcent increment of the abſciſſe drawn into the altitude 1, is to the increment of the area, as radius is to the ſine of the angle of the ordinate and abſciſſe, or of the aſymptotes; and at the beginning of the logarithms, the naſcent increment of the natural numbers is to the increment of the logarithms as 1 is to the modulus of the ſyſtem. Hence we eaſily diſcover, that the angle formed by the aſymptotes of the hyperbola, exhibiting Briggs's Syſtem of Logarithms, will be 25° 44′ $25\frac{1}{2}''$; this being the angle whoſe ſine is 0 43429448 19, &c. the modulus of this ſyſtem.

Or indeed any one hyperbola, as has been remarked by Mr. Baron Maſeres, will expreſs all poſſible ſyſtems of logarithms whatever; namely, if the ſquare or rhombus inſcribed at the vertex, or, which is the ſame thing, any parallelogram inſcribed between the aſymptotes and the curve at any other point, be expounded by the modulus of the ſyſtem; or, which is the ſame, by expounding the area, intercepted between two ordinates which are to each other in the ratio of 10 to 1, by the logarithm of that ratio in the propoſed ſyſtem.

As to the firſt remarks on the analogy between logarithms and the hyperbolic ſpaces; it having been ſhown by Gregory St. Vincent, in his *Quadratura Circuli et Sectionum Coni*, publiſhed at Antwerp in 1647, that if one aſymptote be divided into parts in geometrical progreſſion, and from the points of diviſion ordinates be drawn parallel to the other aſymptote, they will divide the ſpace between the aſymptote and curve into equal portions: from hence it was ſhown by Merſennus, that, by taking the continual ſums of thoſe parts, there would be obtained areas in arithmetical progreſſion, adapted to abſciſſes in geometrical progreſſion, and which therefore were analogous to a ſyſtem of logarithms. And the ſame analogy was remarked and illuſtrated ſoon after by Huygens and many others, who ſhow how to ſquare the hyperbolic ſpaces by means of the logarithms. There are likewiſe many other geometrical figures which have properties analogous to logarithms; ſuch as the equi-angular ſpiral, the figures of the tangents and ſecants, &c.

§ 5. *Mercator's Method.*

This is purely arithmetical, and is founded upon the idea of logarithms already mentioned; *viz.* that they are the meaſures of ratios, and expreſs the number of *ratiunculæ* contained in any ratio into which it may be divided. Having ſhown then that theſe logarithms, or numbers of ſmall ratios, or meaſures of ratios, may be all properly repreſented by numbers; and that of 1, or the ratio of equality, the logarithm or meaſure being always 0, the logarithm of 10, or the meaſure of the ratio of 10 to 1, is moſt conveniently repreſented by 1 with any number of cyphers; he then proceeds to ſhow how the meaſures of all other ratios may be found from this laſt ſuppoſition. And he explains the principles by the two following examples:

First, to find the logarithm of 102·5, or to find how many *ratiunculæ* are contained in the ratio of 100·5 to 1, the number of *ratiunculæ* in the decuple ratio, or ratio of 10 to 1, being 10,000,000.

The given ratio 100·5 to 1 he firſt divides into its parts; namely, 100·5 to 100, 100 to 10, and 10 to 1; the laſt two of which being decuples, it follows that the characteriſtic will be 2, and it only remains to find how many parts of the next decuple belong to the firſt ratio of 100·5 to 100. Now if each term of this ratio be multiplied by itſelf, the products will be in the duplicate ratio of the firſt terms, or this laſt ratio will contain a double number of parts; and if theſe be multiplied by the firſt terms again, the ratio of the laſt products will contain three times the number of parts, and ſo on; the number of times of the firſt parts contained in the ratio of any like powers of the firſt terms, being always denoted by the exponent of the power. If therefore the firſt terms 100·5 and 100 be continually multiplied till the ſame powers of them have to each other a ratio whoſe meaſure is known; as ſuppoſe the decuple ratio 10 to 1, whoſe meaſure is 10,000,000: then the exponent of that power ſhows what multiple this meaſure 10,000,000 of the decuple ratio is of the required meaſure of the firſt ratio 100·5 to 100; and conſequently dividing 10,000,000 by that exponent, the quotient is the meaſure of the ratio 100·5 to 100 ſought. The operation for finding this he ſets down as here follows; where the ſeveral multiplications are all performed in the contracted way by inverting the figures of the multiplier, and retaining only the firſt number of decimals in each product.

				Power.
100·5000	-	-	-	1
5001	-	-	-	1
1005·00				
5025				
1010025	-	-	-	2
5200101	-	-	-	2
1010025				
10100				
20				
5				
1020150	-	-	-	4
0510201	-	-	-	4
1020150	-	-	-	
20403				
102				
51				
1040706	-	-	-	8
6070401	-	-	-	8
1083068	-	-	-	16
8603801	-	-	-	16
1173035	-	-	-	32
5303711	-	-	-	32
1376011	-	-	-	64
1106731	-	-	-	64
1893406	-	-	-	128
6043981	-	-	-	128
3584985	-	-	-	256
5894853	-	-	-	256
12852116	-	-	-	512

The power being greater than the decuple of the like power of 100, which muſt always be 1 with cyphers, reſume therefore the 256th power, and multiply it not by itſelf but by the next before it, *viz.* by the 128th, thus:

				Power.
3584985	-	-	-	256
6043981	-	-	-	128
6787831	-	-	-	384
1106731	-	-	-	64
9340130	-	-	-	448
5303711	-	-	-	32
10956299	-	-	-	480

This power again exceeding the ſame power of 100 more than 10 times, he therefore draws the ſame 448th not into the 32d but the next preceeding, thus: Power.

9340130	-	-	-	448
8603801	-	-	-	16
10115994	-	-	-	464

This being again too much, inſtead of the 16th draw it into the 8th or next preceding, thus: Power.

9340130	-	-	-	448
6070401	-	-	-	8
9720329	-	-	-	456
0510201	-	-	-	4
9916193	-	-	-	460
5200101	-	-	-	2
10015603	-	-	-	462

Which power again exceeds the limit: therefore draw the 460th into the 1ſt, thus, Power.

9916193	-	-	-	460
5001	-	-	-	1
9965774	-	-	-	461

Since therefore the 462d power of 100·5 is greater, and the 461ſt power is leſs, than the decuple of the ſame power of 100; he finds that the ratio of 100·5 to 100 is contained in the decuple more than 461 times, but leſs than 462 times. Again,

Since the { 460, 461, 462 } power is { 9916193, 9965774, 10015603 } and the differences { 49581, 49829 } nearly equal; therefore the proportional part which the exact power, or 10000000, exceeds the next leſs 9965774, will be eaſily and accurately found by the Golden Rule, thus:

The juſt power	-	-	10000000
and the next leſs	-	-	9965774
the difference	-	-	34226; then,

As 49829 the dif. between the next leſs and greater,
: To 34226 the dif. between the next leſs and juſt,
: : So is 10000: to 6868, the decimal parts; and therefore the ratio of 100·5 to 100, is 461·6868 times contained in the decuple or ratio of 10 to 1. Dividing now 1,0000000, the meaſure of the decuple ratio, by 461,6868, the quotient 00216597 is the meaſure of the ratio of 100·5 to 100; which being added to 2, the meaſure of 100 to 1, the ſum 2,00216597 is the meaſure of the ratio of 100·5 to 1, that is, the log. of 100·5 is 2,00216597.

In the ſame manner he next inveſtigates the log. of 99·5, and finds it to be 1,99782307.

A few obſervations are then added, calculated to generalize the conſideration of ratios, their magnitude and affections. It is here remarked, that he conſiders the magnitude of the ratio between two quantities as the ſame, whether the antecedent be the greater or the leſs of the two terms; ſo the magnitude of the ratio of 8 to 5 is the ſame as of 5 to 8; that is, by the magnitude of the ratio of either to the other is meant the number of *ratiunculæ* between them, which will evidently be the ſame whether the greater or leſs term be the antecedent. And he farther remarks, that of different ratios,

when we divide the greater term of each ratio by the leſs, that ratio is of the greater maſs or magnitude which produces the greater quotient, *et vice verſa*; although thoſe quotients are not proportional to the maſſes or magnitudes of the ratios. But when he conſiders the ratio of a greater term to a leſs, or of a leſs to a greater, that is to ſay, the ratio of greater or leſs inequality, as abſtracted from the magnitude of the ratio, he diſtinguiſhes it by the word *affection*, as much as to ſay greater or leſs affection, ſomething in the manner of poſitive and negative quantities, or ſuch as are affected with the ſigns + and − . . . . . The remainder of this work he delivers in ſeveral propoſitions, as follows:

Prop. 1. In ſubtraction from each other two quantities of the ſame affection, to wit, both poſitive, or both negative; if the remainder be of the ſame affection with the two given, then is the quantity ſubtracted the leſs of the two, or expreſſed by the leſs number; but if the contrary, it is the greater.

Prop. 2. In any continued ratios, as $\frac{a}{a+b}, \frac{a+b}{a+2b}, \frac{a+2b}{a+3b}$, &c. (by which is meant the ratios of a to $a+b$, $a+b$ to $a+2b$, $a+2b$ to $a+3b$, &c.) of equidifferent terms, the antecedent of each ratio being equal to the conſequent of the next preceding one, and proceeding from leſs terms to greater; the meaſure of each ratio will be expreſſed by a greater quantity than that of the next following; and the ſame through all their orders of differences, namely, the 1ſt, 2d, 3d, &c. differences; but the contrary, when the terms of the ratios decreaſe from greater to leſs.

Prop. 3 In any continued ratios of equidifferent terms, if the 1ſt or leaſt be a, the difference between the 1ſt and 2d b, and c, d, e, &c. the reſpective firſt term of their 2d, 3d, 4th, &c. differences; then ſhall the ſeveral quantities themſelves be as in the annexed ſcheme; where each term is compoſed of the firſt term together with as many of the differences as it is diſtant from the firſt term, and to thoſe differences joining, for coefficients, the numbers in the ſloping or oblique lines contained in the annexed table of figurate numbers; in the ſame manner, he obſerves, as the ſame figurate numbers complete the powers raiſed from a binomial root, as had long before been taught by others. He alſo remarks, that this rule not only gives any one term, but alſo the ſum of any number of ſucceſſive terms from the beginning, making the 2d coefficient the 1ſt, the 3d, the 2d, and ſo on; thus, the ſum of the firſt 5 terms is $5a + 10b + 10c + 5d + e$

1ſt term	-	a
2d	-	$a + b$
3d	-	$a + 2b + c$
4th	-	$a + 3b + 3c + d$
5th	-	$a + 4b + 6c + 4d + e$
&c.		&c.

1	1	1	1	1	1	1	1	1
1	2	3	4	5	6	7	8	9
1	3	6	10	15	21	28	36	
1	4	10	20	35	56	84		
1	5	15	35	70	126			
1	6	21	56	126				
1	7	28	84					
1	8	36						
1	9							

In the 4th *prop.* it is ſhown, that if the terms decreaſe, proceeding from the greater to the leſs, the ſame theorems hold good, by only changing the ſign of every other term, as below.

1ſt term	-	a
2d	-	$a - b$
3d	-	$a - 2b + c$
4th	-	$a - 3b + 3c - d$
5th	-	$a - 4b + 6c - 4d + e$
&c.		&c.

Prop. 6th and 7th, treat of the approximate multiplication and diviſion of ratios, or, which is the ſame thing, the finding nearly any powers or any roots of a given fraction, in an eaſy manner. The theorem for raiſing any power, when reduced to a ſimpler form, is this, the m power of $\frac{a}{b}$, or $\overbrace{\frac{a}{o}}^{m}$ is $= \frac{s \mp md}{s \pm md}$ nearly, where s is $= a + b$, and $d = a \sim b$, the ſum and difference of the two numbers, and the upper or under ſigns take place according as $\frac{a}{b}$ is a proper or an improper fraction, that is, according as a is leſs or greater than b. And the theorem for extracting the mth root of $\frac{a}{b}$ is $\sqrt[m]{\frac{a}{b}}$ or $\overbrace{\frac{a}{b}}^{\frac{1}{m}} = \frac{ms \mp d}{ms \pm d}$ nearly; which latter rule is alſo the ſame as the former, as will be evident by ſubſtituting $\frac{1}{m}$ inſtead of m in the firſt theorem. So that univerſally $\overbrace{\frac{a}{b}}^{\frac{m}{n}}$ is $= \frac{ns \mp md}{ns \pm md}$ nearly. Theſe theorems, however, are nearly true only in ſome certain caſes, namely, when $\frac{a}{b}$ and $\frac{m}{n}$ do not differ greatly from unity. And in the 7th *prop.* the author ſhows how to find nearly the error of the theorems.

In the 8th *prop.* it is ſhown, that the meaſures of ratios of equidifferent terms, are nearly reciprocally as the arithmetical means between the terms of each ratio. So of the ratios $\frac{1}{1}\frac{6}{7}$, $\frac{3}{3}\frac{3}{7}$, $\frac{5}{5}\frac{0}{2}$, the mean between the terms of the firſt ratio is 17, of the 2d 34, of the 3d 51, and the meaſures of the ratios are nearly as $\frac{1}{1}\frac{1}{7}$, $\frac{1}{3}\frac{1}{4}$, $\frac{1}{5}\frac{1}{1}$.

From this property he proceeds, in the 9th *prop.* to find the meaſure of any ratio leſs than $\frac{5}{1}\frac{0}{0}\frac{0.5}{0.5}$, which has an equal difference (1) of terms. In the two examples mentioned near the beginning, our author found the logarithm or meaſure of the ratio of $\frac{9}{1}\frac{0}{0}\frac{0.5}{0.5}$ to be $21769\frac{3}{1}\frac{}{0}$, and that of $\frac{1}{1}\frac{0}{0}\frac{0}{0.5}$ to be $21659\frac{7}{1}\frac{}{0}$; therefore the ſum 43429 is the logarithm of $\frac{9}{1}\frac{9}{0}\frac{9.5}{0.5}$ or $\frac{9}{1}\frac{9.5}{0} \times \frac{1}{1}\frac{0}{0}\frac{0}{5}$; or the logarithm of $\frac{5}{1}\frac{0}{0}\frac{0.5}{0.5}$ is nearer 43430, as found by other more accurate computations.—Now, to find the logarithm of $\frac{1}{1}\frac{0}{0}\frac{0}{1}$, having the ſame difference of terms (1) with the former; it will be, by prop. 8. as 100.5 (the mean between 101 and 100) : 100 the mean between 99·5 and 100·5) :: 43430 · 43213 the logarithm of $\frac{1}{1}\frac{0}{0}\frac{0}{1}$, or the difference between the logarithms of 100 and 101. But the logarithm of 100 is 2; therefore the logarithm of 101 is 2,0043213.—— Again, to find the logarithm of 102, we muſt firſt find the logarithm of $\frac{1}{1}\frac{0}{0}\frac{1}{2}$; the mean between its terms being 101·5, therefore as 101·5 : 100 :: 43430 : 42788 the logarithm of $\frac{1}{1}\frac{0}{0}\frac{1}{2}$, or the difference of the logarithms of 101 and 102. But the logarithm of 101 was found above to be 2,0043213; therefore the logarithm of 102 is 2,0086001.—So that dividing continually 868596 (the double of 434298 the logarithm of $\frac{5}{1}\frac{0}{0}\frac{0.5}{0.5}$ or $\frac{1}{2}\frac{0}{0}\frac{0}{1}$) by each number of the ſeries 201, 203, 205, 207, &c. then add 2 to the 1ſt quotient, to the ſum add the 2d quotient, and ſo on, adding always the next quotient to the laſt ſum, the

ſeveral ſums will be the reſpective logarithms of the numbers in this ſeries, 101, 102, 103, 104, &c.

The next, or *prop.* 10th, ſhows that, of two pair of continued ratios, whoſe terms have equal differences, the difference of the meaſures of the firſt two ratios is to the difference of the meaſures of the other two, as the ſquare of the common term in the two latter is to that in the former, nearly. Thus in the four ratios $\frac{a}{a+b}$, $\frac{a+b}{a+2b}$, $\frac{a+3b}{a+4b}$, $\frac{a+4b}{a+5b}$, as the meaſure of $\frac{aa+2ab}{\overline{a+b}^2}$ (the difference of the firſt two, or the quotient of the two fractions): the meaſure of $\frac{aa+8ab+15bb}{\overline{a+4b}^2}$ $:: \overline{a+4b}^2 : \overline{a+b}^2$, nearly.

In *prop.* 11. the author ſhows that ſimilar properties take place among two ſets of ratios, conſiſting each of 3 or 4, &c. continued numbers.

Prop. 12. ſhows, that of the powers of numbers in arithmetical progreſſion, the orders of differences which become equal, are the ſecond differences in the ſquares, the 3d differences in the cubes, the 4th differences in the 4th powers, &c. And from hence it is ſhown, how to conſtruct all thoſe powers by the continual addition of their differences: As had been long before more fully explained by Briggs.

In the next, or 13th *prop.* our author explains his compendious method of raiſing the tables of logarithms, ſhowing how to conſtruct the logarithms by addition only, from the properties contained in the 8th, 9th, and 12th propoſitions. For this purpoſe he makes uſe of the quantity $\frac{a}{b-c}$, which by diviſion he reſolves into this infinite ſeries $\frac{a}{b} + \frac{ac}{bb} + \frac{ac^2}{b^3} + \frac{ac^3}{b^4}$, &c. (*in infin.*) Putting then $a = 100$ the arithmetical mean between the terms of the ratio $\frac{99999}{100000}$, $b = 100000$, and c ſucceſſively equal to 0·5, 1·5, 2·5, &c. that ſo $b-c$ may be reſpectively equal to 99999·5, 99998·5, 99997·5, &c. the correſponding means between the terms of the ratios $\frac{99999}{100000}$, $\frac{99998}{99999}$, $\frac{99997}{99998}$, &c. it is evident that $\frac{a}{b-c}$ will be the quotient of the 2d term divided by the 1ſt in the proportions mentioned in the 8th and 9th propoſitions; and when each of theſe quotients are found, it remains then only to multiply them by the conſtant 3d term 43429, or rather 43429·8, of the proportion, to produce the logarithms of the ratios $\frac{99999}{100000}$, $\frac{99998}{99999}$, $\frac{99997}{99998}$, &c. till $\frac{100000}{100001}$; then adding theſe continually to 4 the logarithm of 10·00 the leaſt number, or ſubtracting them from 5 the logarithm of the higheſt term 100000, there will reſult the logarithms of all the abſolute numbers from 10000 to 100000. Now when c is $= 0.5$, then

$\frac{a}{b} = .001$, $\frac{ac}{bb} = .0000005$, $\frac{ac^2}{b^3} = .000000000000025$, $\frac{ac^3}{b^4} = .000000000000000000125$,

&c.; therefore $\frac{a}{b-c} = \frac{a}{b} + \frac{ac}{bb} + \frac{ac^2}{b^3}$, &c. is $= .001000000500000250000125$,

In like manner, if $c = 1.5$, then $\frac{a}{b+c}$ will be $= .001000001500002250033375$;

and if $c = 2.5$, then $\frac{a}{b-c}$ will be $= .001000002500006250156250$;

&c. But inſtead of conſtructing all the values of $\frac{a}{b-c}$ in the uſual way of raiſing the powers, he directs them to be found by addition only, as in the laſt propoſition. Having thus found all the values of $\frac{a}{b-c}$, the author then ſhows, that they may be drawn into the conſtant logarithm 43429 by addition only, by the help of the annexed table of the firſt 9 products of it.

1	43429
2	86858
3	130287
4	173716
5	217145
6	260574
7	304003
8	347432
9	390861

The author then diſtinguiſhes which of the logarithms it may be proper to find in this way, and which from their component parts. Of theſe the logarithms of all even numbers need not be thus computed, being compoſed from the number 2; which cuts off one half of the numbers: neither are thoſe numbers to be computed which end in 5, becauſe 5 is one of their factors; theſe laſt are $\frac{1}{10}$ of the numbers; and the two together $\frac{1}{2}+\frac{1}{10}$ make $\frac{3}{5}$ of the whole: and of the other $\frac{2}{5}$, the $\frac{1}{3}$ of them, or $\frac{2}{15}$ of the whole, are compoſed of 3; and hence $\frac{2}{5}+\frac{2}{15}$, or $\frac{11}{15}$ of the numbers, are made up of ſuch as are compoſed of 2, 3, and 5. As to the other numbers which may be compoſed of 7, of 11, &c.; he recommends to find their logarithms in the general way, the ſame as if they were incompoſites, as it is not worth while to ſeparate them in ſo eaſy a mode of calculation. So that of the 90 chiliads of numbers from 10000 to 100000, only 24 chiliads are to be computed. Neither indeed are all of theſe to be calculated from the foregoing ſeries for $\frac{a}{b-c}$, but only a few of them in that way, and the reſt by the proportion in the 8th propoſition. Thus, having computed the logarithms of 10003 and 10013, omitting 10023 as being diviſible by 3, eſtimate the logarithms of 10033 and 10043, which are the 30th numbers from 10003 and 10013; and again, omitting 10053, a multiple of 3, find the logarithms of 10063 and 10073. Then by prop. 8.

As 10048, the arithmetical mean between 10033 and 10063,
to 10018, the arithmetical mean between 10003 and 10033,
ſo 13006, the difference between the logarithms of 10003 and 10033.
to 12967, the difference between the logarithms of 10033 and 10063;

That is, 1ſt, As $\left\{\begin{matrix}10048\\10078\\10108\end{matrix}\right\}$: 10018 : : 13006 : $\left\{\begin{matrix}12967\\\&c.\end{matrix}\right.$

Again, As $\left\{\begin{matrix}10058\\10088\\10118\end{matrix}\right\}$: 10028 : : 12992 : $\left\{\begin{matrix}12953\\\&c.\end{matrix}\right.$

And 3dly, as $\left\{\begin{matrix}10068\\10098\\\&c.\end{matrix}\right\}$: 10038 : : 12979 : $\left\{\begin{matrix}12940\\\&c.\end{matrix}\right.$

And with this our author concludes his compendium for conſtructing the tables of logarithms.

§ 6. *Gregory's Method.*

This is founded upon an analogy between a ſcale of logarithmic tangents and Wright's protraction of the nautical meridian line conſiſting of the ſums of the ſecants. It is not known by whom this diſcovery was made; but, about 1645, it was publiſhed by Mr. Henry Bond, who mentions this property in Norwood's Epitome of Navigation. The mathematical demonſtration of it was firſt inveſtigated by Mercator; who, with a view to make ſome advantage of his diſcovery, offered, in the Philoſophical Tranſactions for June 4th 1666, to lay a wager with any one concerning it; but this propoſal not being accepted, the demonſtration was not publiſhed. Other mathematicians, however, ſoon found out the myſtery; and in two years after, Dr. Gregory publiſhed a demonſtration, and from this and other ſimilar properties he ſhowed a method of computing the logarithmic ſines and tangents by means of an infinite ſeries. Several of theſe were invented by him, and the method of applying them laid down by himſelf and others; but Mr. Hutton thinks that a ſhorter and better method than any they propoſed might have been found by computing, by means of the ſeries, only a few logarithms of ſmall ratios, in which the terms of the ſeries would have decreaſed by the powers of 10 or ſome greater number, the numerators of all the terms being unity, and their denominators the powers of 10 or ſome greater number, and then employing theſe few logarithms, ſo computed, to the finding of the logarithms of other and greater ratios by the eaſy operations of mere addition and ſubtraction. This might have been done for the logs. of the ratios of the firſt ten numbers, 2, 3, 4, 5, 6, 7, 8, 9, 10, and 11, to 1, in the following manner, communicated by Mr. Baron Maſeres.—In the firſt place the logarithm of the ratio of 10 to 9, or of 1 to $\frac{9}{10}$, or of 1 to $1-\frac{1}{10}$, is equal to the ſeries $\frac{1}{10}+\frac{1}{2\times100}+\frac{1}{3\times1000}+\frac{1}{4\times10000}+\frac{1}{5\times100000}$ &c. In like manner are eaſily found the logarithms of the ratios of 11 to 10; and then by the ſame ſeries thoſe of 121 to 120, and of 81 to 80, and of 2401 to 2400; in all which caſes the ſeries would converge ſtill faſter than in the two firſt caſes. We may then proceed by mere addition and ſubtraction of logarithms, as follows.

Log. $\frac{11}{9}$ = L. $\frac{11}{10}$ + L. $\frac{10}{9}$,	L. $\frac{120}{100}$ = L. $\frac{3}{2}$,	L. $\frac{80}{81}$ = L. $\frac{81}{100}$ — L. $\frac{81}{80}$
L. $\frac{121}{81}$ = 2L. $\frac{11}{9}$,	L. $\frac{9}{4}$ = 2L. $\frac{3}{2}$,	L. $\frac{5}{1}$ = L. $\frac{80}{16}$,
L. $\frac{121}{80}$ = L. $\frac{121}{81}$ + L. $\frac{81}{80}$,	L. $\frac{10}{4}$ = L. $\frac{10}{9}$ + $\frac{9}{4}$,	L. $\frac{5}{2}$ = L. $\frac{10}{4}$,
L. $\frac{120}{100}$ = L. $\frac{121}{80}$ — L. $\frac{121}{120}$,	L. $\frac{9}{16}$ = 2L. $\frac{9}{4}$,	L. $\frac{2}{1}$ = L. $\frac{5}{2}$ — L. $\frac{5}{2}$.

Having thus got the logarithm of the ratio of 2 to 1, or, in common language, the logarithm of 2, the logarithms of all ſorts of even numbers may be derived from thoſe of the odd numbers which are their coefficients with 2 or its powers. We may then proceed as follows:

L. 4 = 2 L. 2,	L. 100 = 2L. 10,	L. 2401 = L. $\frac{2401}{2400}$ + L. 2400,
L. 10 = L. $\frac{10}{4}$ + L. 4,	L. 8 = 3L. 2,	L. 7 = $\frac{1}{4}$ L. 2401,
L. 9 = L. $\frac{9}{4}$ + L. 4,	L. 24 = L. 8 + L. 3,	L. 11 = L. $\frac{11}{5}$ + L. 9.
L. 3 = $\frac{1}{2}$ L. 9.	L. 2400 = L. 100 + L. 24.	L. 6 = L. 2 + L. 3.

Thus we have got the logarithms of 2, 3, 4, 5, 6, 7, 8, 9, 10, and 11. And this is upon the whole, perhaps, the beſt method of computing logarithms that can be taken.—This method of computing logarithms is very nearly the ſame with that of Sir Iſaac Newton in his ſecond letter to Mr. Oldenburg, dated October 1676.

§ 7. *Conſtruction of Logarithms by Fluxions.*

From the definition and deſcription of logarithms given by Napier, and of which we have already taken notice, it appears that the fluxion of his, or the hyperbolic logarithm of any number, is a fourth proportional to that number, its logarithm and unity; or, which is the ſame, that it is equal to the fluxion of the number divided by the number: For the deſcription ſhows that $z1 : za$ or $1 : : \dot{z}1$ the fluxion of $z1 : za$, which therefore is $= \frac{\dot{z}1}{z1}$; but $\dot{z}a$ is alſo equal to the fluxion of the logarithm A, &c. by the deſcription; therefore the fluxion of the logarithm is equal to $\frac{\dot{z}1}{z1}$, the fluxion of the quantity divided by the quantity itſelf. The ſame thing appears again at art. 2. of that little piece in the appendix to his *Conſtructio Logarithmorum*, entitled *Habitudines Logarithmorum & ſuorum naturalium numerorum invicem*; where he obſerves, that as any greater quantity is to a leſs, ſo is the velocity of the increment or decrement of the logarithms at the place of the leſs quantity to that at the greater. Now this velocity of the increment or decrement of the logarithms being the ſame thing as their fluxions, that proportion is this $x : a : :$ flux. log. a : flux. log. x: hence if a be $= 1$, as at the beginning of the table of numbers, where the fluxion of the logs. is the index or characteriſtic c, which is alſo one in Napier's or the hyperbolic logarithms, and 43429, &c. in Briggs's, the ſame proportion becomes $x : 1 : : c :$ flux. log. x; but the conſtant fluxion of the numbers is alſo 1, and therefore that proportion is alſo this $x : \dot{x} : : c : \frac{\dot{c}x}{x}$ = the fluxion of the logarithm of x: and in the hyperbolic logarithms, where c is $= 1$, it becomes $\frac{\dot{x}}{x}$ = the fluxion of Napier's or the hyperbolic logarithm of x. This ſame property has alſo been noticed by many other authors ſince Napier's time. And the ſame or a ſimilar property is evidently true in all the ſyſtems of logarithms whatever, namely, that the modulus of the ſyſtem is to any number as the fluxion of its logarithm is to the fluxion of the number.

Now from this property, by means of the doctrine of fluxions, are derived other ways for making logarithms, which have been illuſtrated by many writers on this branch; as Craig, Jo. Bernoulli, and almoſt all the writers on fluxions. And this method chiefly conſiſts in expanding the reciprocal of the given quantity in an infinite ſeries, then multiplying each term by the fluxion of the ſaid quantity, and laſtly taking the fluents of the terms; by which there ariſes an infinite ſeries of terms for the logarithm ſought. So, to find the logarithm of any number N, put any compound quantity for N, as ſuppoſe $\frac{n+x}{n}$; then the flux. of the

log. or $\frac{N}{N}$ being $\frac{\dot{x}}{n+x} = \frac{\dot{x}}{n} - \frac{\dot{x}x}{nn} + \frac{\dot{x}^2x}{n^3} - \frac{x^3\dot{x}}{n^4}$, &c. the fluents give log. of N or log. of $\frac{n+x}{n} = \frac{x}{n} - \frac{x^2}{2n^2} + \frac{x^3}{3n^3} - \frac{x^4}{4n^4}$, &c. And writing $-x$ for x gives log. $\frac{n-x}{n} = -\frac{x}{n} - \frac{x^2}{2n^2} - \frac{x^3}{3n^3} - \frac{x^4}{4n^4}$, &c. Alſo, becauſe $\frac{n}{n\pm x} = 1 \div \frac{n+x}{n}$, or log. $\frac{n}{n\pm x} = 0 - \log. \frac{n\pm x}{n}$, we have log. $\frac{n}{n+x} = -\frac{x}{n} + \frac{x^2}{2n^2} - \frac{x^3}{3n^3} + \frac{x^4}{4n^4}$, &c. and log. $\frac{n}{n-x} = +\frac{x}{n} + \frac{x^2}{2n^2} + \frac{x^3}{3n^3} + \frac{x^4}{4n^4}$, &c.

And by adding and ſubtracting any of theſe ſeries to or from one another, and multiplying or dividing their correſponding numbers, various other ſeries for logarithms may be found, converging much quicker than theſe do.

In like manner, by aſſuming quantities otherwiſe compounded for the value of N, various other forms of logarithmic ſeries may be found by the ſame means.

§ 8. *Mr. Long's Method.*

THIS method was publiſhed in the 339th number of the Philoſophical Tranſactions; and is performed by means of a ſmall table containing eight claſſes of logarithms, as follows:

Log.	Nat. Numb.	Log.	Nat. Numb.
,9	7,943282347	,00009	1,000207254
,8	6,309573445	8	1,000184224
,7	5,011872336	7	1,000161194
,6	3,981071706	6	1,000138165
,5	3,162277660	5	1,000115136
,4	2,511886432	4	1,000092106
,3	1,995262315	3	1,000069080
,2	1,584893193	2	1,000046053
,1	1,258925412	1	1,000023026
,09	1,230268771	,000009	1,000020724
8	1,202264435	8	1,000018421
7	1,174897555	7	1,000016118
6	1,148153621	6	1,000013816
5	1,122 018454	5	1,000011513
4	1,096478196	4	1,000009210
3	1,071519305	3	1,000006908
2	1,047128548	2	1,000004605
1	1,023292992	1	1,000002302
,029	1,020939484	,0000009	1,000002072
8	1,018591388	8	1,000001842
7	1,016248691	7	1,000001611
6	1,013911386	6	1,000001381
5	1,011579454	5	1,000001151
4	1,009252886	4	1,000000921
3	1,006931669	3	1,000000690
2	1,004615791	2	1,000000460
1	1,002305238	1	1,000000230
,0009	1,002074475	,00000009	1,000000207
8	1,001843766	8	1,000000184
7	1,001613109	7	1,000000161
6	1,001382506	6	1,000000138
5	1,001151956	5	1,000000115
4	1,000921459	4	1,000000092
3	1,000691015	3	1,000000069
2	1,000460623	2	1,000000046
1	1,000230285	1	1,000000023

Here, becauſe the logarithms in each claſs are the continual multiples 1, 2, 3, &c. of the loweſt, it is evident that the natural numbers are ſo many ſcales of geometrical proportionals, the loweſt being the common ratio, or the aſcending numbers are the 1, 2, 3, &c. powers of the loweſt, as expreſſed by the figures 1, 2, 3, &c. of their correſponding logarithms. Alſo the laſt number in the firſt, ſecond, third, &c. claſs, is the 10th, 100th, 1000th, &c. root of 10; and any number in any claſs is the 10th power of the correſponding number in the next following claſs.

To find the logarithm of any number, as ſuppoſe of 2000, by this table: Look in the firſt claſs for the number next leſs than the firſt figure 2, and it is 1,995262315, againſt which is 3 for the firſt figure of the logarithm ſought. Again, dividing 2, the number propoſed, by 1,995262315, the number found in the table, the quotient is 1,002374467; which being looked for in the ſecond claſs of the table, and finding neither its equal nor a leſs, 0 is therefore to be taken for the ſecond figure of the logarithm; and the ſame quotient 1,002374467 being looked for in the third claſs, the next leſs is there found to be 1,002305238, againſt which is 1 for the third figure of the logarithm; and dividing the quotient 1,002374467 by the ſaid next leſs number 1,002305238, the new quotient is 1,000069070; which being ſought in the fourth claſs gives 0, but ſought in the fifth claſs gives 2, which are the fourth and fifth figures of the logarithm ſought: again, dividing the laſt quotient by 1,000046053, the next leſs number in the table, the quotient is 1,000023025, which gives 9 in the 6th claſs for the 6th figure of the logarithm ſought: and again dividing the laſt quotient by 1,000020724, the next leſs number, the quotient is 1,000002291, the next leſs than which in the 7th claſs gives 9 for the 7th figure of the logarithm: and dividing the laſt quotient by 1,000002072, the quotient is 1,000000219, which gives 9 in the 8th claſs for the 8th figure of the logarithm: and again the laſt quotient 1,000000219 being divided by 1,000000207 the next leſs, the quotient 1,000000012 gives 5 in the ſame 8th claſs, when one figure is cut off, for the 9th figure of the logarithm ſought. All which figures collected together give 3,301029995 for Briggs's logarithm of 2000, the index 3 being ſupplied; which logarithm is true in the laſt figure.

To find the number anſwering to any given logarithm, as ſuppoſe to 3,301030: omitting the characteriſtic, againſt the other figures 3, 0, 1, 0, 3, 0, 0, as in the firſt column in the margin, are the ſeveral numbers as in the ſecond column, found from their reſpective 1ſt, 2d, 3d, &c. claſſes; the effective numbers of which multiplied continually together, the laſt product is 2,000000019766, which, becauſe the characteriſtic is three, gives 2000,00019766 or 2000 only for the required number anſwering to the given logarithm.

3	1,995262315
0	0
1	1,002305238
0	0
3	1,000069080
0	0
0	0

§. 9. *Mr. Hutton's Practical Rule for the Conſtruction of Logarithms.*

THE methods laid down in the above ſections are abundantly ſufficient to ſhow the various principles upon which logarithms may be conſtructed; though there are ſtill a variety of others which our limits will not admit of our inſerting: The following rule is added from Mr. Hutton's Treatiſe on the ſubject, for the ſake of thoſe who do not chooſe to enter deeply into theſe inveſtigations.

Call z the ſum of any number whoſe logarithm is ſought, and the number next leſs by unity; divide ·8685889638, &c. (or $2 \div 2.3025$, &c.) by z, and reſerve the quotient; divide the reſerved quotient by the ſquare of z, and reſerve this

quotient; divide this laſt quotient alſo by the ſquare of z, and again reſerve this quotient; and thus proceed continually, dividing the laſt quotient by the ſquare of z as long as diviſion can be made. Then write theſe quotients orderly under one another, the firſt uppermoſt, and divide them reſpectively by the uneven numbers 1, 3, 5, 7, 9, 11, &c. as long as diviſion can be made; that is, divide the 1ſt reſerved quotient by 1, the 2d by 3, the 3d by 5, the 4th by 7, &c. Add all theſe laſt quotients together, and the ſum will be the logarithm of $b \div a$; and therefore to this logarithm add alſo the logarithm of a the next leſs number, and the ſum will be the required logarithm of b the number propoſed.

Ex. 1. *To find the Log. of* 2.—Here the next leſs number is 1, and $2+1=3=z$, whoſe ſquare is 9. Then,

3)	·868588964	1)	·289529654(·289529654
9)	·289529654	3)	32169962(10723321
9)	32169962	5)	3574440(7 4883
9)	3574440	7)	397160(56737
9)	397160	9)	44129(4903
9)	44129	11)	4903(446
9)	4903	13)	545(42
9)	545	15)	61(4
9)	61		

Log. $\frac{2}{1}$ - ·301029995
Add L. 1 - 000000000

Log. of 2 - ·301029995

Ex. 2. *To find the log. of* 3.—Here the next leſs number is 2, and $2+3=5=z$, whoſe ſquare is 25, to divide by which always multiply by ·04. Then,

5)	·868588964	1)	·173717793(·173717793
25)	·173717793	3)	6948712(2316237
25)	6948712	5)	277948(55590
25)	277948	7)	11118(1588
25)	11118	9)	448(50
25)	445	11)	18(2
	18		

L. $\frac{1}{2}$ - - - ·176091260
L. 2 add - ·301029995

L. 3 - - - ·477121255

Then becauſe the ſum of the logarithms of numbers gives the logarithm of their product, and the difference of the logarithms gives the logarithm of the quotient of the numbers, from the above two logarithms, and the logarithm of 10, which is 1, we may raiſe a great many logarithms, thus:

Ex. 3. Becauſe $2 \times 2 = 4$, therefore

to L. 2 - - - - -	·301029995$\frac{2}{3}$
add L. 2 - - - - -	·301029995$\frac{2}{3}$
ſum is L. 4 - - - -	·602059991$\frac{1}{3}$

Ex. 4. Becauſe $2 \times 3 = 6$, therefore

to L. 2 - - - - -	·301029995
add L. 3 - - - - -	·477121255
ſum is L. 6 - - - -	·778151250

Ex. 5. Becauſe $2^3 = 8$, therefore,

L. 2 - - - - -	·301029995$\frac{2}{3}$
mult. by - - - -	3
gives L. 8 - - -	·903089987

Ex. 6. Becauſe $3^2 = 9$, therefore

L. 3 - - - -	·477121254$\frac{7}{15}$
mult. by - - -	2
gives L. 9 - - -	·954242509

Ex. 7. Becauſe $\frac{10}{2} = 5$, therefore

from L. 10 - - -	1·000000000
take L. 2 - - -	·301029995$\frac{2}{3}$
leaves L. 5 - - -	·698970004$\frac{1}{3}$

Ex. 8. Becauſe $12 = 3 \times 4$, therefore

to L. 3 - - - -	·477121255
add L. 4 - - -	·602059991
gives L. 12 - - -	1.079181246

And thus by computing, by the general rule, the logarithms of the other prime numbers 7, 11, 13, 17, 19, 23, &c.; and then uſing compoſition and diviſion, we may eaſily find as many logarithms as we pleaſe, or may ſpeedily examine any logarithm in the table.

§ 10. *Mr. Thomas Atkinſon of Balliſhannon's Method.*

In any ſeries of numbers in a geometrical progreſſion, beginning from unity, as in the margin, the ſeries is compoſed of a ſet of continued proportionals, of which the member ſtanding neareſt to unity is the common ratio or rate of the proportion. If over or under theſe another ſeries is placed, as in the example, of numbers in an arithmetical progreſſion, beginning with nought, and whoſe common difference is unity, the members of this ſeries are called *indexes*; for they ſerve to ſhow how many ſucceſſive multiplications have been made with the common rate to produce that member of the geometrical progreſſion over which each of theſe indexes does ſeverally ſtand.

0	1	2	3	
1	10	100	100	

This theory may be conſidered in another light: If the ſquare root of 10 (that is, of the common rate) is found, it is a mean proportional between 1 and 10, and becomes a new common rate for a new ſet of continued proportionals, as in the margin. And if the half of unity, which in the former caſe was the additional difference of the arithmetical progreſſion, is made the additional difference of this new ſeries, and noted as in the example, a new combination is formed of two ſerieſes agreeing with the firſt in theſe remarkable properties, viz. If any two members of the geometrical progreſſion are multiplied together, the ſum of their correſponding indexes will become the index of their product; and converſely, if any of them is divided by any other, the difference of their indexes will be found to be the index of the quotient. This theory is indefinite; and repeated extractions may be made with any propoſed number of decimals, and biſection made of the correſponding indexes, until one has no more number to work with; and each of the mean proportionals thus found between 1 and 10, will be found a member of every new geometrical progreſſion formed by every ſmaller root; and conſequently all the roots thus found, together with their correſponding indexes, have, in caſes of multiplication or diviſion, the ſame connection as has been juſt deſcribed.

0	·5	1	1.5	2	25	
1	3.16	10	31.6	100	316.	

Let thoſe ſucceſſive roots be found, and noted in the form of a table, and, in another column, let the correſponding indexes found by theſe directions be regularly noted, each oppoſite to its own roots. Theſe indexes are commonly known by the denomination of *logarithms*; the roots themſelves may be called *natural numbers*.

Theſe roots are compoſed of natural numbers ſeldom or never wanted; but from them the logarithms of ſuch as are of general uſe may be thus found.

Suppoſe 2 the propoſed number, one muſt examine the table of roots; there he will find 3.16, &c. &c. the neareſt to 2 of thoſe which are greater; and 1.778, &c. &c. alſo neareſt to it of thoſe which are leſs. He may make a diviſion at his pleaſure, either $\frac{3.16}{2}$ or $\frac{2}{1.77}$; yet let the choice fall on what will yield the ſmalleſt quotient, and let the circumſtances of the calculation be noted, as in the margin, for future direction. Here $\frac{2}{1.77} =$ 1.1246. With this quotient let the table be applied to as before, and 1.1246, &c. will be found to be between 1.154, &c. &c. and 1.074, &c. &c. and diviſion to be made as in the example. In this manner one is to proceed with each ſucceſſive quotient, till at length he has one in which the number of the initial decimal noughts is equal at leaſt, if not greater than that of the ſignificant figures. Here the work of diviſion may be diſcontinued; and as it will rarely happen, that one will not have an additional initial nought for every diviſion, the number cannot be great in calculations of a moderate extent. Having at laſt found a quotient ſuch as was deſcribed, and ſuppoſing the number of decimals to be 10, one may readily find the logm. of that quotient thus:—Suppoſe the quotient 1.0000057968; he is to look into the table of roots for thoſe noted with 5 initial decimal noughts, and from any one of theſe and its correſponding logm. ſtate thus:

$\frac{2}{1.77} = 1.1246$, &c. &c.

$\frac{1.154}{1.124} = .02$, &c. &c.

.0000087837, . . . 0000038147 its logm. . . . . .0000057968 of the quotient.
.0000025175, its logm.

Thus knowing that 0.0000025175, or ſuch like, is the logm. of the laſt quotient, one may have that of 2, if he will but call to mind the following circumſtances:

In every caſe of diviſion, if he has logarithms of quotient and diviſor, he has alſo that of the dividend, by adding the two firſt together: if he has the logarithm of the dividend, and that of either the diviſor or quotient, he may find that of the other; for he has only to ſubtract what he knows from the logarithm of the dividend, the remainder is what he wants: and laſtly, that in every diviſion he made, he took one number from the table of roots whoſe logarithm is known, being noted in the table, and which he made uſe of as his direction either as a dividend or a diviſor: From theſe circumſtances, one may, by the help of the logarithm juſt found, diſcover the logarithm of that number of the laſt diviſion, whether it be dividend or diviſor, which was the quotient of the preceding diviſion: and thus, tracing his own work backwards by his notes from quotient to quotient, be they ever ſo few or ever ſo many, he will come at laſt by addition and ſubtraction to the logarithm of the propoſed number.

By this method, the logarithm of any number within the compaſs of the table of roots may be found: if a greater is propoſed, ſuppoſe 9495, it muſt be made 9.495, and its logarithm found; then it muſt be reſtored to the propoſed form, and have a proper index noted before the decimals juſt found. How to do this is too well known to have occaſion to mention it here.

The reaſon for finding the logarithm of the laſt quotient by the common proportion is this: He who has made a table of roots, will find, by inſpection only, that as initial noughts come into the decimal parts of the roots, the ſignificant figures juſt immediately following them do aſſume the form of a geometrical progreſſion, deſcending, whoſe common rate or diviſor is 2, as is juſt the caſe with the whole of the decimals of the correſponding logarithms; and that the number of the ſignificant figures endued with this property is generally equal to that of the initial noughts: ſo far as this, and no farther, the common proportion will hold between the ſignificant figures of the decimals in the roots and the ſame number of places in the logarithms; and for this reaſon it was needful to continue the ſucceſſive diviſions till a quotient was found ſo circumſtanced, that its logarithm could be found by the proportion.

The ſame gentleman hath alſo favoured us with the following new method

Of extracting Roots of Fractions by LOGARITHMS.

THE eaſieſt way to explain this, is firſt to give an example of involving ſuch numbers:

−3.301029995664 the logarithm of the fraction given.
7 the power to which it is to be raiſed.

−19.107209969648 the logarithm of the anſwer.

This differs from the like work in whole numbers only in this, that, in multiplying the decimals, one has at laſt 2 to be carried from them to the whole numbers; this is to be conſidered as + 2, then − 3 × 7 = − 21, and − 21 + 2 = − 19 to be noted the index of the anſwer. Extraction of the roots is only the converſe of this. Suppoſe −19.107209969648 given, to find that root whoſe exponent number is 7. As 7 is the exponent number here, one may in his mind multiply it by 2 for a trial, as in common diviſion; but the product = 14 being leſs than 19, muſt be rejected; then he may try it with 3, this yields 21 for a product. This 3 muſt be noted with a negative ſign for the index of the new logarithm. Then, on comparing 19 with 21, the difference is 2. This 2 muſt be carried as 20 to the decimals, and one muſt from that carry on the diviſion of the decimals with 7 for a diviſor, as is uſually done in other caſes.

− 19.107209969648
− 3.301029995664

As another EXAMPLE, ſuppoſe
−1.4771212545 given, to extract the root of its 5th power.
−1.8954252109 the logarithm of the root.

For 5, the exponent of the root × 1 is greater than the index of the given logarithm, and 4 is the remainder. Then − 1 becomes the index of the logarithm of the root; and 4 = the overplus, is to be carried as 40 to the decimals; and from that, diviſion is to be made with 5 as a diviſor for the reſt of the work.

SECT. III. *A general Account of the various Sciences to which Logarithms may be applied.*

As theſe artificial numbers conſtitute a new ſpecies of arithmetic capable of performing every thing which can be done in

the old way, it is plain that its use must be equally extensive, and that in every science in which common arithmetic can be useful, the logarithmical arithmetic must be much more so, by reason of its being more easily performed. Though the general principles of logarithmical arithmeric have been already laid down, we shall here, in order to render the subject still more plain, subjoin the following practical rules:

I. *Multiplication by Logarithms.*

Add together the logarithms of all the factors, and the sum is a logarithm, the natural number corresponding to which will be the product required.

Observing to add, to the sum of the affirmative indices, what is carried from the sum of the decimal parts of the logarithms.

And that the difference betwixt the affirmative and negative indices is to be taken for the index to the logarithm of the product.

Ex. 1. To multiply 23·14 by 5·062.

23·14 its log. is		1·3643634
5·062 its log. is		0·7043221
Prod. 117·1347	-	2·0686855

Ex. 2. To mult. 2·581926 by 3·457291.

2·581926 its log. is		0·4119438
3·457291	- -	0·5387359
Prod. 8.92647	-	0.9506797

Ex. 3. To mult. 3·902 and 597·16, and ·0314728 all together.

3·902 its log. is		0·5912873
597·16	- -	2·7760907
·0314728	-	$\bar{2}$·4979353
Prod. 73·33533	-	1·8653133

The $\bar{2}$ cancels the 2, and the 1 to carry from the decimals is set down.

Ex. 4. To mult. 35·86, and 2·1046, and 0·8372, and 0.0294 all together.

35·86 its log. is		0·5546103
2·1046	- -	0·3231696
0·8372	- -	$\bar{1}$·9228292
0·0294	- -	$\bar{2}$·4683473
Prod. ·1857618	- -	$\bar{1}$·2689364

Here the 2 to carry cancels the $\bar{2}$, and there remains the $\bar{1}$ to set down.

II. *Division by Logarithms.*

From the logarithm of the dividend subtract the logarithm of the divisor, the remainder is a logarithm whose corresponding number will be the quotient required.

But first observe to change the sign of the index of the logarithm of the divisor, viz. from negative to affirmative, or from affirmative to negative; then take the sum of the indices if they be of the same kind, or their difference when of different signs, with the sign of the greater, for the index to the logarithm of the quotient.

And when 1 is borrowed in the left-hand place of the decimal part of the logarithm, add it to the index of the logarithm of the divisor when that index is affirmative, but subtract it when negative; then let the index thus found be changed, and worked with as before.

Ex. 1. To divide 24163 by 4567.

Divide 24163 its log.		4·3831509
Divis. 4567	- -	3·6596310
Quot. 5·290782	-	0·7235199

Ex. 2. To divide 37·149 by 523·76.

Divid. 37·149 its log.		1·5699471
Divis. 523·76	- -	$\bar{2}$·7191323
Quot. ·07092752	-	$\bar{2}$·8508148

Ex. 3. To divide ·06314 by ·007241.

Divid. 06314 its log.		$\bar{2}$·8003046
Divis. ·007241	- -	$\bar{3}$·8597985
Quot. 8·719702	-	0·9405061

Here 1 carried from the decimals to the 3 makes it become $\bar{2}$, which taken from the other $\bar{2}$, leaves 0 remaining.

Ex. 4. To divide ·7438 by 12·9476.

Divid. ·7438 its log.		1·8714562
Divis. 12·9476	-	1·1121893
Quot. ·05744694	-	$\bar{2}$·7592669

Here the 1 taken from the 1 makes it become 2 to set down.

III. *The Rule of Three, or Proportion.*

Add the logarithms of the 2d and 3d terms together, and from their sum subtract the logarithm of the 1st by the foregoing rules; the remainder will be the logarithm of the 4th term required.

Or in any compound proportion whatever, add together the logarithms of all the terms that are to be multiplied, and from that sum take the sum of the others; the remainder will be the logarithm of the term sought.

But instead of subtracting any logarithm, we may add its complement, and the result will be the same. By the complement is meant the logarithm of the reciprocal of the given number, or the remainder by taking the given logarithm from 0, or from 10, changing the radix from 0 to 10; the easiest method of doing which, is to begin at the left hand, and subtract each figure from 9, except the last significant figure on the right-hand, which must be subtracted from 10. But when the index is negative, add it to 9, and subtract the rest as before. And for every complement that is added, subtract 10 from the last sum of the indices.

Ex. 1. To find a 4th proportional to 72·34, and 2·519 and 357·4862.

As 72·34	- comp. log.	8·1406215
To 2·519	- -	0·4012282
So 357·4862	- -	2·5532592
To 12·44827	- -	1·0951089

Ex. 2. To find a third proportional to 12·796 and 3·24718.

As 12.796	- comp. log	8·8929258
To 3·24718	- -	0·5115064
So 3·24718	- -	0·5115064
To ·8240216	- -	$\bar{1}$·9159386

Ex. 3. To find a number in proportion to ·379145 as ·85132 is to ·0649.

As ·0649	- comp. log.	11·1877553
To ·85132	- -	$\bar{1}$·9299028
So ·379145	- -	$\bar{1}$·5788054
To 4·973401	- -	0·6966535

Ex. 4. If the intereſt of 100l. for a year or 365 days be 4·5l. what will be the intereſt of 279·25l. for 274 days?

As	100	comp. log.	8·0000000
	365		7·4377071
To	279·25	- -	2·4459932
	274	- -	2·4377506
So 4·5	- - -		0·6532125
To 9·433296	- -		0·9746634

IV. *Involution, or raiſing of Powers.*

Multiply the logarithm of the number given by the propoſed index of the power, and the product will be the logarithm of the power ſought.

Note. In multiplying a logarithm with a negative index by any affirmative number, the product will be negative.—But what is to be carried from the decimal part of the logarithm will be affirmative.—Therefore the difference will be the index of the product; and is to be accounted of the ſame kind with the greater.

Ex. 1. To find the 2d power of 2·5791.

Root 2·5791 its log.	-	0·4114682
index	- -	2
Power 6·651756	- -	0·8229364

Ex. 2. To find the cube of 3·07146.

Root 3·07146 its log.	-	0·4873449
index	- -	3
Power 28·97575	- -	1·4620347

Ex. 3. To find the 4th power of ·09163.

Root ·09163 its log.	-	$\bar{2}$·9620377
index	- -	4
Power ·000070938	-	$\bar{5}$·8481508

Here 4 times the negative index being $\bar{8}$, and 3 to carry, the difference $\bar{5}$ is the index of the product.

Ex. 4. To find the 365th power of 1·0045.

Root 1·0045 its log.	-	0·0019499
index	- -	365
		97495
		116994
		58497
Power 5·148888	- -	0·7117135

V. *Evolution, or Extraction of Roots.*

Divide the logarithm of the power or given number by its index, and the quotient will be the logarithm of the root required.

Note. When the index of the logarithm is negative, and the diviſor is not exactly contained in it without a remainder, increaſe it by ſuch a number as will make it exactly diviſible; and carry the units borrowed, as ſo many tens, to the left-hand place of the decimal part of the logarithm; then divide the reſults by the index of the root.

Ex. 1. To find the ſquare root of 365.

Power 365	- -	2)2·5622929
Root 19·10498	- -	1·2811465

Ex. 2. To find the cube root of 12345.

Power 12345	- -	3)4·0914911
Root 23·11162	- -	1·3638304

Ex. 3. To find the 10th root of 2.

Power 2	- -	10)0·3010300
Root 1·071773	- -	0·0301030

Ex. 4. To find the 365th root of 1·045.

Power 1·045	- -	365)0.0191163
Root 1·000121	- -	0·0000524

Ex. 5. To find the ſquare root of 093.

Power ·093	- -	2)$\bar{2}$·9684829
Root ·304959	- -	1·4842415

Here the diviſor 2 is contained exactly once in $\bar{2}$ the negative index; therefore the index of the quotient is $\bar{1}$.

Ex. 6. To find the cube root of ·00048.

Power	- -	3)$\bar{4}$,6812412
Root ·07829735	-	$\bar{2}$·8937471

Here the diviſor 3 not being exactly contained in $\bar{4}$, augment it by 2, to make it become 6, in which the diviſor is contained juſt $\bar{2}$ times; and the two borrowed being carried to the other figures 6, &c. makes 2·6812412, which divided by 3 gives ·8937471.

In trigonometry, the uſe of logarithmic ſines, tangents, &c. are uſed as well as the common arithmetical logarithms; and by uſing them according to the rules above laid down, the operations are ſhortened to a degree altogether incredible to perſons unacquainted with this invention. In theſe calculations, however, a *Table of Logarithms* (too copious for inſertion in a work of this nature) muſt of courſe be reſorted to. With no leſs facility are the problems in aſtronomy and navigation to be ſolved by this means, as well as thoſe of the higher geometry, fluxions, and in ſhort every thing which requires deep and laborious calculation. For the particular application of them to the different ſciences, ſee the articles NAVIGATION, TRIGONOMETRY, &c.

LOGARITHMIC CURVE. If on the line AN pl. 9. fig. 2. both ways indefinitely extended, be taken AC, CE, EG, GI, IL, on the right hand; and alſo A*g*, *g* P, &c, on the left, all equal to one another: and if at the points P, *g*, A, C, E, G, I, L, be erected to the right line A N, the perpendiculars PS *gd*, A B, C D, E F, G H, I K, L M, which let be continually proportional, and repreſent numbers, viz. AB, 1; CD, 10; EF, 100, &c. then ſhall we have two proſſions of lines, arithmetical and geometrical: for the lines AC, AE, AG, &c. are in arithmetical progreſſion, or as 1, 2, 3, 4, 5, &c and ſo repreſent the logarithms to which the geometrical lines AB, CD, EF, &c. do correſpond. For ſince AG is triple of the firſt line AC, the number GH ſhall be in the third place from unity, if CD be in the firſt: ſo likewiſe ſhall LM be in the fifth place, ſince AL = 5 AC. If the extremities of the proportionals S, *d*, B, D, F, &c. be

joined by right lines, the figures SBML will become a polygon, conſiſting of more or leſs ſides, according as there are more or leſs terms in the progreſſion.

If the parts AC, CE, EG, &c. be biſected in the points *c*, *e*, *g*, *i*, *l*, and there be again raiſed the perpendiculars, *cd*, *ef*, *gh*, *ik*, *lm*, which are mean proportionals between AB, CD, CD, EF, &c. then there will ariſe a new ſeries of proportionals, whoſe terms, beginning from that which immediately follows unity, are double of thoſe in the firſt ſerics, and the difference of the terms is become leſs, and approach nearer to a ratio of equality than before. Likewiſe, in this new ſeries, the right lines AL, Ac, expreſs the diſtances of the terms LM *cd*, from unity, viz. ſince AL is ten times greater than Ac, LM ſhall be the tenth term of the ſeries from unity: and becauſe *Ae* is three times greater than *Ac*, *ef* will be the third term of the ſeries if *cd* be the firſt, and there ſhall be two mean proportionals between AB and *ef*, and between AB and LM there will be nine mean proportionals. And if the extremities of the lines B*d*, D*f*, *Fh*, &c. be joined by right lines, there will be a new polygon made, conſiſting of more but ſhorter ſides than the laſt.

If, in this manner, mean proportionals be continually placed between every two terms, the number of terms at laſt will be made ſo great, as alſo the number of the ſides of the polygon, as to be greater than any given number, or to be infinite; and every ſide of the polygon ſo leſſened, as to become leſs than any given right line; and conſequently the polygon will be changed into a curve-lined figure; for any curve-lined figure may be conceived as a polygon, whoſe ſides are infinitely ſmall and infinite in number. A curve deſcribed after this manner is called *logarithmical*.

It is manifeſt from this deſcription of the logarithmic curve, that all numbers at equal diſtances are continually proportional. It is alſo plain, that if there be four numbers, AB, CD, IK, LM, ſuch that the diſtance between the firſt and ſecond be equal to the diſtance between the third and the fourth, let the diſtance from the ſecond to the third be what it will, theſe numbers will be proportional For becauſe the diſtances AC, IL, are equal, AB ſhall be to the increment D*s*, as IK is to the increment MT. Wherefore, by compoſition, AB. DC:: IK: ML. And, contrariwiſe, if four numbers be proportional, the diſtance between the firſt and ſecond ſhall be equal to the diſtance between the third and fourth.

The diſtance between any two numbers is called *the logarithm of the ratio of thoſe numbers*; and, indeed, doth not meaſure the ratio itſelf, but the number of terms in a given ſeries of geometrical proportionals proceeding from one number to another, and defines the number of equal ratios by the compoſition whereof the ratios of number are known.

Logarithmic *Lines*. For many mechanical purpoſes it is convenient to have the logarithms of numbers laid down on ſcales, as well as the logarithmic ſigns and tangents; by which means, computations may be carried on by mere menſuration with compaſſes. Lines of this kind are always put on the common Gunter's ſcale; but as theſe inſtruments muſt be extended to a very great length, in order to contain any conſiderable quantity of numbers, it becomes an object of importance to ſhorten them. Such an improvement has been made by Mr. William Nicholſon, and publiſhed in the 77th volume of the Philoſophical Tranſactions. The principles on which the conſtruction of his inſtruments depends are as follow:

1. If two geometrical ſeries of numbers, having the ſame common ratio, be placed in order with the terms oppoſite to each other, the ratio between any term in one ſeries and its oppoſite in the other will be conſtant: Thus,

2 6 18 54 162, &c.
3 9 27 81 243, &c. Then,
2 3 6 9 18 27 54 81 162 243, &c.

where it is evident, that each of the terms in the upper ſeries is exactly two-thirds of the correſponding one in the lower.

2. The ratio of any two terms in one ſeries will be the ſame with that between thoſe which have an equal diſtance in the other.

3. In all ſuch geometrical ſeries as have the ſame ratio, the property above-mentioned takes place, though we compare the terms of any ſeries with thoſe of another: Thus,

2 4 8 16 32 64, &c.
3 6 12 24 48 96, &c.
4 8 16 32 64 128, &c.
5 10 20 40 80 160, &c.; where it is plain that 2, 4, 3, 6; alſo 2, 4, 4, 8, and 2, 4, 5, 10, &c. have the ſame ratio with that of each ſeries.

4. If the differences of the logarithms of the numbers be laid in order upon equidiſtant parallel right lines, in ſuch a manner that a right line drawn acroſs the whole ſhall interſect it at diviſions denoting numbers in geometrical progreſſion; then, from the condition of the arrangement, and the property of this logarithmic line, it follows, 1ſt, That every right line ſo drawn will, by its interſections, indicate a geometrical ſeries of numbers; 2dly, That ſuch ſeries as are indicated by theſe right lines will have the ſame common ratio; and, 3dly, That the ſeries thus indicated by two parallel right lines, ſuppoſed to move laterally, without changing either their mutual diſtance or parallelism to themſelves, will have each the ſame ratio, and in all ſeries indicated by ſuch two lines, the ratio between an antecedent and conſequent; the former taken upon one line, and the latter upon another, will be alſo the ſame.

The 1*ſt* of theſe propoſitions is proved in the following manner. Let the lines AB, CD, EF, pl. 9, fig. 11. repreſent parts of the logarithmic line arranged according to the proportion already mentioned; and let GH be a right line paſſing through the points *e*, *c*, *a*, denoting numbers in geometrical progreſſion; then will any other line IK, drawn acroſs the arrangement, likewiſe paſs through three points *f*, *d*, *b*, in geometrical progreſſion. From one of the points of interſection *f* in the laſt mentioned line IK, draw the line *fg* parallel to GH, and interſecting the arrangement in the points *i*, *h*; and the ratios of the numbers *e*, *f*, *c*, *i*, will be equal, as well as of *a*, *h*; becauſe the intervals on the logarithmic line, or differences of the logarithms of thoſe numbers are equal. Again, the point *f*, the line *id*, and the line *hb*, are in arithmetical progreſſion denoting the differences between the logarithms of the numbers themſelves; whence the quotients of the numbers are in geometrical progreſſion.

The 2*d* propoſition is proved in a ſimilar manner. For as it was ſhown that the line *fg*, parallel to GH, paſſes through points of diviſion denoting numbers in the ſame continued ratio as thoſe indicated by the line GH; it may alſo be ſhown, that the line LM parallel to any other line IK, will paſs through a ſeries of points denoting numbers which have the ſame continued ratio with thoſe indicated by the line IK, to which it is parallel.

The 3*d* propoſition ariſes from the parallelism of the lines to their former ſituation; by which means they indicate numbers in a geometrical ſeries, having the ſame common ratio as before: their diſtance on the logarithmic line alſo remains unchanged; whence the differences between the logarithms of the oppoſite numbers, and of conſequence their ratios, will always be conſtant.

5. Suppoſing now an antecedent and conſequent to be given in any geometrical ſeries, it will always be poſſible to find them, provided the line be of unlimited length. Drawing two parallel lines, then, through each of the numbers, and ſuppoſing the lines to move without changing their direc-

tion or parallel ſituation, they will continually deſcribe new antecedents and conſequents in the ſame geometrical ſeries as before.

6. Though the logarithmic line contain no greater range of numbers than from 1 to 10, it will not be found neceſſary for the purpoſes of computation to repeat it. The only thing requiſite is to have a ſlider or beam with two fixed points at the diſtance of the interval betwixt 1 and 10, and that a moveable point be made to range betwixt them always to indicate the antecedent; then, if the conſequent fixed point fall without the rule, the other fixed point will always denote the diviſion on which it would have fallen had the rule been prolonged; and this contrivance may eaſily be adapted to any arrangement of parallel lines whatever. The arrangement of right lines, however, ought always to be diſpoſed in ſuch a manner as to occupy a right-angled parallelogram, or the croſs line already mentioned ought always to be at right angles to the length of the ruler.

Fig. 7. is a ruler conſiſting of ten parallel lines. Fig. 8. a beam-compaſs for meaſuring the intervals. B, A, C, are the parts which apply to the ſurface of the ruler; the middle one, A, being moveable ſidewiſe in a groove in the piece DE, ſo as always to preſerve its parallelifm to the external pieces DC, which are fixed at a diſtance equal to the length of the ruler, and have their edges placed in ſuch a manner, as to form with the parallel lines which they interſect a ratio, which by compoſition is $\frac{1}{10}$; which in the preſent caſe requires them to be at right angles to the length. The piece DE is applied to the edge FG of the ruler. The edges or borders H, I, K, L, are more conveniently made of tranſparent horn, or tortoiſe-ſhell, than of any opaque matter.

In uſing this ruler, apply the edge of either B or C to the conſequent, and ſlide the piece A to the antecedent; obſerving the difference between the numbers on the pieces denoting the lines they are found on: then, applying the ſame edge of A to any other antecedent, the other piece B or C will interſect a conſequent in the ſame ratio upon that line, having the ſame ſituation with regard to the antecedent that the line of the former conſequent had to its antecedent. But if B be the conſequent piece, and fall without the ruler, the piece C will ſhow the conſequent one line lower; or if C, in like manner, fall without the ruler, then B will ſhow the conſequent one line higher. "It might be convenient (ſays Mr. Nicholſon) for the purpoſe of computation, to make inſtruments of this kind with one hundred or more lines: but in the preſent inſtrument, the numbers on the pieces will anſwer the ſame purpoſe; for if a conſequent fall upon a line at any given number of intervals without the ruler, it will be found on that line of the arrangement which occupies the ſame number of intervals reckoned inwards from the oppoſite edge of the ruler."

Fig. 9. is an inſtrument on the plan of a Gunter's ſcale of 28½ inches long, invented by the late Mr. Robertſon. There is a moveable piece AB in the ſlider GH, acroſs which is drawn a fine line: the ſlider having alſo lines CD, EF, drawn acroſs it at diſtances from each other equal to the length of the ruler AB. In uſing the inſtrument, the line CD or EF is to be placed at the conſequent, and the line in AB at the antecedent: then, if the piece AB be placed at any other antecedent, the ſame line CD or EF will indicate its conſequent in the ſame ratio taken the ſame way: that is, if the antecedent and conſequent lie on the ſame ſide of the ſlider, all other antecedents and conſequents in that ratio will be in the ſame manner; and the contrary if they do not. But if the conſequent line fall without the rule, the other fixed line on the ſlider will ſhow the conſequent, but on the contrary ſide of the ſlider to that where it would elſe have been ſeen by means of the firſt conſequent line.

Fig. 10. is a circular inſtrument equivalent to the former; conſiſting of three concentric circles engraved and graduated upon a plate of an inch and an half diameter. Two legs A and B proceed from the centre, having right-lined edges in the direction of radii; and are moveable either ſingly or together. In uſing the inſtrument, place one of the edges at the antecedent and the other at the conſequent, and fix them at the angle. Move the two legs then together; and having placed the antecedent leg at any other number, the other will give the conſequent one in the like poſition on the lines. If the line CD happen to lie between the legs, and B be the conſequent leg, the number ſought will be found one line farther from the centre than it would otherwiſe have been; and on the contrary, it will be found one line nearer in the like caſe, if A be the conſequent leg. "This inſtrument (ſays Mr. Nicholſon) differing from that repreſented fig. 7. only in its circular form, and the advantages reſulting from that form, the lines muſt be taken to ſucceed each other in the ſame manner laterally; ſo that numbers which fall either within or without the arrangement of circles, will be found on ſuch lines of the arrangement as would have occupied the vacant places if the ſucceſſion of lines had been indefinitely repeated ſidewiſe.

"I approve of this conſtruction as ſuperior to every other which has yet occurred to me, not only in point of convenience, but likewiſe in the probability of being better executed; becauſe ſmall arcs may be graduated with very great accuracy, by diviſions transferred from a larger original. The inſtrument, fig. 7. may be contained conveniently in a circle of about four inches and an half diameter.

"The circular inſtrument is a combination of the Gunter's line and the ſector, with the improvements here pointed out. The property of the ſector may be uſeful in magnifying the differences of the logarithms in the upper parts of the line of ſines, the middle of the tangents, and the beginning of the verſed ſines. It is even poſſible, as mathematicians will eaſily conceive, to draw ſpirals, on which graduations of parts, every where equal to each other, will ſhow the ratios of thoſe lines by moveable radii, ſimilar to thoſe in this inſtrument."

LOGIC.

LOGIC is the art of thinking and reaſoning juſtly; or, it may be defined the ſcience or hiſtory of the human mind, inaſmuch as it traces the progreſs of our knowledge from our firſt and moſt ſimple conceptions through all their different combinations, and all thoſe numerous deductions that reſult from variouſly comparing them one with another.

The preciſe buſineſs of logic therefore is, To explain the nature of the human mind, and the proper manner of conducting its ſeveral powers, in order to the attainment of truth and knowledge. It lays open thoſe errors and miſtakes we are apt, through inattention, to run into; and teaches us how to diſtinguiſh between truth, and what only carries the appearance of it. By theſe means we grow acquainted with the nature and force of the underſtanding; ſee what things lie within its reach; where we may attain certainty and demonſtration; and when we muſt be contented with probability.

This ſcience is generally divided into four parts, viz. *Perception, Judgement, Reaſoning*, and *Method*. This diviſion comprehends the whole hiſtory of the ſenſations and operations of the human mind.

PART I. OF PERCEPTION.

WE find ourſelves ſurrounded with a variety of objects, which acting differently upon our ſenſes, convey diſtinct impreſſions into the mind, and thereby rouſe the attention and notice of the underſtanding. By reflecting too on what paſſes within us, we become ſenſible of the operations of our own minds, and attend to them as a new ſet of impreſſions. But in all this there is only bare *conſciouſneſs*. The mind, without proceeding any farther, takes notice of the impreſſions that are made upon it, and views things in order, as they preſent themſelves one after another. This attention of the underſtanding to the object acting upon it, whereby it becomes ſenſible of the impreſſions they make, is called by logicians *perception*; and the notices themſelves, as they exiſt in the mind, and are there treaſured up to be the materials of thinking and knowledge, are diſtinguiſhed by the name of *ideas*. In the article METAPHYSICS it will be ſhown how the mind, being furniſhed with ideas, contrives to diverſify and enlarge its ſtock: we have here chiefly to conſider the means of making known our thoughts to others; that we may not only underſtand how knowledge is acquired, but alſo in what manner it may be communicated with the greateſt certainty and advantage.

CHAP. I. *Of Words conſidered as the Signs of our Ideas.*

I. OUR ideas, though manifold and various, are nevertheleſs all within our own breaſts, inviſible to others, nor can of themſelves be made appear. But God, deſigning us for ſociety, and to have fellowſhip with thoſe of our kind, has provided us with organs fitted to frame articulate ſounds, and given us alſo a capacity of uſing thoſe ſounds as ſigns of internal conceptions. Hence ſpring words and language: for, having once pitched upon any ſound to ſtand as the mark of an idea in the mind, cuſtom by degrees eſtabliſhes ſuch a connection between them, that the appearance of the idea in the underſtanding always brings to our remembrance the ſound or name by which it is expreſſed; as in like manner the hearing of the ſound never fails to excite the idea for which it is made to ſtand. And thus it is eaſy to conceive how a man may record his own thoughts, and bring them again into view in any ſucceeding period of life. For, this connection being once ſettled, as the ſame ſounds will always ſerve to excite the ſame ideas; if he can but contrive to regiſter his words in the order and diſpoſition in which the preſent train of his thoughts preſent themſelves to his imagination, it is evident he will be able to recall theſe thoughts at pleaſure, and that too in the very manner of their firſt appearance. Accordingly we find, that the inventions of writing and printing, by enabling us to fix and perpetuate ſuch periſhable things as ſounds, have alſo furniſhed us with the means of giving a kind of permanency to the tranſactions of the mind, inſomuch that they may be in the ſame manner ſubjected to our review as any other objects of nature.

II. But, beſides the ability of recording our own thoughts, there is this farther advantage in the uſe of external ſigns, that they enable us to communicate our thoughts to *others*, and alſo to receive information of what paſſes in *their* breaſts. For any number of men, having agreed to eſtabliſh the ſame ſounds as ſigns of the ſame ideas, it is apparent that the repetition of theſe ſounds muſt excite the like perceptions in each, and create a perfect correſpondence of thoughts. When, for inſtance, any train of ideas ſucceed one another in my mind, if the names by which I am wont to expreſs them have been annexed by thoſe with whom I converſe to the very ſame ſet of ideas, nothing is more evident, than that, by repeating thoſe names according to the tenor of my preſent conceptions, I ſhall raiſe in their minds the ſame courſe of thought as has taken poſſeſſion of my own. For by barely attending to what paſſes within themſelves upon hearing the ſounds which I repeat, they will alſo become acquainted with the ideas in my underſtanding, and have them in a manner laid before their view. So that we here clearly perceive how a man may communicate his ſentiments, knowledge, and diſcoveries to others, if the language in which he converſes be extenſive enough to mark all the ideas and tranſactions of his mind. But as this is not always the caſe, and men are often obliged to invent terms of their own to expreſs new views and conceptions of things; it may be aſked, how in theſe circumſtances we can become acquainted with the thoughts of another, when he makes uſe of words, to which we have never annexed any ideas, and that of courſe can raiſe no perceptions in our minds? In order to unveil this myſtery, and give ſome little inſight into the foundation, growth, and improvement of language, the following obſervations will be found of conſiderable moment.

III. Firſt, that no word can be to any man the ſign of an idea, till that idea comes to have a real exiſtence in his mind. For names, being only ſo far intelligible as they denote known internal conceptions; where they have none ſuch to anſwer them, there they are plainly ſounds without ſignification, and of courſe convey no inſtruction or knowledge. But no ſooner are the ideas to which they belong raiſed in the underſtanding, than, finding it eaſy to connect them with the eſtabliſhed names, we can join in any agreement of this kind made by others, and thereby enjoy the benefit of their diſcoveries. The firſt thing therefore to be conſidered is, how theſe ideas may be conveyed into the mind; that, being there, we may learn to connect them with their appropriate ſounds, and ſo become capable of underſtanding others when they make uſe of theſe ſounds in laying open and communicating their thoughts. Now, to comprehend this diſtinctly, it will be neceſſary to attend to the diviſion of our ideas into ſimple and complex, (ſee METAPHYSICS.) And firſt, as for our ſimple ideas; they can find no admiſſion into the mind, but by the two original fountains of knowledge, ſenſation and reflection. If therefore any of theſe have as yet no being in the underſtanding, it is impoſſible by words or a deſcription to excite them there. A man who had never felt the ſenſation of *heat*, could not be brought to comprehend that ſenſation by any thing we might ſay to explain it. If we would really produce the idea in him, it muſt be by applying the proper object to his ſenſes, and bringing him within the influence of a hot body. When this is done, and experience has taught him the perception to which men have annexed the name *heat*, it then becomes to him the ſign of that idea, and he thenceforth underſtands the meaning of the term, which, before, all the words in this world would not have been ſufficient to convey into his mind. The caſe is the ſame in reſpect of light and colours. A man born blind, and thereby deprived of the only conveyance for the ideas of this claſs, can never be brought to underſtand the names by which they are expreſſed. The reaſon is plain: they ſtand for ideas that have no exiſtence in his mind; and as the organ appropriated to their reception is wanting, all other contrivances are vain, nor can they by any force or deſcription be raiſed in his imagination. But it is quite otherwiſe in our complex notions. For theſe being no more than certain combinations of ſimple ideas,

put together in various forms; if the original ideas out of which the collections are made have already got admiſſion into the underſtanding, and the names ſerving to expreſs them are known; it will be eaſy, by enumerating the ſeveral ideas concerned in the compoſition, and marking the order and manner in which they are united, to raiſe any complex conception in the mind. Thus the idea anſwering to the word *rainbow* may be readily excited in the imagination of another who has never ſeen the appearance itſelf, by barely deſcribing the figure, largeneſs, poſition, and order of colours; if we ſuppoſe theſe ſeveral ſimple ideas, with their names, ſufficiently known to him.

IV. And this leads to a ſecond obſervation upon this ſubject, namely, That words ſtanding for complex ideas are all definable, but thoſe by which we denote ſimple ideas are not; for ſimple ideas being ſecondary perceptions, which have no other entrance into the mind than by ſenſation or reflection, can only be got by experience, from the ſeveral objects of nature proper to produce thoſe perceptions in us. Words indeed may very well ſerve to remind us of them, if they have already found admiſſion into the underſtanding, and their connection with the eſtabliſhed names is known, but they can never give them their original being and exiſtence there. And hence it is, that when any one aſks the meaning of a word denoting a ſimple idea, we pretend not to explain it to him by a definition, well knowing that to be impoſſible; but, ſuppoſing him already acquainted with the idea, and only ignorant of the name by which it is called, we either mention it to him by ſome other name with which we preſume he knows its connection, or appeal to the object where the idea itſelf is found. Thus, were any one to aſk the meaning of the word *white*, we ſhould tell him it ſtood for the ſame idea as *albus* in Latin, or *blanc* in French; or, if we thought him a ſtranger to theſe languages, we might appeal to an object producing the idea, by ſaying it denoted the colour we obſerve in *ſnow* or *milk*. But this is by no means a definition of the word, exciting a new idea in his underſtanding; but merely a contrivance to remind him of a known idea, and teach him its connection with the eſtabliſhed name. For if the ideas after which he inquires have never yet been raiſed in his mind; as ſuppoſe one who had ſeen no other colours than *black* and *white*, ſhould aſk the meaning of the word *ſcarlet*; it is eaſy to perceive, that it would be no more poſſible to make him comprehend it by words, or a definition, than to introduce the ſame perception into the imagination of a man born blind. The only method in this caſe is, to preſent ſome object, by looking at which the perception itſelf may be excited; and thus he will learn both the name and the idea together.

V. But how comes it to paſs that men agree in the names of their ſimple ideas, ſeeing they cannot view the perceptions in one another's minds, nor make known theſe perceptions by words to others? The effect is produced by experience and obſervation. Thus finding, for inſtance, that the name of *heat* is annexed to that ſenſation which men feel when they approach the fire, I make it alſo the ſign of the ſenſation excited in me by ſuch an approach, nor have any doubt but it denotes the ſame perception in my mind as in theirs. For we are naturally led to imagine, that the ſame objects operate alike upon the organs of the human body, and produce an uniformity of ſenſations. No man fancies, that the idea raiſed in him by the taſte of *ſugar*, and which he calls *ſweetneſs*, differs from that excited in another by the like means; or that *wormwood*, to whoſe relish he has given the epithet *bitter*, produces in another the ſenſation which he denotes by the word *ſweet*. Preſuming therefore upon this conformity of perceptions, when they ariſe from the ſame objects, we eaſily agree as to the names of our ſimple ideas: and if at any time, by a more narrow ſcrutiny into things, new ideas of this claſs come in our way, which we chooſe to expreſs by terms of our own invention; theſe names are explained, not by a definition, but by referring to the objects whence the ideas themſelves may be obtained.

VI. Being in this manner furniſhed with ſimple ideas, and the names by which they are expreſſed; the meaning of terms that ſtand for complex ideas is eaſily got, becauſe the ideas themſelves anſwering to theſe terms may be conveyed into the mind by definitions. For our complex notions are only certain combinations of ſimple ideas. When therefore theſe are enumerated, and the manner in which they are united into one conception explained, nothing more is wanting to raiſe that conception in the underſtanding; and thus the term denoting it comes of courſe to be underſtood. And here it is worth while to reflect a little upon the wiſe contrivance of nature, in thus furniſhing us with the very apteſt means of communicating our thoughts. For, were it not ſo ordered that we could thus convey our complex ideas from one to another by definition, it would in many caſes be impoſſible to make them known at all. This is apparent in thoſe ideas which are the proper work of the mind. For as they exiſt only in the underſtanding, and have no real objects in nature in conformity to which they are framed; if we could not make them known by deſcription, they muſt lie for ever hid within our own breaſts, and be confined to the narrow acquaintance of a ſingle mind. All the fine ſcenes that ariſe from time to time in the poet's fancy, and by his lively painting give ſuch entertainment to his readers; were he deſtitute of this faculty of laying them open to the view of others by words and deſcription, could not extend their influence beyond his own imagination, or give joy to any but the original inventor.

VII. There is this further advantage in the ability we enjoy of communicating our complex notions by definitions; that as theſe make by far the largeſt claſs of our ideas, and moſt frequently occur in the progreſs and improvement of knowledge, ſo they are by theſe means imparted with the greateſt readineſs, than which nothing would tend more to the increaſe and ſpreading of ſcience: for a definition is ſoon peruſed; and if the terms of it are well underſtood, the idea itſelf finds an eaſy admiſſion into the mind. Whereas in ſimple perceptions, where we are referred to the objects producing them, if theſe cannot be come at, as is ſometimes the caſe, the names by which they are expreſſed muſt remain empty ſounds. But new ideas of this claſs occurring very rarely in the ſciences, they ſeldom create any great obſtruction. It is otherwiſe with our complex notions: for, every ſtep we take leading us into new combinations and views of things, it becomes neceſſary to explain theſe to others, before they can be made acquainted with our diſcoveries; and as the manner of definitions is eaſy, requiring no apparatus but that of words, which are always ready, and at hand; hence we can with the leſs difficulty remove ſuch obſtacles as might ariſe from terms of our own invention, when they are made to ſtand for new complex ideas ſuggeſted to the mind by ſome preſent train of thinking. And thus at laſt we are let into the myſtery hinted at in the beginning of this chapter, *viz.* how we may become acquainted with the thoughts of another, when he makes uſe of words to which we have as yet joined no ideas. The anſwer is obvious from what has been already ſaid. If the terms denote ſimple perceptions, he muſt refer us to thoſe objects of nature whence the perceptions themſelves are to be obtained; but, if they ſtand for complex ideas, their meaning may be explained by a *definition*.

CHAP. II. *Of Definitions.*

I. A Definition *is the unfolding of ſome conception of the mind, anſwering to the word, or term made uſe of as the ſign of it.*—

Now as, in exhibiting any idea to another, it is neceſſary that the deſcription be ſuch as may excite that preciſe idea in his mind; hence it is plain that definitions, properly ſpeaking, are not arbitrary, but confined to the repreſenting of certain determinate ſettled notions, ſuch namely as are annexed by the ſpeaker or writer to the words he uſes. As nevertheleſs it is univerſally allowed that the ſignification of words is perfectly voluntary, and not the effect of any natural and neceſſary connection between them and the ideas for which they ſtand; ſome may perhaps wonder why definitions are not ſo too. In order therefore to unravel this difficulty, and ſhow diſtinctly what is and what is not arbitrary in ſpeech, we muſt carefully diſtinguiſh between the connection of our words and ideas, and the unfolding of the ideas themſelves.

II. Firſt, as to the connection of our words and ideas; this, it is plain, is a purely arbitrary inſtitution. When, for inſtance, we have in our minds the idea of any particular ſpecies of metals, the calling it by the name *gold* is an effect of the voluntary choice of men ſpeaking the ſame language, and not of any peculiar aptneſs in that ſound to expreſs that idea. Other nations we find make uſe of different ſounds, and with the ſame effect. Thus *aurum* denotes that idea in Latin, and *or* in French; and even the word *gold* itſelf would have as well ſerved to expreſs the idea of that metal which we call *ſilver*, had cuſtom in the beginning eſtabliſhed it.

III. But although we are thus entirely at liberty in connecting any idea with any ſound, yet it is quite otherwiſe in unfolding the ideas themſelves. For every idea having a preciſe appearance of its own, by which it is diſtinguiſhed from every other idea; it is manifeſt, that in laying it open to others, we muſt ſtudy ſuch a deſcription as ſhall exhibit that peculiar appearance. When we have formed to ourſelves the idea of a figure bounded by four equal ſides, joined together at right angles, we are at liberty to expreſs that idea by any ſound, and call it either a *ſquare* or a *triangle*. But whichever of theſe names we uſe, ſo long as the idea is the ſame, the deſcription by which we would ſignify it to another muſt be ſo too. Let it be called *ſquare* or *triangle*, it is ſtill a figure having four equal ſides, and all its angles right ones. Hence we clearly ſee what is and what is not arbitrary in the uſe of words. The eſtabliſhing any ſound as the mark of ſome determinate idea in the mind, is the effect of free choice, and a voluntary combination among men: and as different nations make uſe of different ſounds to denote the ſame ideas, hence proceeds all that variety of languages which we meet with in the world. But when a connection between our ideas and words is once ſettled, the unfolding of the idea anſwering to any word, which properly conſtitutes a definition, is by no means an arbitrary thing: for here we are bound to exhibit that preciſe conception which either the uſe of language, or our own particular choice, hath annexed to the term we uſe.

IV. And thus it appears, that definitions, conſidered as deſcriptions of ideas in the mind, are ſteady and invariable, being bounded to the repreſentation of theſe preciſe ideas. But then, in the application of definitions to particular names, we are altogether left to our own free choice. Becauſe, as the connecting of any idea with any ſound is a perfectly arbitrary inſtitution, the applying the deſcription of that idea to that ſound muſt be ſo too. When therefore logicians tell us that the definition of the name is arbitrary, they mean no more than this; that as different ideas may be connected with any term, according to the good pleaſure of him that uſes it; in like manner may different deſcriptions be applied to the term ſuitable to the ideas ſo connected. But this connection being ſettled, and the term conſidered as the ſign of ſome fixed idea in the underſtanding, we are no longer left to arbitrary explications, but muſt ſtudy ſuch a deſcription as correſponds with that preciſe idea. Now this alone, according to what has been before laid down, ought to be accounted a definition. What ſeems to have occaſioned no ſmall confuſion in this matter, is, that many explanations of words, where no idea is unfolded, but merely the connection between ſome word and idea aſſerted, have yet been dignified with the name of definitions. Thus, when we ſay that *a clock is an inſtrument by which we meaſure time*; that is by ſome called a definition; and yet it is plain that we are beforehand ſuppoſed to have an idea of this inſtrument, and only taught that the word *clock* ſerves in common language to denote that idea. By this rule all explications of words in our dictionaries will be definitions, nay, the names of even ſimple ideas may be thus defined. *White*, we may ſay, is the colour we obſerve in ſnow or milk; *heat*, the ſenſation produced by approaching the fire; and ſo in innumerable other inſtances. But theſe, and all others of the like kind, are by no means definitions, exciting new ideas in the underſtanding, but merely contrivances to remind us of known ideas, and teach their connection with the eſtabliſhed names.

V. But now in definitions properly ſo called, we firſt conſider the term we uſe, as the ſign of ſome inward conception, either annexed to it by cuſtom, or our own free choice; and then the buſineſs of the definition is to unfold and explicate that idea. As therefore the whole art lies in giving juſt and true copies of our ideas; a definition is then ſaid to be made perfect, when it ſerves diſtinctly to excite the idea deſcribed in the mind of another, even ſuppoſing him before wholly unacquainted with it. This point ſettled, let us next inquire what thoſe ideas are which are capable of being thus unfolded? And in the firſt place it is evident, that all our ſimple ideas are neceſſarily excluded. We have ſeen already that experience alone is to be conſulted here, inſomuch that, if either the objects whence they are derived come not in our way, or the avenues appointed by nature for their reception are wanting, no deſcription is ſufficient to convey them into the mind. But where the underſtanding is already ſupplied with theſe original and primitive conceptions, as they may be united together in an infinity of different forms; ſo may all their ſeveral combinations be diſtinctly laid open, by enumerating the ſimple ideas concerned in the various collections, and tracing the order and manner in which they are linked one to another. Now theſe combinations of ſimple notices conſtitute what we call our complex notions; whence it is evident, that complex ideas, and thoſe alone, admit of that kind of deſcription which goes by the name of a definition.

VI. Definitions, then, are pictures or repreſentations of our ideas; and as theſe repreſentations are then only poſſible when the ideas themſelves are complex, it is obvious to remark, that definitions cannot have place but where we make uſe of terms ſtanding for ſuch complex ideas. But our complex ideas being, as we have ſaid, nothing more than different combinations of ſimple ideas, we then know and comprehend them perfectly, when we know the ſeveral ſimple ideas of which they conſiſt, and can ſo put them together in our minds as may be neceſſary towards the framing of that peculiar connection which gives every idea its diſtinct and proper appearance.

VII. Two things are therefore required in every definition: firſt, That all the original ideas, out of which the complex one is formed, be diſtinctly enumerated; and, ſecondly, That the order and manner of combining them into one conception be clearly explained. Where a definition has theſe requiſites, nothing is wanting to its perfection; becauſe every one who reads it and underſtands the terms, ſeeing at once what ideas he is to join together, and alſo in what manner, can at pleaſure form in his own mind the complex conception anſwering to the term defined. Let us, for inſtance, ſuppoſe the word *ſquare* to ſtand for that idea by which we repreſent to ourſelves a figure whoſe

ſides ſubtend quadrants of a circumſcribed circle. The parts of this idea are the ſides bounding the figure. Theſe muſt be four in number, and all equal among themſelves, becauſe they are each to ſubtend a fourth part of the ſame circle. But, beſides theſe component parts, we muſt alſo take notice of the manner of putting them together, if we would exhibit the preciſe idea for which the word *ſquare* here ſtands. For four equal right lines, any-how joined, will not ſubtend quadrants of a circumſcribed circle. A figure with this property muſt have its ſides ſtanding alſo at right angles. Taking in therefore this laſt conſideration reſpecting the manner of combining the parts, the idea is fully deſcribed, and the definition thereby rendered complete. For a figure bounded by four equal ſides, joined together at right angles, has the property required; and is moreover the only right-lined figure to which that property belongs.

VIII. It will now be obvious to every one, in what manner we ought to proceed, in order to arrive at juſt and adequate definitions. Firſt, we are to take an exact view of the idea to be deſcribed, trace it to its original principles, and mark the ſeveral ſimple perceptions that enter into the compoſition of it. Secondly, we are to conſider the particular manner in which theſe elementary ideas are combined, in order to the forming of that preciſe conception for which the term we make uſe of ſtands.—When this is done, and the idea wholly unravelled, we have nothing more to do than fairly tranſcribe the appearance it makes to our own minds. Such a deſcription, by diſtinctly exhibiting the order and number of our primitive conceptions, cannot fail to excite at the ſame time, in the mind of every one that reads it, the complex idea reſulting from them; and therefore attains the true and proper end of a definition.

Chap. III. *Of the Compoſition and Reſolutions of our Ideas, and the Rules of Definition thence ariſing.*

I. The rule laid down in the foregoing chapter is general, extending to all poſſible caſes; and is indeed that to which alone we can have recourſe, where any doubt or difficulty ariſes. It is not, however, neceſſary that we ſhould practiſe it in every particular inſtance. Many of our ideas are extremely complicated, inſomuch that to enumerate all the ſimple perceptions out of which they are formed, would be a very troubleſome and tedious work. For this reaſon, logicians have eſtabliſhed certain compendious rules of defining, of which it may not be amiſs here to give ſome account. But in order to the better underſtanding of what follows, it will be neceſſary to obſerve, that there is a certain gradation in the compoſition of our ideas. The mind of man is very limited in its views, and cannot take in a great number of objects at once. We are therefore fain to proceed by ſteps, and make our firſt advances ſubſervient to thoſe which follow. Thus, in forming our complex notions, we begin at firſt with but a few ſimple ideas, ſuch as we can manage with eaſe, and unite them together into one conception. When we are provided with a ſufficient ſtock of theſe, and have by habit and uſe rendered them familiar to our minds, they become the component parts of other ideas ſtill more complicated, and form what we may call a ſecond order of compound notions. This proceſs, as is evident, may be continued to any degree of compoſition we pleaſe, mounting from one ſtage to another, and enlarging the number of combinations.

II. But now in a ſeries of this kind, whoever would acquaint himſelf perfectly with the laſt and higheſt order of ideas, finds it much the moſt expedient method to proceed gradually through all the intermediate ſteps. For, were he to take any very compound idea to pieces, and, without regard to the ſeveral claſſes of ſimple perceptions that have already been formed into diſtinct combinations, break it at once into its original principles, the number would be ſo great as perfectly to confound the imagination, and overcome the utmoſt reach and capacity of the mind. When we ſee a prodigious multitude of men jumbled together in crowds, without order or any regular poſition, we find it impoſſible to arrive at an exact knowledge of their number. But if they are formed into ſeparate battalions, and ſo ſtationed as to fall within the leiſure ſurvey of the eye; by viewing them ſucceſſively and in order, we come to an eaſy and certain determination. It is the ſame in our complex ideas. When the original perceptions, out of which they are framed, are very numerous, it is not enough that we take a view of them in looſe and ſcattered bodies; we muſt form them into diſtinct claſſes, and unite theſe claſſes in a juſt and orderly manner, before we can arrive at a true knowledge of the compound notices reſulting from them.

III. This gradual progreſs of the mind to its compound notions, through a variety of intermediate ſteps, plainly points out the manner of conducting the definitions by which theſe notions are conveyed into the minds of others. For, as the ſeries begins with ſimple and eaſy combinations, and advances through a ſucceſſion of different orders, riſing one above another in the degree of compoſition, it is evident, that, in a train of definitions expreſſing theſe ideas, a like gradation is to be obſerved. Thus the complex ideas of the loweſt order can no otherwiſe be deſcribed than by enumerating the ſimple ideas out of which they are made, and explaining the manner of their union. But then in the ſecond, or any other ſucceeding order, as they are formed out of thoſe gradual combinations, and conſtitute the inferior claſſes, it is not neceſſary, in deſcribing them, to mention one by one all the ſimple ideas of which they conſiſt. They may be more diſtinctly and briefly unfolded, by enumerating the compound ideas of a lower order, from whoſe union they reſult, and which are all ſuppoſed to be already known in conſequence of previous definitions. Here then it is that the logical method of defining takes place; which, that it may be the better underſtood, we ſhall explain ſomewhat more particularly the ſeveral ſteps and gradations of the mind in compounding its ideas, and thence deduce that peculiar form of a definition which logicians have thought fit to eſtabliſh.

IV. All the ideas we receive from the ſeveral objects of nature that ſurround us, repreſent diſtinct individuals. Theſe individuals, when compared together, are found in certain particulars to reſemble each other. Hence, by collecting the reſembling particulars into one conception, we form the notion of a *ſpecies*. And here let it be obſerved, that this laſt idea is leſs complicated than that by which we repreſent any of the particular objects contained under it. For the idea of the ſpecies excludes the peculiarities of the ſeveral individuals, and retains only ſuch properties as are common to them all. Again, by comparing ſeveral ſpecies together, and obſerving their reſemblance, we form the idea of a *genus*; where, in the ſame manner as before, the compoſition is leſſened, becauſe we leave out what is peculiar to the ſeveral ſpecies compared, and retain only the particulars wherein they agree. It is eaſy to conceive the mind proceeding thus from one ſtep to another, and advancing through its ſeveral claſſes of general notions, until at laſt it comes to the higheſt genus of all, denoted by the word *being*, where the bare idea of exiſtence is only concerned.

V. In this procedure we ſee the mind unravelling a complex idea, and tracing it in the aſcending ſcale, from greater or leſs degrees of compoſition, until it terminates in one ſimple perception. If now we take the ſeries the contrary way, and, beginning with the laſt or higheſt genus, carry our view downwards, through all the inferior genera and ſpecies, quite to the individuals, we ſhall thereby arrive at a diſtinct apprehenſion of the conduct of the underſtanding in compounding its ideas. For,

in the ſeveral claſſes of our perceptions, the higheſt in the ſcale is for the moſt part made up of but a few ſimple ideas, ſuch as the mind can take in and ſurvey with eaſe. This firſt general notion, when branched out into the different ſubdiviſions contained under it, has in every one of them ſomething peculiar, by which they are diſtinguiſhed among themſelves; inſomuch that, in deſcending from the genus to the ſpecies, we always ſuperadd ſome new idea, and thereby increaſe the degree of compoſition. Thus the idea denoted by the word *figure* is of a very general nature, and compoſed of but few ſimple perceptions, as implying no more than ſpace every where bounded. But if we deſcend farther, and conſider the boundaries of this ſpace, as that they may be either lines or ſurface, we fall into the ſeveral ſpecies of figure. For, where the ſpace is bounded by one or more ſurfaces, we give it the name of a *ſolid figure*; but where the boundaries are lines, it is called a plain figure.

VI. In this view of things it is evident, that the ſpecies is formed by ſuperadding a new idea to the genus. Here, for inſtance, the genus is circumſcribed ſpace. If now to this we ſuperadd the idea of a circumſcription by lines, we frame the notion of that ſpecies of figures which are called *plain*; but if we conceive the circumſcription to be by ſurfaces, we have the ſpecies of ſolid figures. This ſuperadded idea is called the *ſpecific difference*, not only as it ſerves to divide the ſpecies from the genus, but becauſe, being different in all the ſeveral ſubdiviſions, we thereby alſo diſtinguiſh the ſpecies one from another. And as it is likewiſe that conception, which, by being joined to the general idea, completes the notion of the ſpecies; hence it is plain, that the genus and ſpecific difference are to be conſidered as the proper and conſtituent parts of the ſpecies. If we trace the progreſs of the mind ſtill farther, and obſerve it advancing through the inferior ſpecies, we ſhall find its manner of proceeding to be always the ſame. For every lower ſpecies is formed by ſuperadding ſome new idea to the ſpecies next above it; inſomuch that, in this deſcending ſcale of our perceptions, the underſtanding paſſes through different orders of complex notions, which become more and more complicated at every ſtep it takes. Let us reſume here, for inſtance, the ſpecies of plain figures. They imply no more than ſpace bounded by lines. But if we take in an additional conſideration of the nature of theſe lines, as whether they are *right* or *curves*, we fall into the ſubdiviſions of plain figure, diſtinguiſhed by the names of *rectilinear*, *curvilinear*, and *mixtilinear*.

VII. And here we are to obſerve, that though plain figures, when conſidered as one of thoſe branches that come under the notion of figure in general, take the name of a ſpecies; yet compared with the claſſes of curvilinear, rectilinear, and mixtilinear, into which they themſelves may be divided, they really become a genus, of which the before-mentioned ſubdiviſions conſtitute the ſeveral ſpecies. Theſe ſpecies, in the ſame manner as in the caſe of plain and ſolid figures, conſiſt of the genus and ſpecific difference as their conſtituent parts. For in the curvilinear kind, the curvity of the lines bounding the figure makes what is called the *ſpecific difference*; to which if we join the genus, which here is a plain figure or ſpace circumſcribed by lines, we have all that is neceſſary towards completing the notion of this ſpecies. We are only to take notice, that this laſt ſubdiviſion, having two genera above it, *viz.* plain figure, and figure in general; the genus joined with the ſpecific difference, in order to conſtitute the ſpecies of curvilinears, is that which lies neareſt to the ſaid ſpecies. It is the notion of plain figure, and not of figure in general, that, joined with the idea of curvity, makes up the complex conception of curve-lined figures. For, in this deſcending ſcale of our ideas, figure in general, plain figures, curve-lined figures, the two firſt are conſidered as genera in reſpect of the third; and the ſecond in order, or that which ſtands next to the third, is called the *neareſt genus*. But now as it is this ſecond idea, which, joined with the notion of curvity, forms the ſpecies of curve-lined figures; it is plain, that the third or laſt idea in the ſeries is made up of the neareſt genus and ſpecific difference. This rule holds invariably, however far the ſeries is continued; becauſe, in a train of ideas thus ſucceeding one another, all that precede the laſt are conſidered as ſo many genera in reſpect of that laſt; and the laſt itſelf is always formed by ſuperadding the ſpecific difference to the genus next it.

VIII. Here then we have an univerſal deſcription, applicable to all our ideas of whatever kind, from the higheſt genus to the loweſt ſpecies. For, taking them in order downwards from the ſaid general idea, they every where conſiſt of the *genus proximum*, and *differentia ſpecifica*, as logicians love to expreſs themſelves. But when we come to the loweſt ſpecies of all, comprehending under it only individuals, the ſuperadded idea, by which theſe individuals are diſtinguiſhed one from another, no longer takes the name of the ſpecific difference. For here it ſerves not to denote diſtinct ſpecies, but merely a variety of individuals, each of which having a particular exiſtence of its own, is therefore numerically different from every other of the ſame kind. And hence it is, that, in this laſt caſe, logicians chooſe to call the ſuperadded idea by the name of the *numerical difference*; inſomuch that, as the idea of a ſpecies is made up of the neareſt genus and ſpecific difference, ſo the idea of an individual conſiſts of the loweſt ſpecies and numeric difference. Thus the circle is a ſpecies of curve-lined figures, and what we call the *loweſt ſpecies*, as comprehending under it only individuals. Circles in particular are diſtinguiſhed from one another by the length and poſition of their diameters. The length therefore and poſition of the diameter of a circle form what logicians call the *numerical difference*; becauſe, theſe being given, the circle itſelf may be deſcribed, and an individual thereby conſtituted.

IX. Thus the mind, in compounding its ideas, begins, we ſee, with the moſt general notions, which, conſiſting of but a few ſimple notices, are eaſily combined and brought together into one conception. Thence it proceeds to the ſpecies comprehended under this general idea, and theſe are formed by joining together the genus and ſpecific difference. And as it often happens that theſe ſpecies may be ſtill farther ſubdivided, and run on in a long ſeries of continued gradations, producing various orders of compound perceptions; ſo all theſe ſeveral orders are regularly and ſucceſſively formed by annexing in every ſtep the ſpecific difference to the neareſt genus. When by this method of procedure we are come to the loweſt order of all, by joining the ſpecies and numeric difference, we frame the ideas of individuals. And here the ſeries neceſſarily terminates, becauſe it is impoſſible any farther to bound or limit our conceptions. This view of the compoſition of our ideas, repreſenting their conſtituent parts in every ſtep of the progreſſion, naturally points out the true and genuine form of a definition. For, as definitions are no more than deſcriptions of the ideas for which the terms defined ſtand; and as ideas are then deſcribed, when we enumerate diſtinctly and in order the parts of which they conſiſt; it is plain, that, by making our definitions follow one another according to the natural train of our conceptions, they will be ſubject to the ſame rules, and keep pace with the ideas they deſcribe.

X. As therefore the firſt order of our compound notions, or the ideas that conſtitute the higheſt genera in the different ſcales of perception, are formed by uniting together a certain number of ſimple notices; ſo the terms expreſſing theſe genera are defined *by enumerating the ſimple notices ſo combined*. And as the ſpecies comprehended under any genus, or the complex ideas of the ſecond order, ariſe from ſuperadding the ſpecific difference to the ſaid general idea; ſo the definition of the

names of the ſpecies is abſolved, in a detail of the ideas of the ſpecific difference, connected with the term of the genus. For, the genus having been before defined, the term by which it is expreſſed ſtands for a known idea, and may therefore be introduced into all ſubſequent definitions, in the ſame manner as the names of ſimple perceptions. It will now be ſufficiently obvious, that the definitions of all the ſucceeding orders of compound notions will every where conſiſt of the term of the nearest genus, joined with an enumeratiou of the ideas that conſtitute the ſpecific difference; and that the definition of individuals unites the names of the loweſt ſpecies with the terms by which we expreſs the ideas of the numeric difference.

XI. Here then we have the true and proper form of a definition, in all the various orders of conception. This is that method of defining which is commonly called *logical*, and which we ſee is perfect in its kind, inaſmuch as it preſents a full and adequate deſcription of the idea for which the term defined ſtands.

Part II. Of JUDGMENT.

Chap. I. *Of the Grounds of Human Judgment.*

THE mind being furniſhed with ideas, its next ſtep in the way to knowledge is, the comparing theſe ideas together, in order to judge of their agreement or diſagreement. In this joint view of our ideas, if the relation is ſuch as to be immediately diſcoverable by the bare inſpection of the mind, the judgments thence obtained are called *intuitive*, from a word that denotes *to look at*; for, in this caſe, a mere attention to the ideas compared ſuffices to let us ſee how far they are connected or disjoined. Thus, *that the Whole is greater than any of its Parts*, is an intuitive judgment; nothing more being required to convince us of its truth, than an attention to the ideas of *whole* and *part*. And this too is the reaſon why we call the act of the mind forming theſe judgments *intuition*; as it is indeed no more than an immediate perception of the agreement or diſagreement of any two ideas.

II. But here it is to be obſerved, that our knowledge of this kind reſpects only our ideas, and the relations between them; and therefore can ſerve only as a foundation to ſuch reaſonings as are employed in inveſtigating thoſe relations. Now it ſo happens, that many of our judgments are converſant about facts, and the real exiſtence of things, which cannot be traced by the bare contemplation of our ideas. It does not follow, becauſe I have the idea of a circle in my mind, that therefore a figure anſwering to that idea has a real exiſtence in nature. I can form to myſelf the notion of a centaur or golden mountain, but never imagine on that account that either of them exiſts. What then are the grounds of our judgment in relation to facts? *Experience* and *teſtimony*. By experience we are informed of the exiſtence of the ſeveral objects which ſurround us, and operate upon our ſenſes. Teſtimony is of a wider extent, and reaches not only to objects beyond the preſent ſphere of our obſervation, but alſo to facts and tranſactions, which being now paſt, and having no longer any exiſtence, could not without this conveyance have fallen under our cognizance.

III. Here we have three foundations of human judgment, from which the whole ſyſtem of our knowledge may with eaſe and advantage be derived. Firſt, intuition, which reſpects our ideas themſelves, and their relations; and is the foundation of that ſpecies of reaſoning which we call *demonſtration*. For, whatever is deduced from our intuitive perceptions, by a clear and connected ſeries of proofs, is ſaid to be demonſtrated, and produces abſolute certainty in the mind. Hence the knowledge obtained in this manner is what we properly term *ſcience*; becauſe in every ſtep of the procedure it carries its own evidence along with it, and leaves no room for doubt or heſitation. And what is highly worthy of notice; as the truths of this claſs expreſs the relation between our ideas, and the ſame relations muſt ever and invariably ſubſiſt between the ſame ideas, our deductions in the way of ſcience conſtitute what we call *eternal*, *neceſſary*, and *immutable truths*. If it be true that the whole is equal to all its parts, it muſt be ſo unchangeably; becauſe the relation of equality being attached to the ideas themſelves, muſt ever intervene where the ſame ideas are compared. Of this nature are all the truths of natural religion, morality, and mathematics, and in general whatever may be gathered from the bare view and conſideration of our ideas.

IV. The ſecond ground of human judgment is *experience*; from which we infer the exiſtence of thoſe ſubjects that ſurround us, and fall under the immediate notice of our ſenſes. When we ſee the ſun, or caſt our eyes towards a building, we not only have perceptions of theſe objects within ourſelves, but aſcribe to them a real exiſtence out of the mind. It is alſo by the information of the ſenſes that we judge of the qualities of bodies; as when we ſay that *ſnow is white*, *fire hot*, or *ſteel hard*. For, as we are wholly unacquainted with the internal ſtructure and conſtitution of the bodies that produce theſe ſenſations in us, nay, and are unable to trace any connection between that ſtructure and the ſenſations themſelves, it is evident that we build our judgments altogether upon obſervation, aſcribing to bodies ſuch qualities as are anſwerable to the perceptions they excite in us. Not that we ever ſuppoſe the qualities of bodies to be things of the ſame nature with our perceptions; for there is nothing in fire ſimilar to our ſenſation of heat, or in a ſword ſimilar to pain: but that when different bodies excite in our minds ſimilar perceptions, we neceſſarily aſcribe to theſe bodies not only an exiſtence independent of us, but likewiſe ſimilar qualities, of which it is the nature to produce ſimilar perceptions in the human mind. But this is not the only advantage derived from experience; for to that too are we indebted for all our knowledge regarding the co-exiſtence of ſenſible qualities in objects, and the operations of bodies one upon another. Ivory, for inſtance, is hard and elaſtic; this we know by experience, and indeed by that alone. For, being altogether ſtrangers to the true nature both of elaſticity and hardneſs, we cannot by the bare contemplation of our ideas determine how far the one neceſſarily implies the other, or whether there may not be a repugnance between them. But when we obſerve them to exiſt both in the ſame object, we are then aſſured from experience that they are not incompatible; and when we alſo find that a ſtone is hard and not elaſtic, and that air though elaſtic is not hard, we alſo conclude, upon the ſame foundation, that the ideas are not neceſſarily conjoined, but may exiſt ſeparately in different objects. In like manner, with regard to the operations of bodies one upon another, it is evident that our knowledge this way is all derived from obſervation. *Aquaregia* diſſolves gold, as has been found by frequent trial; nor is there any other way of arriving at the diſcovery. Naturaliſts may tell us, if they pleaſe, that the parts of *aquaregia* are of a texture apt to inſinuate between the corpuſcles of gold, and thereby looſen and ſhake them aſunder. If this is a true account of the matter, it will notwithſtanding be allowed that our conjecture in regard to the conformation of theſe bodies is deduced from the experiment, and not the experiment from the conjecture. It was not from any previous knowledge of the intimate ſtructure of *aquaregia*

and *gold*, and the aptneſs of their parts to act or to be acted upon, that we came by the concluſion above mentioned. The internal conſtitution of bodies is in a manner wholly unknown to us; and could we even ſurmount this difficulty, yet, as the ſeparation of the parts of gold implies ſomething like an active force in the *menſtruum*, and we are unable to conceive how it comes to be poſſeſſed of this activity, the effect muſt be owned to be altogether beyond our comprehenſion. But when repeated trials had once confirmed it, inſomuch that it was admitted as an eſtabliſhed truth in natural knowledge, it was then eaſy for men to ſpin out theories of their own invention, and contrive ſuch a ſtructure of parts, both for *gold* and *aquaregia*, as would beſt ſerve to explain the phenomenon upon the principles of that ſyſtem of philoſophy they had adopted.

V. From what has been ſaid it is evident, that as intuition is the foundation of what we call *ſcientifical* knowledge, ſo is experience of *natural*. For this laſt being wholly taken up with objects of ſenſe, or thoſe bodies that conſtitute the natural world; and their properties, as far as we can diſcover them, being to be traced only by a long and painful ſeries of obſervations; it is apparent, that, in order to improve this branch of knowledge, we muſt betake ourſelves to the method of trial and experiment.

VI. But though experience is what we may term the immediate foundation of natural knowledge, yet with reſpect to particular perſons its influence is very narrow and confined. The bodies that ſurround us are numerous; many of them lie at a great diſtance, and ſome quite beyond our reach. Life is ſo ſhort, and ſo crowded with cares, that but little time is left for any ſingle man to employ himſelf in unfolding the myſteries of nature. Hence it is neceſſary to admit many things upon the teſtimony of others, which by this means becomes the foundation of a great part of our knowledge of body. No man doubts of the power of *aquaregia* to diſſolve gold, though perhaps he never himſelf made the experiment. In theſe therefore and ſuch-like caſes, we judge of the facts and operations of nature upon the mere ground of teſtimony. However, as we can always have recourſe to experience where any doubt or ſcruple ariſes, this is juſtly conſidered as the true foundation of natural philoſophy; being indeed the ultimate ſupport upon which our aſſent reſts, and whereto we appeal when the higheſt degree of evidence is required.

VII. But there are many facts that will not allow of an appeal to the ſenſes; and in this caſe teſtimony is the true and only foundation of our judgments. All human actions, of whatever kind, when conſidered as already paſt, are of the nature here deſcribed; becauſe, having now no longer any exiſtence, both the facts themſelves, and the circumſtances attending them, can be known only from the relations of ſuch as had ſufficient opportunities of arriving at the truth. *Teſtimony* therefore is juſtly accounted a third ground of human judgment; and as from the other two we have deduced *ſcientifical* and *natural* knowledge, ſo we may from this derive *hiſtorical*; by which we mean, not merely a knowledge of the civil tranſactions of ſtates and kingdoms, but of all facts whatſoever, where teſtimony is the ultimate foundation of our belief.

Chap. II. *Of Affirmative and Negative Propoſitions.*

I. While the comparing of our ideas is conſidered merely as an act of the mind, aſſembling them together, and joining or disjoining them according to the reſult of its perceptions, we call it *judgment*: but when our judgments are put into words, they then bear the name of *propoſitions*. A propoſition therefore is a ſentence expreſſing ſome judgment of the mind, whereby two or more ideas are affirmed to agree or diſagree. Now, as our judgments include at leaſt two ideas, one of which is affirmed or denied of the other, ſo muſt a propoſition have terms anſwering to theſe ideas. The idea of which we affirm or deny, and of courſe the term expreſſing that idea, is called the *ſubject* of the propoſition. The idea affirmed or denied, as alſo the term anſwering it, is called the *predicate*. Thus in the propoſition, *God is omnipotent: God* is the ſubject, it being of him that we affirm omnipotence; and *omnipotent* is the predicate, becauſe we affirm the idea expreſſed by that word to belong to God.

II. But as, in propoſitions, ideas are either joined or diſjoined; it is not enough to have terms expreſſing thoſe ideas, unleſs we have alſo ſome words to denote their agreement or diſagreement. That word in a propoſition, which connects two ideas together, is called the *copula*; and if a negative particle be annexed, we thereby underſtand that the ideas are diſjoined. The *ſubſtantive verb* is commonly made uſe of for the copula: as in the above-mentioned propoſition, *God is omnipotent*; where *is* repreſents the copula, and ſignifies the agreement of the ideas of *God* and *omnipotence*. But if we mean to ſeparate two ideas; then, beſides the ſubſtantive verb, we muſt alſo uſe ſome particle of negation, to expreſs this repugnance. The propoſition, *Man is not perfect*, may ſerve as an example of this kind; where, the notion of *perfection* being removed from the idea of *man*, the negative particle *not* is inſerted after the copula, to ſignify the diſagreement between the ſubject and predicate.

III. Every propoſition neceſſarily conſiſts of theſe three parts: but then it is not alike needful that they be all ſeverally expreſſed in words; becauſe the copula is often included in the term of the predicate, as when we ſay, *he ſits*; which imports the ſame as *he is ſitting*. In the Latin language, a ſingle word has often the force of a whole ſentence. Thus *ambulat* is the ſame as *ille eſt ambulans*; *amo*, as *ego ſum amans*; and ſo in innumerable other inſtances: by which it appears, that we are not ſo much to regard the number of words in a ſentence, as the ideas they repreſent, and the manner in which they are put together. For, wherever two ideas are joined or disjoined in an expreſſion, though of but a ſingle word; it is evident that we have a ſubject, predicate, and copula, and of conſequence a complete propoſition.

IV. When the mind joins two ideas, we call it an *affirmative* judgment; when it ſeparates them, *a negative*: and as any two ideas compared together muſt neceſſarily either agree or not agree, it is evident that all our judgments fall under theſe two diviſions. Hence likewiſe the propoſitions expreſſing theſe judgments are all either affirmative or negative. An affirmative propoſition connects the predicate with the ſubject, as, *A ſtone is heavy*; a negative propoſition ſeparates them, as, *God is not the author of evil*. *Affirmation* therefore is the ſame as joining two ideas together, and this is done by means of the copula. *Negation* on the contrary marks a repugnance between the ideas compared; in which caſe a negative particle muſt be called in, to ſhow that the connection included in the copula does not take place.

V. Hence we ſee the reaſon of the rule commonly laid down by logicians, That in all negative propoſitions the negation ought to affect the copula. For, as the copula, when placed by itſelf, between the ſubject and the predicate, manifeſtly binds them together; it is evident, that, in order to render a propoſition negative, the particles of negation muſt enter it in ſuch a manner as to deſtroy this union. In a word, then only are two ideas disjoined in a propoſition, when the negative particle may be ſo referred to the copula, as to break the affirmation included in it, and undo that connection it would otherwiſe eſtabliſh. When we ſay, for inſtance, *No man is perfect*; take away the negation, and the copula of itſelf plainly unites the ideas in the propoſition. But as this is the very reverſe of what is intended, a negative mark is added, to

ſhow that this union does not here take place. The negation, therefore, by deſtroying the effect of the copula, changes the very nature of the propoſition, inſomuch, that, inſtead of binding two ideas together, it denotes their ſeparation. On the contrary, in this ſentence, *The man who departs not from an upright behaviour is beloved of God*, the predicate *beloved of God* is evidently affirmed of the ſubject an *upright man*; ſo that, notwithſtanding the negative particle, the propoſition is ſtill affirmative. The reaſon is plain: the negation here affects not the copula; but, making properly a part of the ſubject, ſerves, with other terms in the ſentence, to form one complex idea, of which the predicate *beloved of God* is directly affirmed.

CHAP. III. *Of Univerſal and Particular Propoſitions.*

I. THE next conſiderable diviſion of propoſitions is into *univerſal* and *particular*. Our ideas, according to what has been already obſerved in the Firſt Part, are all ſingular as they enter the mind, and repreſent individual objects. But as by abſtraction we can render them univerſal, ſo as to comprehend a whole claſs of things, and ſometimes ſeveral claſſes at once; hence the terms expreſſing theſe ideas muſt be in like manner univerſal. If therefore we ſuppoſe any general term to become the ſubject of a propoſition, it is evident, that whatever is affirmed of the abſtract idea belonging to that term, may be affirmed of all the individuals to which that idea extends. Thus, when we ſay, *Men are mortal*; we conſider mortality, not as confined to one or any number of particular men, but as what may be affirmed without reſtriction of the whole ſpecies. By this means the propoſition becomes as general as the idea which makes the ſubject of it; and indeed derives its univerſality entirely from that idea, being more or leſs ſo according as this may be extended to more or fewer individuals. But it is further to be obſerved of theſe general terms, that they ſometimes enter a propoſition in their full latitude, as in the example given above; and ſometimes appear with a mark of limitation. In this laſt caſe we are given to underſtand, that the predicate agrees not to the whole univerſal idea, but only to a part of it; as in the propoſition, *Some men are wiſe*: for here wiſdom is not affirmed of every particular man, but reſtrained to a few of the human ſpecies.

II. Now from this different appearance of the general idea that conſtitutes the ſubject of any judgment, ariſes the diviſion of propoſitions into *univerſal* and *particular*. An univerſal propoſition is that wherein the ſubject is ſome general term taken in its full latitude; inſomuch that the predicate agrees to all the individuals comprehended under it, if it denotes a proper ſpecies; and to all the ſeveral ſpecies, and their individuals, if it marks an idea of a higher order. The words *all*, *every*, *no*, *none*, &c. are the proper ſigns of this univerſality; and as they ſeldom fail to accompany general truths, ſo they are the moſt obvious criterion whereby to diſtinguiſh them. *All animals have a power of beginning motion.* This is an univerſal propoſition; as we know from the word *all* prefixed to the ſubject *animals*, which denotes that it muſt be taken in its full extent. Hence the power of beginning motion may be affirmed of all the ſeveral ſpecies of animals.

III. A *particular* propoſition has in like manner ſome general term for its ſubject; but with a mark of limitation added, to denote that the predicate agrees only to ſome of the individuals comprehended under a ſpecies, or to one or more of the ſpecies belonging to any genus, and not to the whole univerſal idea. Thus, *Some ſtones are heavier than iron*; *Some men have an uncommon ſhare of prudence*. In the laſt of theſe propoſitions, the ſubject *ſome men* implies only a certain number of individuals, comprehended under a ſingle ſpecies. In the former, where the ſubject is a genus that extends to a great variety of diſtinct claſſes, *ſome ſtones* may not only imply any number of particular ſtones, but alſo ſeveral whole ſpecies of ſtones, inaſmuch as there may be not a few with the property there deſcribed. Hence we ſee that a propoſition does not ceaſe to be particular by the predicate's agreeing to a whole ſpecies, unleſs that ſpecies, ſingly and diſtinctly conſidered, makes alſo the ſubject of which we affirm or deny.

IV. There is ſtill one ſpecies of propoſitions that remains to be deſcribed, and which the more deſerves our notice, as it is not yet agreed among logicians to which of the two claſſes mentioned above they ought to be referred; namely, *ſingular* propoſitions, or thoſe where the ſubject is an individual. Of this nature are the following: *Sir Iſaac Newton was the inventor of fluxions*; *This book contains many uſeful truths*. What occaſions ſome difficulty as to the proper rank of theſe propoſitions is, that, the ſubject being taken according to the whole of its extenſion, they ſometimes have the ſame effect in reaſoning as univerſals. But if it be conſidered that they are in truth the moſt limited kind of particular propoſitions, and that no propoſition can with any propriety be called univerſal but where the ſubject is ſome univerſal idea; we ſhall not be long in determining to which claſs they ought to be referred. When we ſay, *Some books contain uſeful truths*; the propoſition is particular, becauſe the general term appears with a mark of reſtriction. If therefore we ſay, *This book contains uſeful truths*; it is evident that the propoſition muſt be ſtill more particular, as the limitation implied in the word *this* is of a more confined nature than in the former caſe.

V. We ſee, therefore, that all propoſitions are either *affirmative* or *negative*; nor is it leſs evident, that in both caſes they may be *univerſal* or *particular*. Hence ariſes that celebrated fourfold diviſion of them into *univerſal affirmative* and *univerſal negative*, *particular affirmative* and *particular negative*, which comprehends indeed all their varieties. The uſe of this method of diſtinguiſhing them will appear more fully afterwards, when we come to treat of reaſoning and ſyllogiſm.

CHAP. IV. *Of Abſolute and Conditional Propoſitions.*

I. THE objects about which we are chiefly converſant in this world, are all of a nature liable to change. What may be affirmed of them at one time, cannot often at another; and it makes no ſmall part of our knowledge to diſtinguiſh rightly theſe variations, and trace the reaſons upon which they depend. For it is obſervable, that amidſt all the viciſſitude of nature, ſome things remain conſtant and invariable; nor even are the changes, to which we ſee others liable, effected but in conſequence of uniform and ſteady laws, which, when known, are ſufficient to direct us in our judgments about them. Hence philoſophers, in diſtinguiſhing the objects of our perception into various claſſes, have been very careful to note, that ſome properties belong eſſentially to the general idea, ſo as not to be ſeparable from it but by deſtroying its very nature; while others are only accidental, and may be affirmed or denied of it in different circumſtances. Thus ſolidity, a yellow colour, and great weight, are conſidered as eſſential qualities of gold; but whether it ſhall exiſt as an uniform conjoined maſs, is not alike neceſſary. We ſee that by a proper menſtruum it may be reduced to a fine powder, and that an intenſe heat will bring it into a ſtate of fuſion.

II. From this diverſity in the ſeveral qualities of things ariſes a conſiderable difference as to the manner of our judging about them. For all ſuch properties as are inſeparable from objects when conſidered as belonging to any genus or ſpecies, are affirmed abſolutely and without reſerve of that general

idea. Thus we ſay, *Gold is very weighty*; *A ſtone is hard*; *Animals have a power of ſelf-motion.* But in the caſe of mutual or accidental qualities, as they depend upon ſome other conſideration diſtinct from the general idea; that alſo muſt be taken into the account, in order to form an accurate judgement. Should we affirm, for inſtance, of ſome ſtones, that they are very ſuſceptible of a rolling motion; the propoſition, while it remains in this general form, cannot with any advantage be introduced into our reaſonings. An aptneſs to receive that mode of motion flows from the figure of the ſtone; which, as it may vary infinitely, our judgment then only becomes applicable and determinate, when the particular figure, of which volubility is a conſequence, is alſo taken into the account. Let us then bring in this other conſideration, and the propoſition will run as follows: *Stones of a ſpherical form are eaſily put into a rolling motion.* Here we ſee the condition upon which the predicate is affirmed, and therefore know in what particular caſes the propoſition may be applied.

III. This conſideration of propoſitions reſpecting the manner in which the predicate is affirmed of the ſubject gives riſe to the diviſion of them into *abſolute* and *conditional*. *Abſolute* propoſitions are thoſe wherein we affirm ſome property inſeparable from the idea of the ſubject, and which therefore belongs to it in all poſſible caſes: as, *God is infinitely wiſe*; *Virtue tends to the ultimate happineſs of man.* But where the predicate is not neceſſarily connected with the idea of the ſubject, unleſs upon ſome conſideration diſtinct from that idea, there the propoſition is called *conditional*. The reaſon of the name is taken from the ſuppoſition annexed, which is of the nature of a condition, and may be expreſſed as ſuch, thus: *If a ſtone is expoſed to the rays of the ſun, it will contract ſome degree of heat; If a river runs in a very declining channel, its rapidity will conſtantly increaſe.*

IV. There is not any thing of greater importance in philoſophy than a due attention to this diviſion of propoſitions. If we are careful never to affirm things abſolutely but where the ideas are inſeparably conjoined; and if in our other judgements we diſtinctly mark the conditions which determine the predicate to belong to the ſubject; we ſhall be the leſs liable to miſtake in applying general truths to the particular concerns of human life. It is owing to the exact obſervance of this rule that mathematicians have been ſo happy in their diſcoveries, and that what they demonſtrate of magnitude in general may be applied with eaſe in all obvious occurrences.

V. The truth of it is, particular propoſitions are then known to be true, when we can trace their connection with univerſals; and it is accordingly the great buſineſs of ſcience to find out general truths that may be applied with ſafety in all obvious inſtances. Now the great advantage ariſing from determining with care the conditions upon which one idea may be affirmed or denied of another is this: that thereby particular propoſitions really become univerſal, may be introduced with certainty into our reaſonings, and ſerve as ſtandards to conduct and regulate our judgments. To illuſtrate this by a familiar inſtance: if we ſay, *Some water acts very forcibly*; the propoſition is particular: and as the conditions on which this forcible action depends are not mentioned, it is as yet uncertain in what caſes it may be applied. Let us then ſupply theſe conditions, and the propoſition will run thus: *Water conveyed in ſufficient quantity along a ſteep deſcent acts very forcibly.* Here we have an univerſal judgment, inaſmuch as the predicate *forcible action* may be aſcribed to all water under the circumſtances mentioned. Nor is it leſs evident that the propoſition in this new form is of eaſy application; and in fact we find that men do apply it in inſtances where the forcible action of water is required; as in corn-mills and many other works of art.

Chap. V. *Of Simple and Compound Propoſitions.*

I. Hitherto we have treated of propoſitions, where only two ideas are compared together. Theſe are in the general called *ſimple*; becauſe, having but one ſubject and one predicate, they are the effect of a ſimple judgment that admits of no ſubdiviſion. But if it ſo happens that ſeveral ideas offer themſelves to our thoughts at once, whereby we are led to affirm the ſame thing of different objects, or different things of the ſame object; the propoſitions expreſſing theſe judgments are called *compound*; becauſe they may be reſolved into as many others as there are ſubjects or predicates in the whole complex determination on the mind. Thus, *God is infinitely wiſe and infinitely powerful.* Here there are two predicates, *infinite wiſdom* and *infinite power*, both affirmed of the ſame ſubject; and accordingly the propoſition may be reſolved into two others, affirming theſe predicates ſeverally. In like manner in the propoſition, *Neither kings nor people are exempt from death*; the predicate is denied of both ſubjects, and may therefore be ſeparated from them in diſtinct propoſitions. Nor is it leſs evident, that if a complex judgment conſiſts of ſeveral ſubjects and predicates, it may be reſolved into as many ſimple propoſitions as are the number of different ideas compared together. *Riches and honours are apt to elate the mind, and increaſe the number of our deſires.* In this judgment there are two ſubjects and two predicates, and it is at the ſame time apparent, that it may be reſolved into four diſtinct propoſitions. *Riches are apt to elate the mind. Riches are apt to increaſe the number of our deſires.* And ſo of honours.

II. Logicians have divided theſe compound propoſitions into a great many different claſſes; but, in our opinion, not with a due regard to their proper definition. Thus *conditionals*, *cauſals*, *relatives*, &c. are mentioned as ſo many diſtinct ſpecies of this kind, though in fact they are no more than ſimple propoſitions. To give an inſtance of a conditional: *If a ſtone is expoſed to the rays of the ſun, it will contract ſome degree of heat.* Here we have but one ſubject and one predicate; for the complex expreſſion, *A ſtone expoſed to the rays of the ſun*, conſtitutes the proper ſubject of this propoſition, and is no more than one determined idea. The ſame thing happens in cauſals. *Rehoboam was unhappy becauſe he followed evil counſel.* There is here an appearance of two propoſitions ariſing from the complexity of the expreſſion; but when we come to conſider the matter more nearly, it is evident that we have but a ſingle ſubject and predicate. *The purſuit of evil counſel brought miſery upon Rehoboam.* It is not enough, therefore, to render a propoſition compound, that the ſubject and predicate are complex notions, requiring ſometimes a whole ſentence to expreſs them: for in this caſe the compariſon is ſtill confined to two ideas, and conſtitutes what we call a ſimple judgment. But where there are ſeveral ſubjects or predicates, or both, as the affirmation or negation may be alike extended to them all, the propoſition expreſſing ſuch a judgment is truly a collection of as many ſimple ones as there are different ideas compared. Confining ourſelves therefore to this more ſtrict and juſt notion of compound propoſitions, they are all reducible to two kinds, viz. *copulatives* and *disjunctives*.

III. A *copulative* propoſition is, where the ſubjects and predicates are ſo linked together, that they may be all ſeverally affirmed or denied one of another. Of this nature are the examples of compound propoſitions given above. *Riches and honours are apt to elate the mind, and increaſe the number of our deſires. Neither kings nor people are exempt from death.* In the firſt of theſe the two predicates may be affirmed ſeverally of each ſubject, whence we have four diſtinct propoſitions. The other furniſhes an example of the negative kind, where the ſame predicate, being disjoined from both ſubjects, may be alſo denied of them in ſeparate propoſitions.

IV. The other ſpecies of compound propoſitions are thoſe called disjunctives; in which, comparing ſeveral predicates with the ſame ſubject, we affirm that one of them neceſſarily belongs to it, but leave the particular predicate undetermined. If any one, for example, ſays, *This world either exiſts of itſelf, or is the work of ſome all-wiſe and powerful cauſe*, it is evident that one of the two predicates muſt belong to the world; but as the propoſition determines not which, it is therefore of the kind we call *disjunctive*. Such, too, are the following: *The ſun either moves round the earth, or is the centre about which the earth revolves. Friendſhip finds men equal, or makes them ſo.* It is the nature of all propoſitions of this claſs, ſuppoſing them to be exact in point of form, that upon determining the particular predicate, the reſt are of courſe to be removed; or if all the predicates but one are removed, that one neceſſarily takes place. Thus, in the example given above; if we allow the world to be the work of ſome wiſe and powerful cauſe, we of courſe deny it to be ſelf-exiſtent; or if we deny it to be ſelf-exiſtent, we muſt neceſſarily admit that it was produced by ſome wiſe and powerful cauſe. Now this particular manner of linking the predicates together, ſo that the eſtabliſhing one diſplaces all the reſt; or the excluding all but one neceſſarily eſtabliſhes that one; cannot otherwiſe be effected than by means of *disjunctive* particles. And hence it is that propoſitions of this claſs take their names from theſe particles, which make ſo neceſſary a part of them, and indeed conſtitute their very nature conſidered as a diſtinct ſpecies.

Chap. VI. *Of the Diviſion of Propoſitions into Self-evident and Demonſtrable.*

I. When any propoſition is offered to the view of the mind, if the terms in which it is expreſſed be underſtood; upon comparing the ideas together, the agreement or diſagreement aſſerted is either immediately perceived, or found to lie beyond the preſent reach of the underſtanding. In the firſt caſe the propoſition is ſaid to be *ſelf-evident*, and admits not of any proof, becauſe a bare attention to the ideas themſelves produces full conviction and certainty; nor is it poſſible to call in any thing more evident by way of confirmation. But where the connection or repugnance comes not ſo readily under the inſpection of the mind, there we muſt have recourſe to reaſoning; and if by a clear ſeries of proofs we can make out the truth propoſed, inſomuch that ſelf-evidence ſhall accompany every ſtep of the procedure, we are then able to demonſtrate what we aſſert, and the propoſition itſelf is ſaid to be *demonſtrable*. When we affirm, for inſtance, *that it is impoſſible for the ſame thing to be and not to be*; whoever underſtands the terms made uſe of perceives at firſt glance the truth of what is aſſerted, nor can he by any efforts bring himſelf to believe the contrary. The propoſition therefore is *ſelf-evident*, and ſuch that it is impoſſible by reaſoning to make it plainer; becauſe there is no truth more obvious or better known, from which as a conſequence it may be deduced. But if we ſay, *This world had a beginning*; the aſſertion is indeed equally true, but ſhines not forth with the ſame degree of evidence. We find great difficulty in conceiving how the world could be made out of nothing; and are not brought to a free and full conſent, until by reaſoning we arrive at a clear view of the abſurdity involved in the contrary ſuppoſition. Hence this propoſition is of the kind we call *demonſtrable*, inaſmuch as its truth is not immediately perceived by the mind, but yet may be made appear by means of others more known and obvious, whence it follows as an unavoidable conſequence.

II. From what has been ſaid, it appears, that reaſoning is employed only about demonſtrable propoſitions, and that our intuitive and ſelf-evident perceptions are the ultimate foundation on which it reſts.

III. Self-evident propoſitions furniſh the firſt principles of reaſoning: and it is certain, that if in our reſearches we employ only ſuch principles as have this character of ſelf-evidence, and apply them according to the rules to be afterwards explained, we ſhall be in no danger of error in advancing from one diſcovery to another. For this we may appeal to the writings of the mathematicians, which being conducted by the expreſs model here mentioned, are an inconteſtable proof of the firmneſs and ſtability of human knowledge, when built upon ſo ſure a foundation. For not only have the propoſitions of this ſcience ſtood the teſt of ages; but are found attended with that invincible evidence, as forces the aſſent of all who duly conſider the proofs upon which they are eſtabliſhed. Since the mathematicians are univerſally allowed to have hit upon the right method of arriving at unknown truths, ſince they have been the happieſt in the choice as well as the application of their principles, it may not be amiſs to explain here their method of ſtating ſelf-evident propoſitions, and applying them to the purpoſes of demonſtration.

IV. Firſt then it is to be obſerved, that they have been very careful in aſcertaining their ideas, and fixing the ſignification of their terms. For this purpoſe they begin with *definitions*, in which the meaning of their words is ſo diſtinctly explained, that they cannot fail to excite in the mind of an attentive reader the very ſame ideas as are annexed to them by the writer. And indeed the clearneſs and irreſiſtible evidence of mathematical knowledge is owing to nothing ſo much as this care in laying the foundation. Where the relation between any two ideas is accurately and juſtly traced, it will not be difficult for another to comprehend that relation, if in ſetting himſelf to diſcover it he brings the very ſame ideas into compariſon. But if, on the contrary, he affixes to his words ideas different from thoſe that were in the mind of him who firſt advanced the demonſtration; it is evident, that as the ſame ideas are not compared, the ſame relation cannot ſubſiſt, inſomuch that a propoſition will be rejected as falſe, which, had the terms been rightly underſtood, muſt have appeared inconteſtably true. A ſquare, for inſtance, is a figure bounded by four equal right lines, joined together at right angles. Here the nature of the angles makes no leſs a part of the idea than the equality of the ſides; and many properties demonſtrated of the ſquare flow entirely from its being a rectangular figure. If therefore we ſuppoſe a man, who has formed a partial notion of a ſquare, comprehending only the equality of its ſides, without regard to the angles, reading ſome demonſtration that implies alſo this latter conſideration; it is plain he would reject it as not univerſally true, inaſmuch as it could not be applied where the ſides were joined together at equal angles. For this laſt figure, anſwering ſtill to his idea of a ſquare, would be yet found without the property aſſigned to it in the propoſition. But if he comes afterwards to correct his notion, and render his idea complete, he will then readily own the truth and juſtneſs of the demonſtration.

V. We ſee, therefore, that nothing contributes ſo much to the improvement and certainty of human knowledge, as the having determinate ideas, and keeping them ſteady and invariable in all our diſcourſes and reaſonings about them. And on this account it is, that mathematicians, as was before obſerved, always begin by defining their terms, and diſtinctly unfolding the notions they are intended to expreſs. Hence, ſuch as apply themſelves to theſe ſtudies have exactly the ſame views of things; and, bringing always the very ſame ideas into compariſon, readily diſcern the relations between them. It is likewiſe of importance, in every demonſtration, to expreſs the ſame *idea* invariably by the ſame word. From this practice mathematicians never deviate; and if it be neceſſary in their demonſtrations, where the reader's comprehenſion

is *aided* by a diagram, it is much more ſo in all reaſonings about moral or intellectual truths, where the ideas cannot be repreſented by a diagram. The obſervation of this rule may ſometimes be productive of ill-founding periods; but when *truth* is the object, *ſound* ought to be deſpiſed.

VI. When the mathematicians have taken this firſt ſtep, and made known the ideas whoſe relations they intend to inveſtigate; their next care is to lay down ſome ſelf-evident truths, which may ſerve as a foundation for their future reaſonings. And here indeed they proceed with remarkable circumſpection, admitting no principles but what flow immediately from their definitions, and neceſſarily force themſelves upon a mind in any degree attentive to its ideas. Thus a *circle* is a figure formed by a right line moving round ſome fixed point in the ſame plane. The fixed point round which the line is ſuppoſed to move, and where one of its extremities terminates, is called the *centre* of the circle. The other extremity, which is conceived to be carried round until it returns to the point whence it firſt ſet out, deſcribes a curve running into itſelf, and termed the *circumference*. All right lines drawn from the centre to the circumference are called *radii*. From theſe definitions compared, geometricians derive this ſelf-evident truth; *that the radii of the ſame circle are all equal to one another*.

VII. We now obſerve, that in all propoſitions we either affirm or deny ſome property of the idea that conſtitutes the ſubject of our judgment, or we maintain that ſomething may be done or effected. The firſt ſort are called *ſpeculative* propoſitions, as in the example mentioned above, the *radii of the ſame circle are all equal to one another*. The others are called *practical*, for a reaſon too obvious to be mentioned: thus, *that a right line may be drawn from one point to another* is a practical propoſition; inaſmuch as it expreſſes that ſomething may be done.

VIII. From this two-fold conſideration of propoſitions ariſes the twofold diviſion of mathematical principles into axioms and poſtulates. By an *axiom* they underſtand any ſelf-evident ſpeculative truth; as, *That the whole is greater than its parts: That things equal to one and the ſame thing are equal to one another*. But a ſelf-evident practical propoſition is what they call a *poſtulate*. Such are thoſe of Euclid; *that a finite right line may be continued directly forwards; that a circle may be deſcribed about any centre with any diſtance*. And here we are to obſerve, that as in an axiom the agreement or diſagreement between the ſubject and predicate muſt come under the immediate inſpection of the mind; ſo in a poſtulate, not only the poſſibility of the thing aſſerted muſt be evident at firſt view, but alſo the manner in which it may be effected. For where this manner is not of itſelf apparent, the propoſition comes under the notion of the demonſtrable kind, and is treated as ſuch by geometrical writers. Thus, *to draw a right line from one point to another*, is aſſumed by Euclid as a poſtulate, becauſe the manner of doing it is ſo obvious, as to require no previous teaching. But then it is not equally evident, how we are to conſtruct an equilateral triangle. For this reaſon he advances it as a demonſtrable propoſition, lays down rules for the exact performance, and at the ſame time proves, that if theſe rules are followed, the figure will be juſtly deſcribed.

IX. This leads us to take notice, that as ſelf-evident truths are diſtinguiſhed into different kinds, according as they are ſpeculative or practical; ſo is it alſo with demonſtrable propoſitions. A demonſtrable ſpeculative propoſition is by mathematicians called a *theorem*. Such is the famous 47th propoſition of the firſt book of the Elements, known by the name of the *Pythagoric theorem*, from its ſuppoſed inventor Pythagoras, viz. "that in every right-angled triangle, the ſquare deſcribed upon the ſide ſubtending the right-angle is equal to both the ſquares deſcribed upon the ſides containing the right-angle." On the other hand, a demonſtrable practical propoſition is called a *problem*; as where Euclid teaches us to deſcribe a ſquare upon a given right-line.

X. It may not be amiſs to add, that, beſides the four kinds of propoſitions already mentioned, mathematicians have alſo a fifth, known by the name of *corollaries*. Theſe are uſually ſubjoined to theorems or problems, and differ from them only in this; that they flow from what is there demonſtrated in ſo obvious a manner as to diſcover their dependence upon the propoſition whence they are deduced, almoſt as ſoon as propoſed. Thus Euclid having demonſtrated, "that in every right-lined triangle all the three angles taken together are equal to two right-angles;" adds by way of corollary, "that all the three angles of any one triangle taken together are equal to all the three angles of any other triangle taken together:" which is evident at firſt ſight; becauſe in all caſes they are equal to two right ones, and things equal to one and the ſame thing are equal to one another.

XI. The ſcholia of mathematicians are indifferently annexed to definitions, propoſitions, or corollaries; and anſwer the ſame purpoſes as annotations upon a claſſic author. For in them occaſion is taken to explain whatever may appear intricate and obſcure in a train of reaſoning; to anſwer objections; to teach the application and uſes of propoſitions; to lay open the original and hiſtory of the ſeveral diſcoveries made in the ſcience; and, in a word, to acquaint us with all ſuch particulars as deſerve to be known, whether conſidered as points of curioſity or profit.

PART III. OF REASONING.

CHAP. I. *Of Reaſoning in general, and the Parts of which it conſiſts.*

IT often happens in comparing ideas together, that their agreement or diſagreement cannot be diſcerned at firſt view, eſpecially if they are of ſuch a nature as not to admit of an exact application one to another. When, for inſtance, we compare two figures of a different make, in order to judge of their equality or inequality, it is plain, that by barely conſidering the figures themſelves, we cannot arrive at an exact determination; becauſe, by reaſon of their diſagreeing forms, it is impoſſible ſo to put them together, as that their ſeveral parts ſhall mutually coincide. Here then it becomes neceſſary to look out for ſome third idea that will admit of ſuch an application as the preſent caſe requires; wherein if we ſucceed, all difficulties vaniſh, and the relation we are in queſt of may be traced with eaſe. Thus right-lined figures are all reduced to ſquares, by means of which we can meaſure their areas, and determine exactly their agreement or diſagreement in point of magnitude.

But how can any third idea ſerve to diſcover a relation between two others? The anſwer is, By being compared ſeverally with theſe others; for ſuch a compariſon enables us to ſee how far the ideas with which this third is compared are connected or diſjoined between themſelves. In the example mentioned above of two right-lined figures, if we compare each of them with ſome ſquare whoſe area is known, and find

the one exactly equal to it, and the other leſs by a ſquare inch, we immediately conclude that the area of the firſt figure is a ſquare inch greater than that of the ſecond. This manner of determining the relation between any two ideas, by the intervention of ſome third with which they may be compared, is that which we call *reaſoning*; and is indeed the chief inſtrument by which we puſh on our diſcoveries, and enlarge our knowledge. The great art lies in finding out ſuch intermediate ideas, as, when compared with the others in the queſtion, will furniſh evident and known truths; becauſe, as will afterwards appear, it is only by means of them that we arrive at the knowledge of what is hidden and remote.

III. Hence it appears, that every act of reaſoning neceſſarily includes three diſtinct judgments; two wherein the ideas whoſe relation we want to diſcover are ſeverally compared with the middle idea, and a third wherein they are themſelves connected or diſjoined, according to the reſult of that compariſon. Now, as in the ſecond part of logic our judgments, when put into words, were called propoſitions, ſo here in the third part the expreſſions of our reaſonings are termed *ſyllogiſms*. And hence it follows, that as every act of reaſoning implies three ſeveral judgments, ſo every ſyllogiſm muſt include three diſtinct propoſitions. When a reaſoning is thus put into words, and appears in form of a ſyllogiſm, the intermediate idea made uſe of, to diſcover the agreement or diſagreement we ſearch for, is called the *middle term*; and the two ideas themſelves, with which this third is compared, go by the name of the *extremes*.

IV. But as theſe things are beſt illuſtrated by examples, let us, for inſtance, ſet ourſelves to inquire *whether men are accountable for their actions*. As the relation between the ideas of *man* and *accountableneſs* comes not within the immediate view of the mind, our firſt care muſt be to find out ſome third idea that will enable us the more eaſily to diſcover and trace it. A very ſmall meaſure of reflection is ſufficient to inform us, that no creature can be accountable for his actions, unleſs we ſuppoſe him capable of diſtinguiſhing the good from the bad; that is, unleſs we ſuppoſe him poſſeſſed of reaſon. Nor is this alone ſufficient. For what would it avail him to know good from bad actions, if he had no freedom of choice, nor could avoid the one and purſue the other? Hence it becomes neceſſary to take in both conſiderations in the preſent caſe. It is at the ſame time equally apparent, that wherever there is this ability of diſtinguiſhing good from bad actions, and of purſuing the one and avoiding the other, there alſo a creature is accountable. We have then got a third idea, with which *accountableneſs* is inſeparably connected, viz. *reaſon and liberty*; which are here to be conſidered as making up one complex conception. Let us now take this middle idea, and compare it with the other term in the queſtion, viz. *man*, and we all know by experience that it may be affirmed of him. Having thus by means of the intermediate idea formed two ſeveral judgments, viz. *that man is poſſeſſed of reaſon and liberty*; and *that reaſon and liberty imply accountableneſs*; a third obviouſly and neceſſarily follows, viz. *that man is accountable for his actions*. Here then we have a complete act of reaſoning, in which, according to what has been already obſerved, there are three diſtinct judgments; two that may be ſtyled previous, inaſmuch as they lead to the other, and ariſe from comparing the middle idea with the two ideas in the queſtion: the third is a conſequence of theſe previous acts, and flows from combining the extreme ideas between themſelves. If now we put this reaſoning into words, it exhibits what logicians term a ſyllogiſm; and, when propoſed in due form, runs thus:

"Every creature poſſeſſed of reaſon and liberty is accountable for his actions.

"Man is a creature poſſeſſed of reaſon and liberty: Therefore man is accountable for his actions."

V. In this ſyllogiſm we may obſerve, that there are three ſeveral propoſitions expreſſing the three judgments implied in the act of reaſoning; and ſo diſpoſed, as to repreſent diſtinctly what paſſes within the mind in tracing the more diſtant relations of its ideas. The two firſt propoſitions anſwer the two previous judgments in reaſoning, and are called the *premiſes*, becauſe they are placed before the other. The third is termed the *concluſion*, as being gained in conſequence of what was aſſerted in the premiſes. We are alſo to remember, that the terms expreſſing the two ideas whoſe relations we enquire after, as here *man* and *accountableneſs*, are in general called the *extremes*; and that the intermediate idea, by means of which the relation is traced, viz. *a creature poſſeſſed of reaſon and liberty*, takes the name of the *middle term*. Hence it follows, that by the *premiſes* of a ſyllogiſm we are always to underſtand the two propoſitions where the middle term is ſeverally compared with the *extremes*; for theſe conſtitute the previous judgments, whence the truth we are in queſt of is by reaſoning deduced. The *concluſion* is that other propoſition, in which the *extremes* themſelves are joined or ſeparated agreeably to what appears upon the above compariſon.

VI. The concluſion is made up of the extreme terms of the ſyllogiſm: and the extreme, which ſerves as the predicate of the concluſion, goes by the name of the *major term*: the other extreme, which makes the ſubject in the ſame propoſition, is called the *minor term*. From this diſtinction of the extremes ariſes alſo a diſtinction between the premiſes, where theſe extremes are ſeverally compared with the middle term. That propoſition which compares the greater extreme, or the predicate of the concluſion, with the middle term, is called the *major propoſition*: the other, wherein the ſame middle term is compared with the ſubject of the concluſion or leſſer extreme, is called the *minor propoſition*. All this is obvious from the ſyllogiſm already given, where the concluſion is, *Man is accountable for his actions*. For here the predicate *accountable for his actions*, being connected with the middle term in the firſt of the two premiſes, *every creature poſſeſſed of reaſon and liberty is accountable for his actions*, gives what we call the *major propoſition*. In the ſecond of the premiſes, *man is a creature poſſeſſed of reaſon and liberty*, we find the leſſer extreme, or ſubject of the concluſion, viz. *man*, connected with the ſame middle term, whence it is known to be the *minor propoſition*. When a ſyllogiſm is propoſed in due form, the major propoſition is always placed firſt, the minor next, and the concluſion laſt.

VII. Theſe things premiſed, we may in the general define reaſoning to be an act or operation of the mind, deducing ſome unknown propoſition from other previous ones that are evident and known. Theſe previous propoſitions, in a ſimple act of reaſoning, are only two in number; and it is always required that they be of themſelves apparent to the underſtanding, inſomuch that we aſſent to and perceive the truth of them as ſoon as propoſed. In the ſyllogiſm given above, the premiſes are ſuppoſed to be ſelf-evident truths; otherwiſe the concluſion could not be inferred by a ſingle act of reaſoning. If, for inſtance, in the major, *every creature poſſeſſed of reaſon and liberty is accountable for his actions*, the connection between the ſubject and predicate could not be perceived by a bare attention to the ideas themſelves; it is evident that this propoſition would no leſs require a proof than the concluſion deduced from it. In this caſe a new middle term muſt be ſought for, to trace the connection here ſuppoſed; and this of courſe furniſhes another

ſyllogiſm, by which having eſtabliſhed the propoſition in queſtion, we are then, and not before, at liberty to uſe it in any ſucceeding train of reaſoning. And ſhould it ſo happen, that in this ſecond eſſay there was ſtill ſome previous propoſition whoſe truth did not appear at firſt ſight, we muſt then have recourſe to a third ſyllogiſm, in order to lay open that truth to the mind: becauſe, ſo long as the premiſes remain uncertain, the concluſion built upon them muſt be ſo too. When, by conducting our thoughts in this manner, we at laſt arrive at ſome ſyllogiſm where the previous propoſitions are intuitive truths; the mind then reſts in full ſecurity, as perceiving that the ſeveral concluſions it has paſſed through ſtand upon the immoveable foundation of ſelf-evidence, and when traced to their ſource terminate in it.

VIII. We ſee, therefore, that in order to infer a concluſion by a ſingle act of reaſoning, the premiſes muſt be intuitive propoſitions. Where they are not, previous ſyllogiſms are required; in which caſe reaſoning becomes a complicated act, taking in a variety of ſucceſſive ſteps. This frequently happens in tracing the more remote relation of our ideas; where, many middle terms being called in, the concluſion cannot be made out but in conſequence of a ſeries of ſyllogiſms following one another in train. But although in this concatenation of propoſitions, thoſe that form the premiſes of the laſt ſyllogiſm are often conſiderably removed from ſelf-evidence; yet if we trace the reaſoning backwards, we ſhall find them the concluſions of previous ſyllogiſms, whoſe premiſes approach nearer and nearer to intuition in proportion as we advance, and are found at laſt to terminate in it. And if, after having thus unravelled a demonſtration, we take it the contrary way; and obſerve how the mind, ſetting out with intuitive perceptions, couples them together to form a concluſion: how, by introducing this concluſion into another ſyllogiſm, it ſtill advances one ſtep farther; and ſo proceeds, making every new diſcovery ſubſervient to its future progreſs; we ſhall then perceive clearly, that reaſoning, in the higheſt ſenſe of that faculty, is no more than an orderly combination of thoſe ſimple acts which we have already ſo fully explained.

IX. Thus we ſee, that reaſoning, beginning with firſt principles, riſes gradually from one judgement to another, and connects them in ſuch manner, that every ſtage of the progreſſion brings intuitive certainty along with it. And now at length we may clearly underſtand the definition given above of this diſtinguiſhing faculty of the human mind. Reaſon, we have ſaid, is the ability of deducing unknown truths from principles or propoſitions that are already known. This evidently appears by the foregoing account, where we ſee that no propoſition is admitted into a ſyllogiſm, to ſerve as one of the previous judgments on which the concluſion reſts, unleſs it is itſelf a known and eſtabliſhed truth, whoſe connection with ſelf-evident principles has been already traced.

Chap. II. *Of the ſeveral Kinds of Reaſoning: and firſt, of that by which we determine the Genera and Species of Things.*

I. All the aims of human reaſon may in the general be reduced to theſe two: 1. To rank things under thoſe univerſal ideas to which they truly belong; and, 2. To aſcribe to them their ſeveral attributes and properties in conſequence of that diſtribution.

II. One great aim of human reaſon is to determine the genera and ſpecies of things. We have ſeen in the firſt part of this treatiſe, how the mind proceeds in framing general ideas. We have alſo ſeen in the ſecond part, how by means of theſe general ideas we come by univerſal propoſitions. Now as in theſe univerſal propoſitions we affirm ſome property of a genus or ſpecies, it is plain that we cannot apply this property to particular objects till we have firſt determined whether they are comprehended under that general idea of which the property is affirmed. Thus there are certain properties belonging to all *even* numbers, which nevertheleſs cannot be applied to any particular number, until we have firſt diſcovered it to be of the ſpecies expreſſed by that natural name. Hence reaſoning begins with referring things to their ſeveral diviſions and claſſes in the ſcale of our ideas; and as theſe diviſions are all diſtinguiſhed by particular names, we hereby learn to apply the terms expreſſing general conceptions to ſuch particular objects as come under our immediate obſervation.

III. Now, in order to arrive at theſe concluſions, by which the ſeveral objects of perception are brought under general names, two things are manifeſtly neceſſary. Firſt, that we take a view of the idea itſelf denoted by that general name, and carefully attend to the diſtinguiſhing marks which ſerve to characterize it. Secondly, that we compare this idea with the object under conſideration, obſerving diligently wherein they agree or differ. If the idea is found to correſpond with the particular object, we then without heſitation apply the general name; but if no ſuch correſpondence intervenes, the concluſion muſt neceſſarily take a contrary turn. Let us, for inſtance, take the number *eight*, and conſider by what ſteps we are led to pronounce it an *even* number. Firſt then, we call to mind the idea ſignified by the expreſſion *an even number*, viz. that it is a number diviſible into two equal parts. We then compare this idea with the number *eight*, and, finding them manifeſtly to agree, ſee at once the neceſſity of admitting the concluſion. Theſe ſeveral judgments therefore transferred into language, and reduced to the form of a ſyllogiſm, appear thus:

"Every number that may be divided into two equal parts is "an *even* number:

"The number eight may be divided into two equal parts;

"Therefore the number *eight* is an *even* number."

IV. Here it may be obſerved, that where the general idea, to which particular objects are referred, is very familiar to the mind, and frequently in view; this reference, and the application of the general name, ſeem to be made without any apparatus of reaſoning. When we ſee a horſe in the fields, or a dog in the ſtreet, we readily apply the name of the ſpecies; habit, and a familiar acquaintance with the general idea, ſuggeſting it inſtantaneouſly to the mind. We are not however to imagine on this account that the underſtanding departs from the uſual rules of juſt thinking. A frequent repetition of acts begets a habit; and habits are attended with a certain promptneſs of execution, that prevents our obſerving the ſeveral ſteps and gradations by which any courſe of action is accompliſhed. But in other inſtances, where we judge not by precontracted habits, as when the general idea is very complex, or leſs familiar to the mind, we always proceed according to the form of reaſoning eſtabliſhed above. A goldſmith, for inſtance, who is in doubt as to any piece of metal, whether it be of the ſpecies called *gold*, firſt examines its properties, and then comparing them with the general idea ſignified by that name, if he finds a perfect correſpondence, no longer heſitates under what claſs of metals to rank it.

V. Nor let it be imagined that our reſearches here, becauſe in appearance bounded to the impoſing of general names upon particular objects, are therefore trivial and of little conſequence. Some of the moſt conſiderable debates among mankind, and ſuch too as nearly regard their lives, intereſt, and happineſs, turn wholly upon this article. Is it not the chief employment of our ſeveral courts of judicature to determine in particular inſtances, what is law, juſtice, and equity? Of what importance is it in many caſes to decide aright whether an action ſhall be termed *murder* or *manſlaughter*? We ſee then that no leſs than

the lives and fortunes of men depend often upon theſe deciſions. The reaſon is plain. Actions, when once referred to a general idea, draw after them all that may be affirmed of that idea; inſomuch that the determining the ſpecies of actions is all one with determining what proportion of praiſe or diſpraiſe, commendation or blame, *&c.* ought to follow them. For as it is allowed that murder deſerves death; by bringing any particular action under the head of murder, we of courſe decide the puniſhment due to it.

VI. But the great importance of this branch of reaſoning, and the neceſſity of care and circumſpection in referring particular objects to general ideas, is ſtill farther evident from the practice of the mathematicians. Every one who has read Euclid knows, that he frequently requires us to draw lines through certain points, and according to ſuch and ſuch directions. The figures thence reſulting are often ſquares, parallelograms, or rectangles. Yet Euclid never ſuppoſes this from their bare appearance, but always demonſtrates it upon the ſtricteſt principles of geometry. Nor is the method he takes in any thing different from that deſcribed above. Thus, for inſtance, having defined a ſquare to be a figure bounded by four equal ſides joined together at right angles; when ſuch a figure ariſes in any conſtruction previous to the demonſtration of a propoſition, yet he never calls it by that name until he has ſhown that its ſides are equal, and all its angles right ones. Now this is apparently the ſame form of reaſoning we have before exhibited in proving *eight* to be an even number.

VII. Having thus explained the rules by which we are to conduct ourſelves in ranking particular objects under general ideas, and ſhown their conformity to the practice and manner of the mathematicians; it remains only to obſerve, that the true way of rendering this part of knowledge both eaſy and certain, is, by habituating ourſelves to clear and determinate ideas, and keeping them ſteadily annexed to their reſpective names. For, as all our aim is to apply general words aright, if theſe words ſtand for invariable ideas that are perfectly known to the mind, and can be readily diſtinguiſhed upon occaſion, there will be little danger of miſtake or error in our reaſonings. Let us ſuppoſe that, by examining any object, and carrying our attention ſucceſſively from one part to another, we have acquainted ourſelves with the ſeveral particulars obſervable in it. If among theſe we find ſuch as conſtitute ſome general idea, framed and ſettled before hand by the underſtanding, and diſtinguiſhed by a particular name, the reſemblance thus known and perceived neceſſarily determines the ſpecies of the object, and thereby gives it a right to the name by which that ſpecies is called. Thus four equal ſides joined together at right angles, make up the notion of a *ſquare*. As this is a fixed and invariable idea, without which the general name cannot be applied; we never call any particular figure a *ſquare* until it appears to have theſe ſeveral conditions; and contrarily, wherever a figure is found with theſe conditions, it neceſſarily takes the name of a *ſquare*. The ſame will be found to hold in all our other reaſonings of this kind, where nothing can create any difficulty but the want of ſettled ideas. If, for inſtance, we have not determined within ourſelves the preciſe notion denoted by the word *manſlaughter*, it will be impoſſible for us to decide whether any particular action ought to bear that name: becauſe, however nicely we examine the action itſelf, yet, being ſtrangers to the general idea with which it is to be compared, we are utterly unable to judge of their agreement or diſagreement. But if we take care to remove this obſtacle, and diſtinctly trace the two ideas under conſideration, all difficulties vaniſh, and the reſolution becomes both eaſy and certain.

VIII. Thus we ſee of what importance it is towards the improvement and certainty of human knowledge, that we accuſtom ourſelves to clear and determinate ideas, and a ſteady application of words.

Chap. III. *Of Reaſoning, as it regards the Powers and Properties of Things, and the Relations of our general Ideas.*

I. We now come to the ſecond great end which men have in view in their reaſoning; namely, the diſcovering and aſcribing to things their ſeveral attributes and properties. And here it will be neceſſary to diſtinguiſh between reaſoning, as it regards the ſciences, and as it concerns common life. In the ſciences, our reaſon is employed chiefly about univerſal truths, it being by them alone that the bounds of human knowledge are enlarged. Hence the diviſion of things into various claſſes, called otherwiſe *genera* and *ſpecies*. For theſe univerſal ideas being ſet up as the repreſentatives of many particular things, whatever is affirmed of them may be alſo affirmed of all the individuals to which they belong. *Murder*, for inſtance, is a general idea, repreſenting a certain ſpecies of human actions. Reaſon tells us that the puniſhment due to it is *death*. Hence every particular action, coming under the notion of *murder*, has the puniſhment of *death* allotted to it. Here then we apply the general truth to ſome obvious inſtance; and this is what properly conſtitutes the reaſoning of common life. For men, in their ordinary tranſactions and intercourſe one with another, have, for the moſt part, to do only with particular objects. Our friends and relations, their characters and behaviour, the conſtitution of the ſeveral bodies that ſurround us, and the uſes to which they may be applied, are what chiefly engage our attention. In all theſe, we reaſon about particular things; and the whole reſult of our reaſoning is, the applying the general truths of the ſciences in the ordinary tranſactions of human life. When we ſee a viper we avoid it. Wherever we have occaſion for the forcible action of water to move a body that makes conſiderable reſiſtance, we take care to convey it in ſuch a manner that it ſhall fall upon the object with impetuoſity. Now all this happens in conſequence of our familiar and ready application of theſe two general truths. *The bite of a viper is mortal. Water, falling upon a body with impetuoſity, acts very forcibly towards ſetting it in motion.* In like manner, if we ſet ourſelves to conſider any particular character, in order to determine the ſhare of praiſe or diſpraiſe that belongs to it, our great concern is to aſcertain exactly the proportion of virtue and vice. The reaſon is obvious. A juſt determination, in all caſes of this kind, depends entirely upon an application of theſe general maxims of morality: *Virtuous actions deſerve praiſe; vicious actions deſerve blame.*

II. Hence it appears that reaſoning, as it regards common life, is no more than the aſcribing the general properties of things to thoſe ſeveral objects with which we are more immediately concerned, according as they are found to be of that particular diviſion or claſs to which the properties belong. The ſteps then by which we proceed are manifeſtly theſe: Firſt, we refer the object under conſideration to ſome general idea or claſs of things. We then recollect the ſeveral attributes of that general idea. And, laſtly, aſcribe all thoſe attributes to the preſent object. Thus, in conſidering the character of *Sempronius*, if we find it to be of the kind called *virtuous*, when we at the ſame time reflect that a virtuous character is deſerving of eſteem, it naturally and obviouſly follows that Sempronius is ſo too. Theſe thoughts put into a *ſyllogiſm*, in order to exhibit the form of reaſoning here required, run thus:

"Every virtuous man is worthy of eſteem.
"*Sempronius* is a virtuous man:
"Therefore *Sempronius* is worthy of eſteem."

III. By this *ſyllogiſm* it appears, that before we affirm any thing of a particular object, that object muſt be referred to

ſome general idea. Sempronius is pronounced worthy of eſteem only in conſequence of his being a virtuous man, or coming under that general notion. Hence we ſee the neceſſary connection of the various parts of reaſoning, and the dependence they have one upon another. The determining the genera and ſpecies of things is, as we have ſaid, one exerciſe of human reaſon; and here we find that this exerciſe is the firſt in order, and previous to the other, which conſiſts in aſcribing to them their powers, properties, and relations. But when we have taken this previous ſtep, and brought particular objects under general names; as the properties we aſcribe to them are no other than thoſe of the general idea, it is plain that, in order to a ſucceſsful progreſs in this part of knowledge, we muſt thoroughly acquaint ourſelves with the ſeveral relations and attributes of theſe our general ideas. When this is done, the other part will be eaſy, and requires ſcarce any labour or thought, as being no more than an application of the general form of reaſoning repreſented in the foregoing ſyllogiſm. Now, as we have already ſufficiently ſhown how we are to proceed in determining the genera and ſpecies of things, which, as we have ſaid, is the previous ſtep to this ſecond branch of human knowledge; all that is farther wanting towards a due explanation of it is, to offer ſome conſiderations as to the manner of inveſtigating the general relations of our ideas. This is the higheſt exerciſe of the powers of the underſtanding, and that by means whereof we arrive at the diſcovery of univerſal truths; inſomuch that our deductions in this way conſtitute that particular ſpecies of reaſoning which we have before ſaid regards principally the ſciences.

IV. But that we may conduct our thoughts with ſome order and method, we ſhall begin with obſerving, that the relations of our general ideas are of two kinds: either ſuch as immediately diſcover themſelves, upon comparing the ideas one with another; or ſuch as, being more remote and diſtant, require art and contrivance to bring them into view. The relations of the firſt kind furniſh us with intuitive and ſelf-evident truths: thoſe of the ſecond are traced by reaſoning, and a due application of intermediate ideas. It is of this laſt kind that we are to ſpeak here, having diſpatched what was neceſſary with regard to the other in the Second Part. As, therefore, in tracing the more diſtant relations of things, we muſt always have recourſe to intervening ideas, and are more or leſs ſucceſsful in our reſearches according to our acquaintance with theſe ideas, and ability of applying them; it is evident that, to make a good reaſoner, two things are principally required. *Firſt*, An extenſive knowledge of thoſe intermediate ideas, by means of which things may be compared one with another. *Secondly*, The ſkill and talent of applying them happily in all particular inſtances that come under conſideration.

V. In order to our ſucceſsful progreſs in reaſoning, we muſt have an extenſive knowledge of thoſe intermediate ideas by means of which things may be compared one with another. For, as it is not every idea that will anſwer the purpoſe of our inquiries, but ſuch only as are peculiarly related to the objects about which we reaſon, ſo as, by a compariſon with them, to furniſh evident and known truths; nothing is more apparent than that the greater variety of conceptions we can call into view, the more likely we are to find ſome among them that will help us to the truths here required. And, indeed, it is found to hold in experience, that in proportion as we enlarge our views of things, and grow acquainted with a multitude of different objects, the reaſoning faculty gathers ſtrength: for, by extending our ſphere of knowledge, the mind acquires a certain force and penetration, as being accuſtomed to examine the ſeveral appearances of its ideas, and obſerve what light they caſt one upon another.

VI. This is the reaſon why, in order to excel remarkably in any one branch of learning, it is neceſſary to have at leaſt a general acquaintance with the whole circle of arts and ſciences. The truth of it is, all the various diviſions of human knowledge are very nearly related among themſelves, and, in innumerable inſtances, ſerve to illuſtrate and ſet off each other. And although it is not to be denied that, by an obſtinate application to one branch of ſtudy, a man may make conſiderable progreſs, and acquire ſome degree of eminence in it; yet his views will be always narrow and contracted, and he will want that maſterly diſcernment which not only enables us to purſue our diſcoveries with eaſe, but alſo, in laying them open to others, to ſpread a certain brightneſs around them. But when our reaſoning regards a particular ſcience, it is farther neceſſary that we more nearly acquaint ourſelves with whatever relates to that ſcience. A general knowledge is a good preparation, and enables us to proceed with eaſe and expedition in whatever branch of learning we apply to. But then, in the minute and intricate queſtions of any ſcience, we are by no means qualified to reaſon with advantage until we have perfectly maſtered the ſcience to which they belong.

VII. We come now to the ſecond thing required, in order to a ſucceſsful progreſs in reaſoning; namely, the ſkill and talent of applying intermediate ideas happily in all particular inſtances that come under conſideration. And here, rules and precepts are of little ſervice. Uſe and experience are the beſt inſtructors. For, whatever logicians may boaſt of being able to form perfect reaſoners by book and rule, we find by experience, that the ſtudy of their precepts does not always add any great degree of ſtrength to the underſtanding. In ſhort, it is the habit alone of reaſoning that makes a reaſoner. And therefore the true way to acquire this talent is, by being much converſant in thoſe ſciences where the art of reaſoning is allowed to reign in the greateſt perfection. Hence it was that the ancients, who ſo well underſtood the manner of forming the mind, always began with *mathematics*, as the foundation of their philoſophical ſtudies. Here the underſtanding is by degrees habituated to truth, contracts inſenſibly a certain fondneſs for it, and learns never to yield its aſſent to any propoſition but where the evidence is ſufficient to produce full conviction. For this reaſon *Plato* has called mathematical demonſtrations the *cathartics* or purgatives of the ſoul, as being the proper means to cleanſe it from error, and reſtore that natural exerciſe of its faculties in which juſt thinking conſiſts.

VIII. If therefore we would form our minds to a habit of reaſoning cloſely and in train, we cannot take any more certain method than the exerciſing ourſelves in mathematical demonſtrations, ſo as to contract a kind of familiarity with them. Not that we look upon it as neceſſary that all men ſhould be deep mathematicians; but that, having got the way of reaſoning which that ſtudy neceſſarily brings the mind to, they may be able to transfer it to other parts of knowledge, as they ſhall have occaſion.

IX. But although the ſtudy of mathematics be of all others the moſt uſeful to form the mind and give it an early reliſh of truth, yet ought not other parts of philoſophy to be neglected. For there alſo we meet with many opportunities of exerciſing the powers of the underſtanding; and the variety of ſubjects naturally leads us to obſerve all thoſe different turns of thinking that are peculiarly adapted to the ſeveral ideas we examine, and the truth we ſearch after. A mind thus trained acquires a certain maſtery over its own thoughts, inſomuch that it can range and model them at pleaſure, and call ſuch into view as beſt ſuit its preſent deſigns. Now in this the whole art of reaſoning conſiſts; from among a great variety of different ideas to ſingle out thoſe that are moſt proper for the buſineſs in hand,

and to lay them together in ſuch order, that from plain and eaſy beginnings, by gentle degrees, and a continued train of evident truths, we may be inſenſibly led on to ſuch diſcoveries, as at our firſt ſetting out appeared beyond the reach of human underſtanding. For this purpoſe, beſides the ſtudy of mathematics before recommended, we ought to apply ourſelves diligently to the reading of ſuch authors as have diſtinguiſhed themſelves for ſtrength of reaſoning, and a juſt and accurate manner of thinking. For it is obſervable, that a mind exerciſed and ſeaſoned to truth, ſeldom reſts ſatisfied in a bare contemplation of the arguments offered by others; but will be frequently aſſaying its own ſtrength, and purſuing its diſcoveries upon the plan it is moſt accuſtomed to. Thus we inſenſibly contract a habit of tracing truth from one ſtage to another, and of inveſtigating thoſe general relations and properties which we afterwards aſcribe to particular things, according as we find them comprehended under the abſtract ideas to which the properties belong.

Chap. IV. *Of the Forms of Syllogiſms.*

I. Hitherto we have contented ourſelves with a general notion of ſyllogiſms, and of the parts of which they conſiſt. It is now time to enter a little more particularly into the ſubject, to examine their various forms, and lay open the rules of argumentation proper to each. In the ſyllogiſms mentioned in the foregoing chapters, we may obſerve, that the *middle term* is the ſubject of the *major* propoſition, and the predicate of the *minor*. This diſpoſition, though the moſt natural and obvious, is not however neceſſary; it frequently happening, that the middle term is the ſubject in both the premiſes, or the predicate in both; and ſometimes, directly contrary to its diſpoſition in the foregoing chapters, the predicate in the major, and the ſubject in the minor. Hence the diſtinction of ſyllogiſms into various kinds, called *figures* by logicians. For figure, according to their uſe of the word, is nothing elſe but the order and diſpoſition of the middle term in any ſyllogiſm. And as this diſpoſition is, we ſee, fourfold, ſo the figures of ſyllogiſms thence ariſing are four in number. When the middle term is the ſubject of the major propoſition, and the predicate of the minor, we have what is called the *firſt figure:* As,

"No work of God is bad;
"The natural paſſions and appetites of men are the work of God:
"Therefore none of them is bad."

If, on the other hand, it is the predicate of both the premiſes, the ſyllogiſm is ſaid to be the *ſecond figure:* As,

"Whatever is bad is not the work of God:
"All the natural paſſions and appetites of men are the "work of God:
"Therefore the natural paſſions and appetites of men "are not bad."

Again, in the *third figure*, the middle term is the ſubject of the two premiſes: As,

"All Africans are black:
"All Africans are men:
"Therefore ſome men are black."

And laſtly, by making it the predicate of the major, and ſubject of the minor, we obtain ſyllogiſms in the *fourth figure:* As,

"The only being who ought to be worſhipped is the "Creator and Governor of the world:
"The Creator and Governor of the world is God:
"Therefore God is the only being who ought to be wor- "ſhipped."

II. But, beſides this fourfold diſtinction of ſyllogiſms, there is alſo a farther ſubdiviſion of them in every figure, ariſing from the *quantity* and *quality*, as they are called, of the propoſitions. By quantity we mean the conſideration of propoſitions, as univerſal or particular; by quality, as affirmative or negative.

Now as, in all the ſeveral diſpoſitions of the middle term, the propoſitions of which a ſyllogiſm conſiſts may be either univerſal or particular, affirmative or negative; the due determination of theſe, and ſo putting them together as the laws of argumentation require, conſtitute what logicians call the *moods* of ſyllogiſms. Of theſe moods there is a determinate number to every figure, including all the poſſible ways in which propoſitions differing in quantity or quality can be combined, according to any diſpoſition of the middle term, in order to arrive at a juſt concluſion.

The firſt figure has only four legitimate moods. The major propoſition in this figure muſt be univerſal, and the minor affirmative; and it has this property, that it yields concluſions of all kinds, affirmative and negative, univerſal and particular.

The ſecond figure has alſo four legitimate moods. Its major propoſition muſt be univerſal, and one of the premiſes muſt be negative. It yields concluſions both univerſal and particular, but all negative.

The third figure has ſix legitimate moods. Its minor muſt always be affirmative; and it yields concluſions both affirmative and negative; but all particular.—Theſe are all the figures which were admitted by the inventor of ſyllogiſms; and of which, ſo far as we know, the number of legitimate moods has been aſcertained, and ſeverally demonſtrated. In *every figure* it will be found upon trial, that there are *ſixty-four* different moods of ſyllogiſm; and he who thinks it worth while to conſtruct ſo many in the *fourth* figure, always remembering that the *middle term* in each muſt be the *predicate* of the *major* and the *ſubject* of the *minor* propoſition, will eaſily diſcern what number of theſe moods are *legitimate*, and give true concluſions.

Beſides the rules that are proper to each figure, Ariſtotle has given ſome that are common to all, by which the legitimacy of ſyllogiſms may be tried. Theſe may be reduced to five:—
1. There muſt be only *three terms* in a ſyllogiſm: As each term occurs in two of the propoſitions, it muſt be preciſely the *ſame in both*; if it be *not*, the ſyllogiſm is ſaid to have *four terms*, which makes a *vicious* ſyllogiſm. 2. The *middle term* muſt be taken *univerſally* in *one* of the premiſes. 3. Both premiſes muſt *not be particular* propoſitions, nor both *negative*. 4. The *concluſion* muſt be *particular*, if *either* of the *premiſes* be *particular*; and *negative*, if *either* of the *premiſes* be *negative*. 5. No term can be taken *univerſally* in the *concluſion*, if it be *not* taken *univerſally* in the *premiſes*.

For underſtanding the *ſecond* and *fifth* of theſe rules, it is neceſſary to obſerve, that a term is ſaid to be taken *univerſally*, not only when it is the *ſubject* of a *univerſal* propoſition, but alſo when it is the *predicate* of a *negative* propoſition. On the other hand, a term is ſaid to be taken *particularly*, when it is either the *ſubject* of a *particular* or the *predicate* of an *affirmative* propoſition.

III. The diviſion of ſyllogiſms according to mood and figure reſpects thoſe eſpecially which are known by the name of plain ſimple ſyllogiſms; that is, which are bounded to three propoſitions, all ſimple, and where the extremes and middle term are connected, according to the rules laid down above. But as the mind is not tied down to any one preciſe form of reaſoning, but ſometimes makes uſe of more, ſometimes of fewer premiſes, and often takes in compound and conditional propoſitions, it may not be amiſs to take notice of the different forms derived from this ſource, and explain the rules by which the mind conducts itſelf in the uſe of them.

IV. When in any ſyllogiſm the major is a conditional propoſition, the ſyllogiſm itſelf is termed *conditional*. Thus:

"If there is a God he ought to be worſhipped:
"But there is a God:
"Therefore he ought to be worſhipped."

In this example, the major, or firſt propoſition, is, we ſee,

conditional, and therefore the ſyllogiſm itſelf is alſo of the kind called by that name. And here we are to obſerve, that all conditional propoſitions are made of two diſtinct parts: one expreſſing the condition upon which the predicate agrees or diſagrees with the ſubject, as in this now before us, *if there is a God*; the other joining or disjoining the ſaid predicate and ſubject, as here, *he ought to be worſhipped*. The firſt of theſe parts, or that which implies the condition, is called the *antecedent*; the ſecond, where we join or disjoin the predicate and ſubject, has the name of the *conſequent*.

V. In all propoſitions of this kind, ſuppoſing them to be exact in point of form, the relation between the antecedent and conſequent muſt ever be true and real; that is, the antecedent muſt always contain ſome certain and genuine condition, which neceſſarily implies the conſequent; for otherwiſe the propoſition itſelf will be falſe, and therefore ought not to be admitted into our reaſonings. Hence it follows, that when any conditional propoſition is aſſumed, if we admit the antecedent of that propoſition, we muſt at the ſame time neceſſarily admit the conſequent; but if we reject the conſequent, we are in like manner bound to reject the antecedent. For, as the antecedent always expreſſes ſome condition which neceſſarily implies the truth of the conſequent; by admitting the antecedent, we allow of that condition, and therefore ought alſo to admit the conſequent. In like manner, if it appears that the conſequent ought to be rejected, the antecedent evidently muſt be ſo too; becauſe, as was juſt now demonſtrated, the admitting of the antecedent would neceſſarily imply the admiſſion alſo of the conſequent.

VI. There are two ways of arguing in *hypothetical* ſyllogiſms, which lead to a certain and unavoidable concluſion. For as the major is always a conditional propoſition, conſiſting of an antecedent and a conſequent; if the minor admits the antecedent, it is plain that the concluſion muſt admit the conſequent. This is called arguing from the admiſſion of the antecedent to the admiſſion of the conſequent, and conſtitutes that mood or ſpecies of hypothetical ſyllogiſms which is diſtinguiſhed in the ſchools by the name of the *modus ponens*, inaſmuch as by it the whole conditional propoſition, both antecedent and conſequent, is eſtabliſhed. Thus:

" If God is infinitely wiſe, and acts with perfect free-
" dom, he does nothing but what is beſt:
" But God is infinitely wiſe, and acts with perfect freedom:
" Therefore he does nothing but what is beſt."

Here we ſee the antecedent or firſt part of the conditional propoſition is eſtabliſhed in the minor, and the conſequent or ſecond part in the concluſion; whence the ſyllogiſm itſelf is an example of the *modus ponens*. But if now we on the contrary ſuppoſe that the minor rejects the conſequent, then it is apparent that the concluſion muſt alſo reject the antecedent. In this caſe we are ſaid to argue from the removal of the conſequent to the removal of the antecedent, and the particular mood or ſpecies of ſyllogiſms thence ariſing is called by logicians the *modus tollens*; becauſe in it both antecedent and conſequent are rejected or taken away, as appears by the following example:

" If God were not a Being of infinite goodneſs, neither
" would he conſult the happineſs of his creatures:
" But God does conſult the happineſs of his creatures:
" Therefore he is a being of infinite goodneſs."

VII. Theſe two ſpecies take in the whole claſs of conditional ſyllogiſms, and include all the poſſible ways of arguing that lead to a legitimate concluſion; becauſe we cannot here proceed by a contrary proceſs of reaſoning, that is, from the removal of the antecedent to the removal of the conſequent, or from the eſtabliſhing of the conſequent to the eſtabliſhing of the antecedent. For, although the antecedent always expreſſes ſome real condition, which, once admitted, neceſſarily implies the conſequent, yet it does not follow that there is therefore no other condition; and if ſo, then, after removing the antecedent, the conſequent may ſtill hold, becauſe of ſome other determination that infers it. When we ſay, *If a ſtone is expoſed ſome time to the rays of the ſun, it will contract a certain degree of heat*, the propoſition is certainly true; and, admitting the antecedent, we muſt alſo admit the conſequent. But as there are other ways by which a ſtone may gather heat, it will not follow, from the ceaſing of the before-mentioned condition, that therefore the conſequent cannot take place. In other words, we cannot argue: *But the ſtone has not been expoſed to the rays of the ſun; therefore neither has it any degree of heat:* Inaſmuch as there are a great many other ways by which heat might have been communicated to it. And if we cannot argue from the removal of the antecedent to the removal of the conſequent, no more can we from the admiſſion of the conſequent to the admiſſion of the antecedent: becauſe, as the conſequent may flow from a great variety of different ſuppoſitions, the allowing of it does not determine the preciſe ſuppoſition, but only that ſome one of them muſt take place. Thus in the foregoing propoſition, *If a ſtone is expoſed ſome time to the rays of the ſun, it will contract a certain degree of heat*; admitting the conſequent, viz. *that it has contracted a certain degree of heat*, we are not therefore bound to admit the antecedent, *that it has been ſome time expoſed to the rays of the ſun*; becauſe there are many other cauſes whence that heat may have proceeded. Theſe two ways of arguing, therefore, hold not in conditional ſyllogiſms.

VIII. As from the major's being a conditional propoſition, we obtain the ſpecies of conditional ſyllogiſms; ſo, where it is a disjunctive propoſition, the ſyllogiſm to which it belongs is alſo called *disjunctive*, as in the following example:

" The world is either ſelf-exiſtent, or the work of ſome
" finite, or of ſome infinite Being:
" But it is not ſelf-exiſtent, nor the work of a finite being:
" Therefore it is the work of an infinite Being."

Now, a disjunctive propoſition is that, where of ſeveral predicates, we affirm one neceſſarily to belong to the ſubject, to the excluſion of all the reſt, but leave that particular one undetermined. Hence it follows, that as ſoon as we determine the particular predicate, all the reſt are of courſe to be rejected; or, if we reject all the predicates but one, that one neceſſarily takes place. When, therefore, in a disjunctive ſyllogiſm, the ſeveral predicates are enumerated in the major; if the minor eſtabliſhes any one of theſe predicates, the concluſion ought to remove all the reſt; or if, in the minor, all the predicates but one are removed, the concluſion muſt neceſſarily eſtabliſh that one. Thus, in the disjunctive ſyllogiſm given above, the major affirms one of the three predicates to belong to the earth, *viz. ſelf-exiſtence*, or that it is *the work of a finite*, or that it is *the work of an infinite Being*. Two of theſe predicates are removed in the minor, *viz. ſelf-exiſtence*, and *the work of a finite being*. Hence the concluſion neceſſarily aſcribes to it the third predicate, and affirms that it is *the work of an infinite Being*. If now we give the ſyllogiſm another turn, inſomuch that the minor may eſtabliſh one of the predicates, by affirming the earth to be *the production of an infinite Being*: then the concluſion muſt remove the other two, aſſerting it to be neither *ſelf-exiſtent*, nor *the work of a finite being*. Theſe are the forms of reaſoning in theſe ſpecies of ſyllogiſms, the juſtneſs of which appears at firſt ſight: and that there can be no other, is evident from the very nature of a disjunctive propoſition.

IX. In the ſeveral kinds of ſyllogiſms hitherto mentioned, we may obſerve, that the parts are complete; that is, the three propoſitions of which they conſiſt are repreſented in form. But it often happens, that ſome one of the premiſes is not only an evident truth, but alſo familiar and in the minds of all men; in

which caſe it is uſually omitted, whereby we have an imperfect ſyllogiſm, that ſeems to be made up of only two propoſitions. Should we, for inſtance, argue in this manner:

"Every man is mortal:
"Therefore every king is mortal:"

the ſyllogiſm appears to be imperfect, as conſiſting but of two propoſitions. Yet it is really complete; only the minor [*every king is a man*] is omitted; and left to the reader to ſupply, as being a propoſition ſo familiar and evident that it cannot eſcape him.

X. Theſe ſeemingly imperfect ſyllogiſms are called *enthymemes*; and occur very frequently in reaſoning, eſpecially where it makes a part of common converſation. Nay, there is a particular elegance in them, becauſe, not diſplaying the argument in all its parts, they leave ſomewhat to the exerciſe and invention of the mind. By this means we are put upon exerting ourſelves, and ſeem to ſhare in the diſcovery of what is propoſed to us. Now this is the great ſecret of fine writing, ſo to frame and put together our thoughts, as to give full play to the reader's imagination, and draw him inſenſibly into our very views and courſe of reaſoning. This gives a pleaſure not unlike to that which the author himſelf feels in compoſing. It beſides ſhortens diſcourſe, and adds a certain force and livelineſs to our arguments, when the words in which they are conveyed favour the natural quickneſs of the mind in its operations, and a ſingle expreſſion is left to exhibit a whole train of thoughts.

XI. But there is another ſpecies of reaſoning with two propoſitions, which ſeems to be complete in itſelf, and where we admit the concluſion without ſuppoſing any tacit or ſuppreſſed judgment in the mind, from which it follows ſyllogiſtically. This happens between propoſitions, where the connection is ſuch, that the admiſſion of the one neceſſarily, and at the firſt ſight, implies the admiſſion alſo of the other. For, if it ſo falls out that the propoſition on which the other depends is ſelf-evident, we content ourſelves with barely affirming it, and infer that other by a direct concluſion. Thus, by admitting an univerſal propoſition, we are forced alſo to admit of all the particular propoſitions comprehended under it, this being the very condition that conſtitutes a propoſition univerſal. If then that univerſal propoſition chances to be ſelf-evident, the particular ones follow of courſe, without any farther train of reaſoning. Whoever allows, for inſtance, *that things equal to one and the ſame thing are equal to one another*, muſt at the ſame time allow, *that two triangles, each equal to a ſquare whoſe ſide is three inches, are alſo equal between themſelves*. This argument, therefore,

"Things equal to one and the ſame thing, are equal to one
"another:
"Therefore theſe two triangles, each equal to the ſquare of
"a line of three inches, are equal between themſelves;"

is complete in its kind, and contains all that is neceſſary towards a juſt and legitimate concluſion. For the firſt or univerſal propoſition is ſelf-evident, and therefore requires no farther proof. And as the truth of the particular is inſeparably connected with that of the univerſal, it follows from it by an obvious and unavoidable conſequence.

XII. Now, in all caſes of this kind, where propoſitions are deduced one from another, on account of a known and evident connection, we are ſaid to reaſon by immediate conſequence. Such a coherence of propoſitions manifeſt at firſt ſight, and forcing itſelf upon the mind, frequently occurs in reaſoning. Logicians have explained at ſome length the ſeveral ſuppoſitions upon which it takes place; and allow of all immediate conſequences that follow in conformity to them. It is however obſervable, that theſe arguments, though ſeemingly complete, becauſe the concluſion follows neceſſarily from the ſingle propoſition that goes before, may yet be conſidered as real enthymemes, whoſe major, which is a conditional propoſition, is wanting. The ſyllogiſm but juſt mentioned, when repreſented according to this view, will run as follows:

"If things equal to one and the ſame thing are equal to
"one another; theſe two triangles, each equal to a
"ſquare whoſe ſide is three inches, are alſo equal between
"themſelves.
"But things equal to one and the ſame thing are equal to
"one another:
"Therefore alſo theſe triangles, &c. are equal between them-
"ſelves."

This obſervation will be found to hold in all immediate conſequences whatſoever, inſomuch that they are in fact no more than enthymemes of hypothetical ſyllogiſms. But then it is particular to them, that the ground on which the concluſion reſts, namely its coherence with the minor, is of itſelf apparent, and ſeen immediately to flow from the rules and reaſons of logic.

XIII. The next ſpecies of reaſoning we ſhall take notice of here is what is commonly known by the name of a *ſorites*. This is a way of arguing, in which a great number of propoſitions are ſo linked together, that the predicate of one becomes continually the ſubject of the next following, until at laſt a concluſion is formed, by bringing together the ſubject of the firſt propoſition, and the predicate of the laſt. Of this kind is the following argument:

"God is omnipotent:
"An omnipotent Being can do every thing poſſible:
"He that can do every thing poſſible, can do whatever in-
"volves not a contradiction:
"Therefore God can do whatever involves not a contradic-
"tion."

This particular combination of propoſitions may be continued to any length we pleaſe, without in the leaſt weakening the ground upon which the concluſion reſts. The reaſon is, becauſe the ſorites itſelf may be reſolved into as many ſimple ſyllogiſms as there are middle terms in it; where this is found univerſally to hold, that when ſuch a reſolution is made, and the ſyllogiſms are placed in train, the concluſion of the laſt in the ſeries is alſo the concluſion of the ſorites. This kind of argument, therefore, as it ſerves to unite ſeveral ſyllogiſms into one, muſt ſtand upon the ſame foundation with the ſyllogiſms of which it conſiſts, and is indeed, properly ſpeaking, no other than a compendious way of reaſoning ſyllogiſtically.

XIV. What is here ſaid of plain ſimple propoſitions may be as well applied to thoſe that are conditional; that is, any number of them may be ſo joined together in a ſeries, that the conſequent of one ſhall become continually the antecedent of the next following; in which caſe, by eſtabliſhing the antecedent of the firſt propoſition, we eſtabliſh the conſequent of the laſt, or by removing the laſt conſequent remove alſo the firſt antecedent. This way of reaſoning is exemplified in the following argument:

"If we love any perſon, all emotions of hatred towards him
"ceaſe:
"If all emotions of hatred towards a perſon ceaſe, we can-
"not rejoice in his misfortunes:
"If we rejoice not in his misfortunes, we certainly wiſh him
"no injury:
"Therefore, if we love a perſon, we wiſh him no injury."

It is evident that this ſorites, as well as the laſt, may be reſolved into a ſeries of diſtinct ſyllogiſms, with this only difference, that here the ſyllogiſms are all conditional.

XV. The laſt ſpecies of ſyllogiſm we ſhall take notice of in this chapter is that commonly diſtinguiſhed by the name of a *dilemma*. A dilemma is an argument by which we endeavour to prove the abſurdity or falſehood of ſome aſſertion. In or-

der to this, we assume a conditional proposition, the antecedent of which is the assertion to be disproved, and the consequent a disjunctive proposition, enumerating all the possible suppositions upon which that assertion can take place. If then it appears, that all these several suppositions ought to be rejected, it is plain that the antecedent or assertion itself must be so too. When therefore such a proposition as that before mentioned is made the major of any syllogism; if the minor rejects all the suppositions contained in the consequent, it follows necessarily, that the conclusion ought to reject the antecedent, which, as we have said, is the very assertion to be disproved. This particular way of arguing is that which logicians call a *dilemma*; and from the account here given of it, it appears that we may in the general define it to be a hypothetical syllogism, where the consequent of the major is a disjunctive proposition, which is wholly taken away or removed in the minor. Of this kind is the following:

"If God did not create the world perfect in its kind, it must
"either proceed from want of inclination, or from want
"of power:
"But it could not proceed either from want of inclination,
"or from want of power:
"Therefore, he created the world perfect in its kind."

Or, which is the same thing: "It is absurd to say that "he did not create the world perfect in its kind."

XVI. The nature then of a dilemma is universally this. The major is a conditional proposition, whose consequent contains all the several suppositions upon which the antecedent can take place. As therefore these suppositions are wholly removed in the minor, it is evident that the antecedent must be so too; insomuch that we here always argue from the removal of the consequent to the removal of the antecedent. That is, a dilemma is an argument in the *modus tollens* of hypothetical syllogisms, as logicians love to speak. Hence it is plain, that if the antecedent of the major is an affirmative proposition, the conclusion of the dilemma will be negative; but if it is a negative proposition, the conclusion will be affirmative.

Chap. V. *Of Induction.*

I. All reasoning proceeds ultimately from first truths, either self-evident or taken for granted; and the first truths of syllogistic reasonings are *general* propositions. But except in the mathematics, and such other sciences as, being conversant about mere ideas, have no immediate relation to things without the mind, we cannot assume as truths propositions which are general. The mathematician indeed may be considered as taking his ideas from the beginning in their *general* form.—Every *proposition* composed of such ideas is therefore general; and those which are theoretic are reducible to two parts or *terms*, a *predicate* and a *subject*, with a *copula* generally affirmative. If the agreement or the relation between the two terms be not immediate and self-evident, he has recourse to an *axiom*, which is a proposition still *more general*, and which supplies him with a third or *middle term*. This he compares first with the *predicate*, and then with the *subject*, or *vice versa*. These two comparisons, when drawn out in form, make two propositions, which are called the *premises*; and if they happen to be *immediate* and *self-evident*, the *conclusion*, consisting of the terms of the question proposed, is said to be demonstrated. This method of reasoning is conducted exactly in the syllogistic form explained in the preceding chapter.

II. But in sciences which treat of things external to the mind, we cannot assume as *first principles* the most general propositions, and from them infer others less and less general till we descend to particulars. The reason is obvious. Every thing in the universe, whether of mind or body, presents itself to our observation in its individual state; so that *perception* and *judgment* employed in the investigation of truth, whether *physical*, *metaphysical*, *moral*, or *historical*, have in the first place to encounter with particulars. "With these reason begins, or should begin, its operations. It observes, tries, canvasses, examines, and compares them together, and judges of them by some of those native evidences and original lights which, as they are the first and indispensable inlets of knowledge to the mind, have been called the *primary principles of truth*. See Metaphysics.

III. "By such acts of observation and judgment, diligently practised and frequently repeated, on many *individuals* of the same class or of a similar nature, noting their agreements, marking their differences however minute, and rejecting all instances which, however similar in appearance, are not in effect the same, reason, with much labour and attention, extracts some *general laws* respecting the powers, properties, qualities, actions, passions, virtues, and relations of *real things*. This is no hasty, premature, *notional* abstraction of the mind, by which images and ideas are formed that have no archetypes in nature: it is a rational, operative, experimental process, instituted and executed upon the constitution of beings, which in part compose the universe. By this process reason advances from *particulars* to *generals*, from *less general* to *more general*, till by a series of slow progression, and by regular degrees, it arrive at the *most general* notions, called forms or formal causes. And by *affirming* or *denying* a genus of a species, or an accident of a substance or class of substances, through all the stages of the gradation, we form *conclusions*, which, if logically drawn, are axioms, or general propositions ranged one above another, till they terminate in those that are universal.

IV. "Thus for instance, *the evidence of the external senses* is obviously the primary principle from which all physical knowledge is derived. But, whereas nature begins with *causes*, which, after a variety of changes, produce *effects*, the senses open upon the *effects*, and from them, through the slow and painful road of experiment and observation, ascend to *causes*. By *experiments* and *observations* skilfully chosen, artfully conducted, and judiciously applied, the philosopher advances from one stage of inquiry to another in the rational investigation of the *general causes* of physical truth. From different experiments and observations made on the same individual subject, and from the same experiments and observations made on different subjects of the same kind, by comparing and judging, he discovers some *qualities*, *causes*, or *phenomena*, which, after carefully distinguishing and rejecting all contradictory instances that occur, he finds common to *many*. Thus, from many collateral comparisons and judgments formed upon *particulars*, he ascends to *generals*; and by a repetition of the same industrious process and laborious investigation, he advances from *general* to *more general*, till at last he is enabled to form a few of the *most general*, with their attributes and operations, into axioms or *secondary principles*, which are the well-founded *laws* enacted and enforced by the God of nature.—This is that just and philosophic method of reasoning which sound logic prescribes in this as well as in other parts of learning; by which, through the slow but certain road of experiment and observation, the mind ascends from appearances to qualities, from effects to causes, and from experiments upon many particular subjects forms *general propositions* concerning the powers and properties of physical body.

V. "Axioms so investigated and established are applicable to all parts of learning, and are the indispensable, and indeed the wonderful expedients, by which, in every branch of knowledge, reason pushes on its inquiries in the particular pursuit of truth: and the method of reasoning by which they are formed, is that of true and legitimate induction; which is

therefore by Lord Bacon, the beſt and ſoundeſt of logicians, called the *key of interpretation*.

VI. "Inſtead of taking his axioms arbitrarily out of the great families of the categories (ſee CATEGORY), and erecting them by his own ſophiſtical invention into the principles upon which his diſputation was to be employed, had the analytical genius of Ariſtotle preſented us with the laws of the true INDUCTIVE LOGIC, by which AXIOMS are philoſophically formed, and had he with his uſual ſagacity given us an example of it in a ſingle branch of ſcience, he would have brought to the temple of truth an offering more valuable than he has done by the aggregate of all his logical and philoſophical productions.

VII. "In all ſciences, except the mathematics, it is only after the INDUCTIVE proceſs has been induſtriouſly purſued and ſucceſsfully performed, that DEFINITION may be logically and uſefully introduced, by beginning with the *genus*, paſſing through all the graduate and ſubordinate ſtages, and marking the *ſpecific difference* as it deſcends, till it arrive at the *individual*, which is the ſubject of the queſtion. And by adding an *affirmation* or *negation* of the attribute of the *genus* on the *ſpecies* or *individual*, or of a general *accident* on the particular *ſubſtance* ſo defined, making the definition a propoſition, the truth of the queſtion will be logically ſolved without any farther proceſs. So that inſtead of being the *firſt*, as employed by the logic in common uſe, *definition* may be the *laſt* act of reaſon in the ſearch of truth in general.

VIII. "Theſe AXIOMS or general propoſitions, thus *inductively* eſtabliſhed, become another ſpecies of PRINCIPLES, which may properly be called SECONDARY, and which lay the foundation of the ſyllogiſtic method of reaſoning. When theſe are formed, but not before, we may ſafely admit the maxim with which logicians ſet out in the exerciſe of their art, as the great hinge on which their reaſoning and diſputation turn: *From truths that are already known, to derive others which are not known*. Or, to ſtate it more comprehenſively, ſo as to apply to probable as well as to ſcientific reaſoning—*From truths which are better known, to derive others which are leſs known*. Philoſophically ſpeaking, ſyllogiſtic reaſoning is, under *general propoſitions* to reduce others which are *leſs general* or which are *particular*; for the *inferior* ones are known to be true, only as we trace their connection with the *ſuperior*. Logically ſpeaking, it is, To predicate a *genus* of a *ſpecies* or *individual* comprehended under it, or an *accident* of the *ſubſtance* in which it is inherent.

IX. "Thus INDUCTION and SYLLOGISM are the two methods of *direct reaſoning* correſponding to the two kinds of principles, *primary* and *ſecondary*, on which they are founded, and by which they are reſpectively conducted. In both methods, indeed, reaſon proceeds by *judging* and *comparing*, but the proceſs is different throughout; and though it may have the ſanction of Ariſtotle, an *inductive ſyllogiſm* is a ſoleciſm.

X. "Till general truths are aſcertained by induction, the *third* or *middle terms* by which ſyllogiſms are made are no where ſafely to be found. So that another poſition of the Stagyrite, *that ſyllogiſm is naturally prior in order to induction*, is equally unfounded; for *induction* does not only naturally but neceſſarily precede *ſyllogiſm*; and, except in mathematics, is in every reſpect indiſpenſable to its exiſtence; ſince, till generals are eſtabliſhed, there can be neither *definition*, *propoſition*, nor *axiom*, and of courſe no ſyllogiſm. And as induction is the firſt, ſo is it the more *eſſential* and fundamental inſtrument of reaſoning: for, as ſyllogiſm cannot produce its own *principles*, it muſt have them from induction; and if the general propoſitions or ſecondary principles be imperfectly or infirmly eſtabliſhed, and much more if they be taken at hazard, upon authority, or by arbitrary aſſumption like thoſe of Ariſtotle, all the ſyllogiſing in the world is a vain and uſeleſs logomachy, only inſtrumental to the multiplication of falſe learning, and to the invention and confirmation of error. The truth of ſyllogiſms depends ultimately on the truth of axioms, and the truth of axioms on the ſoundneſs of inductions."—But though induction is prior in order, as well as ſuperior in utility, to ſyllogiſm, we have thought it expedient to treat of it laſt; both becauſe ſyllogiſm is an eaſier exerciſe of the reaſoning faculty than induction, and becauſe it is the method of mathematics, the firſt ſcience of reaſon in which the ſtudent is commonly initiated.

CHAP. VI. *Of Demonſtration.*

I. HAVING diſpatched what ſeemed neceſſary to be ſaid with regard to the two methods of direct reaſoning, *induction* and *ſyllogiſm*; we now proceed to conſider the laws of demonſtration. And here it muſt be acknowledged, that in ſtrict demonſtration, which removes from the mind all poſſibility of doubt or error, the inductive method of reaſoning can have no place. When the experiments and obſervations from which the general concluſion is drawn are numerous and extenſive, the reſult of this mode of reaſoning is moral certainty; and could the induction be made complete, it would be abſolute certainty, equally convincing with mathematical demonſtration. But however numerous and extenſive the obſervations and experiments may be upon which an inductive concluſion is eſtabliſhed, they muſt of neceſſity come ſhort of the number and extent of nature; which, in ſome caſes, by its immenſity, will defeat all poſſibility of their co extenſion; and, in others, by its diſtance, lies out of the reach of their immediate application. Though truth does not appear in all other departments of learning with that bold and reſiſtleſs conviction with which it preſides in the mathematical ſcience, it ſhines through them all, if not interrupted by prejudice or perverted by error, with a clear and uſeful, though inferior ſtrength. And as it is not neceſſary for the general ſafety or convenience of a traveller, that he ſhould always enjoy the heat and ſplendour of a mid-day ſun, whilſt he can with more eaſe purſue his journey under the weaker influence of a morning or an evening ray; ſo it is not requiſite, for the various concerns and purpoſes of life, that men ſhould be led by truth of the moſt redundant brightneſs. Such truth is to be had only in thoſe ſciences which are converſant about ideas and their various relations; where every thing being certainly what it appears to be, definitions and axioms ariſe from mere intuition. Here *ſyllogiſm* takes up the proceſs from the beginning; and by a ſublime intellectual motion advances from the ſimpleſt axioms to the moſt complicated ſpeculations, and exhibits truth ſpringing out of its firſt and pureſt elements, and ſpreading on all ſides into a ſyſtem of ſcience. As each ſtep in the progreſs is ſyllogiſtic, we ſhall endeavour to explain the uſe and application of ſyllogiſms in this ſpecies of reaſoning.

We have ſeen, that in all the different appearances they put on, we ſtill arrive at a juſt and legitimate concluſion; now it often happens, that the concluſion of one ſyllogiſm becomes a previous propoſition in another; by which means great numbers of them are ſometimes linked together in a ſeries, and truths are made to follow one another in train. And as in ſuch a concatenation of ſyllogiſms all the various ways of reaſoning that are truly concluſive may be with ſafety introduced; hence it is plain, that in deducing any truth from its firſt principles, eſpecially where it lies at a conſiderable diſtance from them, we are at liberty to combine all the ſeveral kinds of ſyllogiſms above explained, according as they are found beſt to ſuit the end and purpoſe of our inquiries. When a propoſition is thus, by means of ſyllogiſms, collected from others more evident and known, it is ſaid to be *proved*; ſo

that we may in the general define the proof of a propoſition to be a ſyllogiſm, or ſeries of ſyllogiſms, collecting that propoſition from known and evident truths. But more particularly, if the ſyllogiſms of which the proofs conſiſt admit of no premiſes but definitions, ſelf-evident truths, and propoſitions already eſtabliſhed, then is the argument ſo conſtituted called a *demonſtration*; whereby it appears that demonſtrations are ultimately founded on definitions and ſelf-evident propoſitions.

II. All ſyllogiſms whatſoever, whether compound, multiform, or defective, are reducible to plain ſimple ſyllogiſms in ſome one of the four figures. But this is not all. Syllogiſms of the firſt figure, in particular, admit of all poſſible concluſions: that is, any propoſitions whatſoever, whether an univerſal affirmative or univerſal negative, a particular affirmative or particular negative, which four-fold diviſion embraces all their varieties; any one of theſe may be inferred by virtue of ſome ſyllogiſm in the firſt figure. By this means it happens that the ſyllogiſms of all the other figures are reducible alſo to ſyllogiſms of the firſt figure, and may be conſidered as ſtanding on the ſame foundation with them. We cannot here demonſtrate and explain the manner of this reduction, becauſe it would too much ſwell the bulk of this treatiſe. It is enough to take notice, that the thing is univerſally known and allowed among logicians, to whoſe writings we refer ſuch as deſire farther ſatisfaction in this matter. This then being laid down, it is plain that any demonſtration whatſoever may be conſidered as compoſed of a ſeries of ſyllogiſms, all in the firſt figure. For, ſince all the ſyllogiſms that enter the demonſtration are reducible to ſyllogiſms of ſome one of the four figures; and ſince the ſyllogiſms of all the other figures are farther reducible to ſyllogiſms of the firſt figure, it is evident, that the whole demonſtration may be reſolved into a ſeries of theſe laſt ſyllogiſms. Let us now, if poſſible, diſcover the ground upon which the concluſion reſts in ſyllogiſms of the firſt figure; becauſe, by ſo doing, we ſhall come at an univerſal principle of certainty, whence the evidence of all demonſtrations in all their parts may be ultimately derived.

III. The rules then of the firſt figure are briefly theſe: The middle term is the ſubject of the major propoſition, and the predicate of the minor. The major is always an univerſal propoſition, and the minor always affirmative. Let us now ſee what effect theſe rules will have in reaſoning. The major is an univerſal propoſition, of which the middle term is the ſubject, and the predicate of the concluſion the predicate Hence it appears, that in the major the predicate of the concluſion is always affirmed or denied univerſally of the middle term. Again, the minor is an affirmative propoſition, whereof the ſubject of the concluſion is the ſubject, and the middle term the predicate. Here then the middle term is affirmed of the ſubject of the concluſion; that is, the ſubject of the concluſion is affirmed to be comprehended under, or to make a part of, the middle term. Thus then we ſee what is done in the premiſes of a ſyllogiſm of the firſt figure. The predicate of the concluſion is univerſally affirmed or denied of ſome idea. The ſubject of the concluſion is affirmed to be or to make a part of that idea. Hence it naturally and unavoidably follows, that the predicate of the concluſion ought to be affirmed or denied of the ſubject. To illuſtrate this by an example, we ſhall reſume one of the ſyllogiſms of the firſt chapter.

" Every creature poſſeſſed of reaſon and liberty is account-
" able for his actions:
" Man is a creature poſſeſſed of reaſon and liberty:
" Therefore man is accountable for his actions."

Here, in the firſt propoſition, the predicate of the concluſion, *accountableneſs*, is affirmed of all creatures that have reaſon and liberty. Again, in the ſecond propoſition, *man*, the ſubject of the concluſion, is affirmed to be or to make a part of this claſs of creatures. Hence the concluſion neceſſarily and unavoidably follows, viz. that man is accountable for his actions; becauſe, if reaſon and liberty be that which conſtitutes a creature accountable, and man has reaſon and liberty, it is plain he has that which conſtitutes him accountable. In like manner, where the major is a negative propoſition, or denies the predicate of the concluſion univerſally of the middle term, as the minor always aſſerts the ſubject of the concluſion to be or make a part of that middle term, it is no leſs evident that the predicate of the concluſion ought in this caſe to be denied of the ſubject. So that the ground of reaſoning, in all ſyllogiſms of the firſt figure, is manifeſtly this: " Whatever may be affirmed univerſally of any idea, may be affirmed of every or any number of particulars comprehended under that idea." And again: " Whatever may be denied univerſally of any idea, may be in like manner denied of every or any number of its individuals." Theſe two propoſitions are called by logicians the *dictum de omni*, and *dictum de nullo*; and are indeed the great principles of ſyllogiſtic reaſoning, inaſmuch as all concluſions whatſoever either reſt immediately upon them, or upon propoſitions deduced from them. But what adds greatly to their value is, that they are really ſelf-evident truths, and ſuch as we cannot gainſay without running into an expreſs contradiction. To affirm, for inſtance, that *no man is perfect*, and yet argue that *ſome men are perfect*; or to ſay that *all men are mortal*, and yet that *ſome men are not mortal*, is to aſſert a thing to be and not to be at the ſame time.

IV. And now we may affirm, that, in all ſyllogiſms of the firſt figure, if the premiſes are true, the concluſion muſt needs be true. If it be true that the predicate of the concluſion, whether affirmative or negative, agrees univerſally to ſome idea; and if it be alſo true that the ſubject of the concluſion is a part of or comprehended under that idea; then it neceſſarily follows, that the predicate of the concluſion agrees alſo to the ſubject. For to aſſert the contrary, would be to run counter to ſome one of the two principles before eſtabliſhed; that is, it would be to maintain an evident contradiction. And thus we are come at laſt to the point we have all along been endeavouring to eſtabliſh; namely, that every propoſition which can be demonſtrated is neceſſarily true. For, as every demonſtration may be reſolved into a ſeries of ſyllogiſms all in the firſt figure; and as in any one of theſe ſyllogiſms, if the premiſes are true, the concluſion muſt needs be ſo too; it evidently follows, that if all the ſeveral premiſes are true, all the ſeveral concluſions are ſo, and conſequently the concluſion alſo of the laſt ſyllogiſm, which is always the propoſition to be demonſtrated. Now that all the premiſes of a demonſtration are true, will eaſily appear from the very nature and definition of that form of reaſoning. A demonſtration, as we have ſaid, is a ſeries of ſyllogiſms, all whoſe premiſes are either definitions, ſelf-evident truths, or propoſitions already eſtabliſhed. Definitions are identical propoſitions, wherein we connect the deſcription of an idea with the name by which we chooſe to have that idea called, and therefore as to their truth there can be no diſpute. Self-evident propoſitions appear true of themſelves, and leave no doubt or uncertainty in the mind. Propoſitions, before eſtabliſhed, are no other than concluſions gained by one or more ſteps from definitions and ſelf-evident principles, that is, from true premiſes, and therefore muſt needs be true. Whence all the previous propoſitions of a demonſtration being, we ſee, manifeſtly true; the laſt concluſion, or propoſition to be demonſtrated, muſt be ſo too. So that demonſtration not only leads to certain truth, but we have here alſo a clear view of the ground and foundation of that certainty. For as, in demonſtrating, we may be ſaid to do nothing more than combine a ſeries of ſyllogiſms together, all reſting on the ſame bottom; it is plain that one uniform

ground of certainty runs through the whole, and that the conclusions are every where built upon some one of the two principles before established, as the foundation of all our reasoning. These two principles are easily reduced into one, and may be expressed thus: "Whatever predicate, whether affirmative or negative, agrees universally to any idea; the same must needs agree to every or any number of individuals comprehended under that idea." And thus at length we have, according to our first design, reduced the certainty of demonstration to one simple and universal principle; which carries its own evidence along with it, and which is indeed the ultimate foundation of all syllogistic reasoning.

V. Demonstration therefore serving as an infallible guide to truth, and standing on so sure and unalterable a basis, we may now venture to assert, that the rules of logic furnish a sufficient criterion for the distinguishing between truth and falsehood. For since every proposition that can be demonstrated is necessarily true, he is able to distinguish truth from falsehood who can with certainty judge when a proposition is truly demonstrated. Now, a demonstration is, as we have said, nothing more than a concatenation of syllogisms, all whose premises are definitions, self-evident truths, or propositions previously established. To judge therefore of the validity of a demonstration, we must be able to distinguish whether the definitions that enter it are genuine, and truly descriptive of the ideas they are meant to exhibit: whether the propositions assumed without proofs as intuitive truths have really that self-evidence to which they lay claim: whether the syllogisms are drawn up in due form, and agreeable to the laws of argumentation: in fine, whether they are combined together in a just and orderly manner, so that no demonstrable propositions serve any where as premises unless they are conclusions of previous syllogisms. Now, it is the business of logic, in explaining the several operations of the mind, fully to instruct us in all these points. It teaches the nature and end of definitions, and lays down the rules by which they ought to be framed. It unfolds the several species of propositions, and distinguishes the self-evident from the demonstrable. It delineates also the different forms of syllogisms, and explains the laws of argumentation proper to each. In fine, it describes the manner of combining syllogisms, so as that they may form a train of reasoning, and lead to the successive discovery of truth. The precepts of logic, therefore, as they enable us to judge with certainty when a proposition is duly demonstrated, furnish a sure criterion for the distinguishing between truth and falsehood.

VI. Perhaps it may be objected, that demonstration is a thing very rare and uncommon, as being the prerogative of but a few sciences, and therefore the criterion here given can be of no great use. But wherever, by the bare contemplation of our ideas, truth is discoverable, there also demonstration may be attained. Now that is an abundantly sufficient criterion which enables us to judge with certainty in all cases where the knowledge of truth comes within our reach; for with discoveries that lie beyond the limits of the human mind we have, properly, no business or concernment. When a proposition is demonstrated, we are certain of its truth. When, on the contrary, our ideas are such as have no visible connection or repugnance, and therefore furnish not the proper means of tracing their agreement or disagreement, there we are sure that scientifical knowledge is not attainable. But where there is some foundation of reasoning, which yet amounts not to the full evidence of demonstration, there the precepts of logic, by teaching us to determine aright of the degree of proof, and of what is still wanting to render it full and complete, enable us to make a due estimate of the measures of probability, and to proportion our assent to the grounds on which the proposition stands. And this is all we can possibly arrive at, or even so much as hope for, in the exercise of faculties so imperfect and limited as ours.

VII. Before we conclude this chapter, it may not be improper to take notice of the distinction of demonstration into *direct* and *indirect*. A *direct demonstration* is, when, beginning with definitions, self evident propositions, or known and allowed truths, we form a train of syllogisms, and combine them in an orderly manner, continuing the series through a variety of successive steps, until at last we arrive at a syllogism whose conclusion is the proposition to be demonstrated. Proofs of this kind leave no doubt or uncertainty behind them; because, all the several premises being true, the conclusions must be so too, and of course the very last conclusion or proposition to be proved. The other species of demonstration is the *indirect*, or, as it is sometimes called, the *apogogical*. The manner of proceeding here is, by assuming a proposition which directly contradicts that we mean to demonstrate; and thence, by a continued train of reasoning, in the way of a direct demonstration, deducing some absurdity or manifest untruth. For hereupon we conclude, that the proposition assumed was false; and thence again, by an immediate consequence, that the proposition to be demonstrated is true. Thus Euclid, in his third book, being to demonstrate *that circles which touch one another inwardly have not the same centre*, assumes the direct contrary to this, viz. *that they have the same centre*; and thence, by an evident train of reasoning, proves *that a part is equal to the whole*. The supposition therefore leading to this absurdity he concludes to be false, viz. *that circles touching one another inwardly have the same centre*; and thence again immediately infers, *that they have not the same centre*.

VIII. Now, because this manner of demonstration is accounted by some not altogether so clear and satisfactory; we shall therefore endeavour to show, that it equally with the other leads to truth and certainty. Two propositions are said to be *contradictory* one of another, when that which is asserted to be in the one is asserted not to be in the other. Thus the propositions, *Circles that touch one another inwardly have the same centre*, and, *Circles that touch one another inwardly have not the same centre*, are *contradictories*, because the second asserts the direct contrary of what is asserted in the first. Now, in all contradictory propositions, this holds universally, that one of them is necessarily true, and the other necessarily false. For, if it be true, that circles which touch one another inwardly have not the same centre; it is unavoidably false, that they have the same centre. On the other hand, if it be false that they have the same centre, it is necessarily true that they have not the same centre. Since therefore it is impossible for them to be both true or both false at the same time; it unavoidably follows, that one is necessarily true, and the other necessarily false. This then being allowed, which is indeed self evident; if any two contradictory propositions are assumed, and one of them can by a clear train of reasoning be demonstrated to be false, it necessarily follows that the other is true. For, as the one is necessarily true, and the other necessarily false; when we come to discover which is the false proposition, we thereby also know the other to be true.

IX. Now this is precisely the manner of an indirect demonstration, as is evident from the account given of it above. For there we assume a proposition which directly contradicts that we mean to demonstrate; and, having by a continued series of proofs shown it to be false, thence infer that its contradictory, or the proposition to be demonstrated, is true. As, therefore, this last conclusion is certain and unavoidable; let us next inquire after what manner we come to be satisfied of the falsehood of the assumed proposition, that so no possible doubt may remain as to the force and validity of demonstrations of this kind. The manner then is plainly this: Beginning with the

aſſumed propoſition, we, by the help of definitions, ſelf-evident truths, or propoſitions already eſtabliſhed, continue a ſeries of reaſoning, in the way of a direct demonſtration, until at length we arrive at ſome abſurdity or known falſehood. Thus Euclid, in the example before mentioned, from the ſuppoſition that circles touching one another inwardly have the ſame centre, deduces, *that a part is equal to the whole*. Since, therefore, by a due and orderly proceſs of reaſoning, we come at laſt to a falſe concluſion; it is manifeſt, that all the premiſes cannot be true: for, were all the premiſes true, the laſt concluſion muſt be ſo too, by what has been before demonſtrated. Now, as to all the other premiſes made uſe of in the courſe of reaſoning, they are manifeſt and known truths by ſuppoſition, as being either definitions, ſelf-evident propoſitions, or truths previouſly eſtabliſhed. The aſſumed propoſition is that only as to which any doubt or uncertainty remains. That alone, therefore, can be falſe; and indeed, from what has been already ſhown, muſt unavoidably be ſo. And thus we ſee, that in indirect demonſtrations, two contradictory propoſitions being laid down, one of which is demonſtrated to be falſe, the other, which is always the propoſition to be proved, muſt neceſſarily be true; ſo that here, as well as in the direct way of proof, we arrive at a clear and ſatisfactory knowledge of truth.

X. This is univerſally the method of reaſoning in all apogogical or indirect demonſtrations. But if any propoſition is aſſumed, from which, in a direct train of reaſoning, we can deduce its contradictory; the propoſition ſo aſſumed is falſe, and the contradictory one true. For, if we ſuppoſe the aſſumed propoſition to be true, then, ſince all the other premiſes that enter the demonſtration are alſo true, we ſhall have a ſeries of reaſoning conſiſting wholly of true premiſes; whence the laſt concluſion or contradictory of the aſſumed propoſition muſt be true likewiſe: ſo that by this means we ſhould have two contradictory propoſitions both true at the ſame time; which is manifeſtly impoſſible. The aſſumed propoſition, therefore, whence this abſurdity flows, muſt neceſſarily be falſe; and conſequently its contradictory, which is here the propoſition deduced from it, muſt be true. If then any propoſition is propoſed to be demonſtrated, and we *aſſume* the *contradictory* of that propoſition, and thence directly infer the propoſition to be demonſtrated; by this very means we know that the propoſition ſo inferred, is true. For, ſince from an aſſumed propoſition we have deduced its contradictory, we are thereby certain that the aſſumed propoſition is falſe; and if ſo, then its contradictory, or that deduced from it, which in this caſe is the ſame with the propoſition to be demonſtrated, muſt be true.

XI. We have a curious inſtance of this in the twelfth propoſition of the ninth book of the Elements. Euclid there propoſes to demonſtrate, *that in any ſeries of numbers, riſing from unity in geometrical progreſſion, all the prime numbers that meaſure the laſt term in the ſeries will alſo meaſure the next after unity*. In order to this, he aſſumes the contradictory of the propoſition to be demonſtrated; namely, *that ſome prime number meaſuring the laſt term in the ſeries does not meaſure the next after unity*; and thence, by a continued train of reaſoning, proves that it actually does meaſure it. Hereupon he concludes the aſſumed propoſition to be falſe; and that which is deduced from it, or its contradictory, which is the very propoſition be propoſed to demonſtrate, to be true. Now that this is a juſt and concluſive way of reaſoning, is abundantly manifeſt from what we have ſo clearly eſtabliſhed above. Whence it appears, how neceſſary ſome knowledge of the rules of logic is, to enable us to judge of the force, juſtneſs, and validity, of demonſtrations. For, though it is readily allowed, that by the mere ſtrength of our natural faculties we can at once diſcern, that of two contradictory propoſitions, the one is neceſſarily true, and the other neceſſarily falſe; yet, when they are ſo linked together in a demonſtration, as that the one ſerves as a previous propoſition whence the other is deduced, it does not ſo immediately appear, without ſome knowledge of the principles of logic, why that alone, which is collected by reaſoning, ought to be embraced as true, and the other, whence it is collected, to be rejected as falſe.

XII. Having thus ſufficiently evinced the certainty of demonſtration in all its branches, and ſhown the rules by which we ought to proceed, in order to arrive at a juſt concluſion, according to the various ways of arguing made uſe of; it is needleſs to enter upon a particular conſideration of thoſe ſeveral ſpecies of falſe reaſoning which logicians diſtinguiſh by the name of *ſophiſms*. He that thoroughly underſtands the form and ſtructure of a good argument, will of himſelf readily diſcern every deviation from it. And although *ſophiſms* have been divided into many claſſes, which are all called by ſounding names, that therefore carry in them much appearance of learning; yet are the errors themſelves ſo very palpable and obvious, that it would be loſt labour to write for a man capable of being miſled by them. Here, therefore, we chooſe to conclude this part of Logic; and ſhall in the next give ſome account of *Method*: which, though inſeparable from reaſoning, is nevertheleſs always conſidered by logicians as a diſtinct operation of the mind; becauſe its influence is not confined to the mere exerciſe of the reaſoning faculty, but extends in ſome degree to all the tranſactions of the underſtanding.

PART IV. OF METHOD.

WE have now done with the three firſt operations of the mind, whoſe office it is to ſearch after truth, and enlarge the bounds of human knowledge. There is yet a fourth, which regards the diſpoſal and arrangement of our thoughts, when we endeavour ſo to put them together as that their mutual connection and dependence may be clearly ſeen. This is what logicians call *Method*, and place always the laſt in order in explaining the powers of the underſtanding; becauſe it neceſſarily ſuppoſes a previous exerciſe of our other faculties, and ſome progreſs made in knowledge before we can exert it in any extenſive degree.

II. In this view, it is plain that we muſt be beforehand well acquainted with the truths we are to combine together; otherwiſe, how could we diſcern their ſeveral connections and relations, or ſo diſpoſe of them as their mutual dependence may require? But it often happens, that the underſtanding is employed, not in the arrangement and compoſition of known truths, but in the ſearch and diſcovery of ſuch as are unknown. And here the manner of proceeding is very different. We aſſemble at once our whole ſtock of knowledge relating to any ſubject, and, after a general ſurvey of things, begin with examining them ſeparately and by parts. Hence it comes to paſs, that whereas, at our firſt ſetting out, we were acquainted only with ſome of the grand ſtrokes and outlines of truth; by thus purſuing her through her ſeveral windings and receſſes, we gradually diſcover thoſe more inward and finer touches whence ſhe derives all her ſtrength, ſymmetry, and beauty. And here it is, that when, by a narrow ſcrutiny into things, we have unravelled any part of knowledge, and traced it to its firſt and original principles, inſomuch that the whole frame and contexture of it lies open to the view of the mind; here it is, that, taking it the contrary way, and beginning with theſe princi-

ples, we can ſo adjuſt and put together the parts as the order and method of ſcience require.

III. But as theſe things are beſt underſtood when illuſtrated by examples; let us ſuppoſe any machine, for inſtance a watch, preſented to us, whoſe ſtructure and compoſition we are as yet unacquainted with, but want, if poſſible, to diſcover. The manner of proceeding, in this caſe, is, by taking the whole to pieces, and examining the parts ſeparately, one after another. When, by ſuch a ſcrutiny, we have thoroughly informed ourſelves of the frame and contexture of each, we then compare them together, in order to judge of their mutual action and influence. By this means we gradually trace out the inward make and compoſition of the whole, and come at length to diſcern how parts of ſuch a form, and ſo put together as we found in unravelling and taking them aſunder, conſtitute that particular machine called a *watch*, and contribute to all the ſeveral motions and phenomena obſervable in it. This diſcovery being made, we can take things the contrary way, and, beginning with the parts, ſo diſpoſe and connect them as their ſeveral uſes and ſtructures require, until at length we arrive at the whole itſelf, from the unravelling of which thoſe parts reſulted.

IV. And as it is in tracing and examining the works of art; ſo is it, in a great meaſure, in unfolding any part of human knowledge; for the relations and mutual habitudes of things do not always immediately appear upon comparing them one with another. Hence we have recourſe to intermediate ideas; and, by means of them, are furniſhed with thoſe previous propoſitions that lead to the concluſion we are in queſt of. And if it ſo happen that the previous propoſitions themſelves are not ſufficiently evident, we endeavour, by new middle terms, to aſcertain their truth; ſtill tracing things backward, in a continual ſeries, until at length we arrive at ſome ſyllogiſm where the premiſes are firſt and ſelf-evident principles. This done, we become perfectly ſatisfied as to the truth of all the concluſions we have paſſed through, inaſmuch as they are now ſeen to ſtand upon the firm and immoveable foundation of our intuitive perceptions. And as we arrived at this certainty by tracing things backward to the original principles whence they flow; ſo may we at any time renew it by a direct contrary proceſs, if, beginning with theſe principles, we carry the train of our thoughts forward until they lead us, by a connected chain of proofs, to the very laſt concluſion of the ſeries.

V. Hence it appears, that, in diſpoſing and putting together our thoughts, either for our own uſe, that the diſcoveries we have made may at all times lie open to the review of the mind, or where we mean to communicate and unfold the diſcoveries to others, there are two ways of proceeding equally within our choice: for we may ſo propoſe the truths relating to any part of knowledge, as they preſented themſelves to the mind in the manner of inveſtigation; carrying on the ſeries of proofs, in a reverſe order, until they at laſt terminate in firſt principles: or, beginning with theſe principles, we may take the contrary way, and from them deduce, by a direct train of reaſoning, all the ſeveral propoſitions we want to eſtabliſh. This diverſity in the manner of arranging our thoughts gives riſe to the twofold diviſion of method eſtabliſhed among logicians: for method, according to their uſe of the word, is nothing elſe but the order and diſpoſition of our thoughts relating to any ſubject. When truths are ſo propoſed and put together as they were or might have been diſcovered, this is called the *analytic method*, or the *method of reſolution*; inaſmuch as it traces things backward to their ſource, and reſolves knowledge into its firſt and original principles. When, on the other hand, they are deduced from theſe principles, and connected according to their mutual dependence, inſomuch that the truths firſt in order tend always to the demonſtration of thoſe that follow; this conſtitutes what we call the *ſynthetic method*, or *method of compoſition*. For here we proceed by gathering together the ſeveral ſcattered parts of knowledge, and combining them into one whole or ſyſtem, in ſuch manner that the underſtanding is enabled diſtinctly to follow truth through all her different ſtages and gradations.

VI. There is this farther to be taken notice of, in relation to theſe two ſpecies of method; that the firſt has alſo obtained the name of the *method of invention*, becauſe it obſerves the order in which our thoughts ſucceed one another in the invention or diſcovery of truth. The other, again, is often denominated the *method of doctrine* or *inſtruction*; inaſmuch as, in laying our thoughts before others, we generally chooſe to proceed in the ſynthetic manner, deducing them from their firſt principles. For we are to obſerve, that although there is great pleaſure in purſuing truth in the method of inveſtigation, becauſe it places us in the condition of the inventor, and ſhows the particular train and proceſs of thinking by which he arrived at his diſcoveries; yet it is not ſo well accommodated to the purpoſes of evidence and conviction. For, at our firſt ſetting out, we are commonly unable to divine where the analyſis will lead us; inſomuch that our reſearches are for ſome time little better than a mere groping in the dark. And even after light begins to break in upon us, we are ſtill obliged to many reviews, and a frequent compariſon of the ſeveral ſteps of the inveſtigation among themſelves. Nay, when we have unravelled the whole, and reached the very foundation on which our diſcoveries ſtand, all our certainty, in regard to their truth, will be found in a great meaſure to ariſe from that connection we are now able to diſcern between them and firſt principles, taken in the order of compoſition. But in the ſynthetic manner of diſpoſing our thoughts, the caſe is quite different: for as we here begin with the intuitive truths, and advance by regular deductions from them, every ſtep of the procedure brings evidence and conviction along with it; ſo that, in our progreſs from one part of knowledge to another, we have always a clear perception of the ground on which our aſſent reſts. In communicating therefore our diſcoveries to others, this method is apparently to be choſen, as it wonderfully improves and enlightens the underſtanding, and leads to an immediate perception of truth.

VII. The logic which for ſo many ages kept poſſeſſion of the ſchools, and was deemed the moſt important of the ſciences, has long been condemned as a mere art of wrangling, of very little uſe in the purſuit of truth. Attempts have been made to reſtore it to credit, but without ſucceſs; and of late years little or no attention whatever has been paid to *the art of reaſoning* in the courſe of what is called a liberal education. As both extremes may be faulty, it ſhould ſeem that we cannot conclude this ſhort treatiſe more properly than with the following

Reflections *on the* Utility *of* Logic.

If Ariſtotle was not the inventor of logic, he was certainly the prince of logicians. The whole theory of ſyllogiſms he claims as his own, and as the fruit of much time and labour; and it is univerſally known, that the later writers on the art have borrowed their materials almoſt entirely from his Organon and Porphyry's Introduction. But after men had laboured near 2000 years in ſearch of truth by the help of ſyllogiſms, lord Bacon propoſed the method of induction, as a more effectual engine for that purpoſe; and ſince his days the art of logic has gradually fallen into diſrepute.

To this conſequence many cauſes contributed. The art of ſyllogiſm is admirably calculated for wrangling; and by the ſchoolmen it was employed with too much ſucceſs, to keep in

countenance the abſurdities of the Romiſh church. Under their management it produced numberleſs diſputes, and numberleſs ſects, who fought againſt each other with much animoſity without gaining or loſing ground: but it did nothing conſiderable for the benefit of human life, whilſt the method of induction has improved arts and increaſed knowledge. It is no wonder, therefore, that the exceſſive admiration of Ariſtotle, which continued for ſo many ages, ſhould end in an undue contempt; and that the high eſteem of logic, as the grand engine of ſcience, ſhould at laſt make way for too unfavourable an opinion, which ſeems now prevalent, of its being unworthy of a place in a liberal education. Men rarely leave one extreme without running into the contrary: Thoſe who think according to the faſhion, will be as prone to go into the preſent extreme as their grandfathers were to go into the former; and even they who in *general* think for themſelves, when they are offended at the abuſe of any thing, are too apt to entertain prejudices againſt the *thing itſelf*. "In practice (ſays the learned WARBURTON), logic is more a *trick* than a *ſcience*, formed rather to amuſe than to inſtruct. And in ſome ſort we may apply to the art of ſyllogiſm what a man of wit ſays of rhetoric, that it only tells us how to *name* thoſe tools which nature had before put into our hands. In the ſervice of chicane, indeed, it is a mere juggler's knot, now faſt, now looſe; and the ſchools where this legerdemain was exerciſed in great perfection are full of the ſtories of its wonders." The authority of *Warburton* is great; but it may be counterbalanced by another which, on ſubjects of this nature, is confeſſedly greater.

"Laying aſide prejudice, whether faſhionable or unfaſhionable, let us conſider (ſays Dr. REID) whether logic is or may be made ſubſervient to any good purpoſe. Its profeſſed end is, to teach men to think, to judge, and to reaſon, with preciſion and accuracy. No man will ſay that this is a matter of little importance: the only thing therefore that can admit of doubt is, whether it can be taught?

"To reſolve this doubt, it may be obſerved, that our rational faculty is the gift of God, given to men in very different meaſures: Some have a large portion, ſome a leſs; and where there is a remarkable defect of the natural power, it cannot be ſupplied by any culture. But this natural power, even where it is the ſtrongeſt, may lie dead for want of the means of improvement. Many a ſavage may have been born with as good faculties as a *Newton*, a *Bacon*, or an *Ariſtotle*; but their talents were buried by having never been put to uſe, whilſt thoſe of the philoſophers were cultivated to the beſt advantage. It may likewiſe be obſerved, that the chief mean of improving our rational power, is the vigorous exerciſe of it in various ways and on different ſubjects, by which the habit is acquired of exerciſing it properly. Without ſuch exerciſe, and good ſenſe over and above, a man who has ſtudied logic all his life may be only a petulant wrangler, without true judgment or ſkill of reaſoning in any ſcience."

This muſt have been Locke's meaning, when in his Thoughts on Education he ſays, "If you would have your ſon to reaſon well, let him read Chillingworth." The ſtate of things is much altered ſince Locke wrote: Logic has been much improved chiefly by his writings; and yet much leſs ſtreſs is laid upon it, and leſs time conſumed in its ſtudy. His counſel, therefore, was judicious and ſeaſonable; to wit, That the improvement of our reaſoning power is to be expected much more from an intimate acquaintance with the authors who reaſon beſt, than from ſtudying voluminous ſyſtems of ſchool logic. But if he had meant, that the ſtudy of logic was of no uſe, nor deſerved any attention, he ſurely would not have taken the pains to make ſo conſiderable an addition to it, by his *Eſſay on the Human Underſtanding*, and by his *Thoughts on the Conduct of the Underſtanding*; nor would he have remitted his pupil to *Chillingworth*, the acuteſt logician as well as the beſt reaſoner of his age."

There is no ſtudy better fitted to exerciſe and ſtrengthen the reaſoning powers than that of the mathematical ſciences; becauſe there is no other branch of ſcience which gives ſuch ſcope to long and accurate trains of reaſoning, or in which there is ſo little room for authority or prejudice of any kind to give a falſe bias to the judgment. When a youth of moderate parts begins to ſtudy Euclid, every thing is new to him: His apprehenſion is unſteady; his judgment is feeble; and reſts partly upon the evidence of the thing, and partly upon the authority of his teacher. But every time he goes over the definitions, the axioms, the elementary propoſitions, more light breaks in upon him; and as he advances, the road of demonſtration becomes ſmooth and eaſy: he can walk in it firmly, and take wider ſteps, till at laſt he acquires the habit not only of underſtanding a demonſtration, but of diſcovering and demonſtrating mathematical truths.

It muſt indeed be confeſſed, that a man without the rules of logic may acquire a habit of reaſoning juſtly in *mathematics*, and perhaps in any other ſcience. Good ſenſe, good examples, and aſſiduous exerciſe, may bring a man to reaſon juſtly and acutely in his own profeſſion without rules. But whoever thinks, that from this conceſſion he may infer the inutility of logic, betrays by this inference a great want of that art; for he might as well infer, becauſe a man *may* go from Edinburgh to London by the way of Paris, that therefore *any other* road is uſeleſs.

There is perhaps no art which may not be acquired, in a very conſiderable degree, by example and practice, without reducing it to rules. But practice joined with rules may carry a man forward in his art farther and more quickly than practice without rules.—Every ingenious artiſt knows the utility of having his art reduced to rules, and thereby made a ſcience. By rules he is enlightened in his practice, and works with more aſſurance. They enable him ſometimes to correct his own errors, and often to detect the errors of others; and he finds them of great uſe to confirm his judgment, to juſtify what is right, and to condemn what is wrong. Now mathematics are the nobleſt *praxis* of *logic*. Through them we may perceive how the ſtated forms of ſyllogiſm are exemplified in one ſubject, namely the predicament of quantity; and by marking the force of theſe forms, as they are there applied, we may be enabled to apply them of ourſelves elſewhere. Whoever, therefore, will ſtudy mathematics with this view, will become not only by mathematics a more expert *logician*, and by logic a more rational *mathematician*, but a wiſer philoſopher, and an acuter reaſoner, in all the poſſible ſubjects either of ſcience or deliberation. But when mathematics, inſtead of being applied to this excellent purpoſe, are uſed not to exemplify logic, but to ſupply its place; no wonder if logic fall into contempt, and if mathematics, inſtead of furthering ſcience, become in fact an obſtacle. For when men, knowing nothing of that reaſoning which is *univerſal*, come to attach themſelves for years to a *ſingle ſpecies*, a ſpecies wholly involved in *lines* and *numbers*, the mind becomes incapacitated for reaſoning at large, and eſpecially in the ſearch of *moral truth*. The object of mathematics is *demonſtration*; and whatever in that ſcience is not demonſtration, is nothing, or at leaſt below the ſublime inquirer's regard. *Probability*, through its almoſt infinite degrees, from ſimple ignorance up to abſolute certainty, is the *terra incognita* of the mathematician. And yet here it is that the great *buſineſs* of the human mind is carried on in the ſearch and diſcovery of all the important truths which concern us as reaſonable beings. And here too it is that all its *vigour* is exerted: for to proportion the aſſent to the probability

accompanying every varying degree of moral evidence, requires the moſt enlarged and ſovereign exerciſe of reaſon.

In reaſonings of this kind, will any man pretend that it is of no uſe to be well acquainted with the various powers of the mind by which we reaſon? Is it of no uſe to reſolve the various kinds of reaſoning into their ſimple elements; and to diſcover, as far as we are able, the rules by which theſe elements are combined in judging and in reaſoning? Is it of no uſe to mark the various fallacies in reaſoning, by which even the moſt ingenious men have been led into error? It muſt ſurely betray great want of underſtanding, to think theſe things uſeleſs or unimportant. Now theſe are the things which logicians have attempted; and which they have executed—not indeed ſo completely as to leave no room for improvement, but in ſuch a manner as to give very conſiderable aid to our reaſoning powers. That the principles they have laid down with regard to definition and diviſion, with regard to the converſion and oppoſition of propoſitions, and the general rules of reaſoning, are not without uſe, is ſufficiently apparent from the blunders committed daily by thoſe who diſdain any acquaintance with them.

Although the art of categorical ſyllogiſm is confeſſedly little fitted for the diſcovery of unknown truth, it may yet be employed to excellent purpoſes, as it is perhaps the moſt compendious method of detecting a fallacy. A man in queſt of unknown truths muſt generally proceed by the way of induction, from effects to cauſes; but he who as a teacher is to inculcate any ſyſtem upon others begins with one or more ſelf-evident truths, and proceeds in the way of demonſtration to the concluſion which he wiſhes to eſtabliſh. Now every demonſtration, as has been already obſerved, may be reſolved into a ſeries of ſyllogiſms, of which the concluſion of the preceding always enters into the premiſes of that which follows: and if the firſt principles be clear and evident, and every ſyllogiſm in ſome legitimate mode and figure, the concluſion of the whole muſt infallibly be admitted. But when the demonſtration is thus broken into parts; if we find that the concluſion of one ſyllogiſm will not, without altering the meaning of the terms, enter legitimately into the premiſes of that which ſhould immediately follow; or, ſuppoſing it to make one of the premiſes of a *new* ſyllogiſm, if we find that the concluſion, reſulting from the whole ſeries *thus* obtained, is different from that of the demonſtration; we may, in either of theſe caſes, reſt aſſured that the author's reaſoning is fallacious, and leads to error; and that, if it carried an appearance of conviction before it was thus reſolved into its elementary parts, it muſt have been owing to the inability of the mind to comprehend at *once* a long train of arguments. Whoever wiſhes to ſee the ſyllogiſtic art employed for this purpoſe, and to be convinced of the truth of what we have ſaid reſpecting its utility, may conſult the excellent writer recommended by Locke, who, in places innumerable of his incomparable book, has, without pedantry even in that pedantic age, made the happieſt application of the rules of logic for unravelling the ſophiſtry of his Jeſuitical antagoniſt.

Upon the whole, then, though we readily acknowledge that much time was waſted by our forefathers in ſyllogiſtic wrangling, and what might with little impropriety be termed the *mechanical* part of logic; yet the art of forming and examining arguments is certainly an attainment not unworthy the ambition of that being whoſe higheſt honour is to be endued with reaſon.

LOG

LOGISTÆ, certain officers at Athens, in number ten, whoſe buſineſs conſiſted in receiving and paſſing the accounts of magiſtrates when they went out of office. The *logiſtæ* were elected by lot, and had ten *euthyni* or auditors of accounts under them.

LOGOGRAPHY, a method of printing, in which the types, inſtead of anſwering only to ſingle letters, are made to correſpond to whole words. This method, though ſeemingly a retrograde proceſſion in the printing art, obtained the ſanction of his majeſty's patent, and for ſome time was actually put in execution in the way of trade, though, we apprehend, with no correſponding advantage to the proprietors. In the year 1783, a treatiſe upon this ſubject appeared by Henry Johnſon, in which the origin as well as the utility of the art are fully laid down. The properties of the logographic art, according to this author, are, 1. That the compoſitor ſhall have leſs charged upon his memory than in the common way. 2. It is much leſs liable to error. 3. The type of each word is as eaſily laid hold of as that of a ſingle letter. 4. The decompoſition is much more readily performed, even by the meereſt novices, than they now decompoſe letters. 5. No extraordinary expence nor greater number of types is required in the logographic than in the common method of printing.

All we ſhall ſay on this ſubject is, that if theſe poſitions had been ſupported by the experiment made, we have no doubt but the practice would have come into general and deſerved repute; but, on the contrary, the logographic art, after having excited more of curioſity than approbation, has, we underſtand, been abandoned even by its original patrons.

LOGWOOD. See HÆMATOXYLON.

LOK

LOHOCH, or LOCH, in pharmacy, a compoſition of a middle conſiſtence between a ſoft electuary and a ſyrup, principally uſed in diſorders of the lungs.

LOINS, in anatomy, the two lateral parts of the umbilical region of the abdomen.

LOIR AND CHER, a department of France, including the late province of Blaſois. It takes its name from the rivers Loir and Cher; the firſt of which falls into the Sarte, above Angers; and the laſt empties itſelf into the Loire, five miles above the confluence of the latter with the Indre. Blois is the capital.

LOIRE, UPPER, a department of France, late the province of Velay. It takes its name from the river Loire, which riſes near its ſouth boundary. Puy is the capital.

LOIRE, LOWER, a department of France, containing part of the late province of Bretagne. It has its name from the river Loire, which forms its ſouth boundary, and then falls into the bay of Biſcay. Nantes is the capital.

LOIRE, the principal river of France, which riſes in the mountains of the Cevennes, in Languedoc. It begins to be navigable at Roanne; and watering Nevers, Orleans, Blois, Tours, Saumur, and Nantes, falls into the bay of Biſcay, below Paimbœuf.

LOIRET, a department of France, late the province of Orleanois. It has its name from a ſmall river that falls into the Loire. Orleans is the capital.

LOKE, in mythology, the name of one of the deities of the northern nations, anſwering to the Ahrimanes among the Perſians, whom they repreſent as at enmity both with gods and men, and the author of all the evils which deſolate the univerſe. Loke is deſcribed in the Edda as producing the

great ſerpent which incircles the world; which ſeems to have been intended as an emblem of corruption or ſin: he alſo gives birth to Hela or death, the queen of the infernal regions; and alſo to the wolf Fenris, that monſter who is to encounter the gods and deſtroy the world.

LOKMAN the WISE, an eminent philoſopher among the Eaſterns. The Arabians ſay he was the ſon of Baura, the ſon or grandſon of a ſiſter or aunt of Job. He was an Ethiopian, and a ſlave for ſome time. It is related that he was born in the time of David, and lived till the age of the prophet Jonas. Some ſuppoſe him to have been the ſame with Æſop the mythologiſt: and indeed we find in the parables or apologues of Lokman in Arabic, many particulars that are ſeen in Æſop's fables; ſo that it is not eaſy to determine whether the Greek or the Arabian are the originals. He is ſaid to have been deformed in his perſon, but that this defect was ſufficiently made up by the perfections of his mind. Some pieces of his are extant; and he was looked upon as ſo excellent a perſon, that Mahomet has inſerted a chapter of the Koran, called after his name, in which he introduces God as ſaying, "We heretofore beſtowed wiſdom on Lokman."—It is related that he got his liberty on the following occaſion: His maſter having given him a bitter melon to eat, he ate it all. His maſter, ſurpriſed at his exact obedience, aſked, How it was poſſible for him to eat ſuch a nauſeous fruit? He anſwered, "I have received ſo many favours from you, that it is no wonder I ſhould once in my life eat a bitter melon from your hand." This generous anſwer of the ſlave ſtruck the maſter to ſuch a degree, that he immediately gave him his liberty. M. Galland tranſlated all the fables of Lokman, and Bidpai or Pilpay a bramin philoſopher, which were publiſhed at Paris in 1724.

LOLIUM, DARNEL-GRASS, in botany: A genus of the digynia order, belonging to the triandria claſs of plants; and in the natural method ranking under the 4th order, *Gramina*. The calyx is monophyllous, fixed, and uniflorous. The moſt remarkable ſpecies are, 1. The *perenne*, red darnel, or rye-graſs. This is very common in roads and dry paſtures. It makes excellent hay upon dry, chalky, or ſandy ſoils. It is advantageouſly cultivated along with clover, and ſprings earlier than other graſſes; thereby ſupplying food for cattle at a time when it is moſt difficult to be obtained. Cows, horſes, and ſheep eat it; goats are not fond of it. 2. The *temulentum*, or white darnel, grows ſpontaneouſly in ploughed fields. If the ſeeds of this ſpecies are malted with barley, the ale ſoon occaſions drunkenneſs; mixed with bread-corn, they produce but little effect unleſs the bread is eaten hot.

LOLLARDS, in eccleſiaſtical hiſtory, a religious ſect, differing in many religious points from the church of Rome, which aroſe in Germany about the beginning of the 14th century; ſo called, as many writers have imagined, from Walter Lollard, who began to dogmatiſe in 1315, and was burnt at Cologn: though others think that Lollard was no ſurname, but merely a term of reproach applied to all heretics who concealed the poiſon of error under the appearance of piety.

The monk of Canterbury derives the origin of the word Lollard among us, from *lolium*, "a tare;" as if the Lollards were the tares ſown in Chriſt's vineyard. Abelly ſays, that the word Lollard ſignifies "praiſing God," from the German *loben*, "to praiſe," and *herr*, "Lord;" becauſe the Lollards employed themſelves in travelling about from place to place, ſinging pſalms and hymns.

Others, much to the ſame purpoſe, derive *lollhard*, *lullhard*, or *lollert*, *lullert*, as it was written by the ancient Germans, from the old German word *lullen*, *lollen*, or *lallen*, and the termination *hard*, with which many of the High Dutch words end. *Lollen* ſignifies "to ſing with a low voice," and therefore Lollard is a ſinger, or one who frequently ſings; and in the vulgar tongue of the Germans it denotes a perſon who is continually praiſing God with a ſong, or ſinging hymns to his honour. The Alexians or Cellites were called *Lollards*, becauſe they were public ſingers who made it their buſineſs to inter the bodies of thoſe who died of the plague, and ſang a dirge over them in a mournful and indiſtinct tone as they carried them to the grave. The name was afterwards aſſumed by perſons that diſhonoured it; for we find, among thoſe Lollards who made extraordinary pretences to piety and religion, and ſpent the greateſt part of their time in meditation, prayer, and ſuch acts of piety, there were many abominable hypocrites, who entertained the moſt ridiculous opinions and concealed the moſt enormous vices under the ſpecious mark of this extraordinary profeſſion. And many injurious aſperſions were propagated againſt thoſe who aſſumed this name by the prieſts and monks; ſo that, by degrees, any perſon who covered hereſies or crimes, under the appearance of piety, was called a *Lollard*. Thus the name was not uſed to denote any one particular ſect, but was formerly common to all perſons and all ſects who were ſuppoſed to be guilty of impiety towards God or the church, under an external profeſſion of extraordinary piety. However, many ſocieties, conſiſting both of men and women under the name of *Lollards*, were formed in moſt parts of Germany and Flanders, and were ſupported partly by their manual labours, and partly by the charitable donations of pious perſons. The magiſtrates and inhabitants of the towns where theſe brethren and ſiſters reſided, gave them particular marks of favour and protection, on account of their great uſefulneſs to the ſick and needy. They were thus ſupported againſt their malignant rivals, and obtained many papal conſtitutions, by which their inſtitute was confirmed, their perſons exempted from the cogniſance of the inquiſitors, and ſubjected entirely to the juriſdiction of the biſhops; but as theſe meaſures were inſufficient to ſecure them from moleſtation, Charles duke of Burgundy, in the year 1472, obtained a ſolemn bull from Pope Sixtus IV. ordering that the Cellites or Lollards ſhould be ranked among the religious orders, and delivered from the juriſdiction of the biſhops; and Pope Julius II. granted them yet greater privileges in the year 1506. Moſheim informs us that many ſocieties of this kind are ſtill ſubſiſting at Cologn, and in the cities of Flanders, though they have evidently departed from their ancient rules.

Lollard and his followers rejected the ſacrifice of the maſs, extreme unction, and penances for ſin; arguing, that Chriſt's ſufferings were ſufficient. He is likewiſe ſaid to have ſet aſide baptiſm, as a thing of no effect; and repentance, as not abſolutely neceſſary, &c.—In England, the followers of Wickliffe were called, by way of reproach, *Lollards*, from ſome affinity there was between ſome of their tenets; though others are of opinion, that the Engliſh Lollards came from Germany—They were ſolemnly condemned by the archbiſhop of Canterbury and the council of Oxford.

LOMBARD (LAMBERT), an eminent painter, born at Liege in 1500; who, after a diligent ſtudy of the antique at Rome, introduced that ſtyle of painting among his countrymen inſtead of the Gothic. He painted hiſtory, architecture, and perſpective; and though he could never altogether free himſelf from his national goût, he is ranked among the beſt painters of his time. He died in 1560.

LOMBARD (Peter), well known by the title of *Maſter of the Sentences*, was born at Novara in Lombardy; but being bred at Paris, he diſtinguiſhed himſelf ſo much at that univerſity, that he firſt had the canonry of Chartres conferred on him, was ſome time tutor to Philip ſon of Louis le Gros, and laſtly obtained the ſee of Paris. He died in 1064. His

work of the Sentences is looked on as the ſource of the ſcholaſtic theology of the Latin church. He wrote alſo Commentaries on the Pſalms, and on St. Paul's Epiſtles.

LOMBARD, or LOMBART (Peter), an engraver of conſiderable eminence, who flouriſhed about the year 1660. He was a native of Paris, where he learned the art of engraving. It appears that he came into England before the Revolution, becauſe ſome of his plates for Engliſh publications are dated prior to that event. He executed a vaſt variety of plates, as well hiſtorical as emblematical; which, however, were chiefly for books. But his beſt works are portraits; and of theſe he produced a conſiderable number, which are eſteemed. They are moſtly after Vandyck.—He alſo engraved hiſtorical ſubjects from Pouſſin, Raphael, Annibal Caracci, Guido, and other maſters.

LOMBARDS, a Scandinavian nation, who formerly ſettled in Italy, and for ſome time made a conſiderable figure. Their name of *Lombards*, or *Longobards*, is by ſome derived from the word *lack*, or *lacke*, ſignifying in the German tongue *winter*; becauſe the Lombards, while in Scandinavia, lived in marſhes, or near the ſea. Others think that it comes from the two German words *langen barden*, or *hellebarden*, that is, from the long halberts they were ſuppoſed to uſe in war. But Paulus Diaconus their hiſtorian, and who was himſelf a Lombard, tells us, that they were called *Longobards* from the length of their beards. A nation called the *Lombards* is mentioned by Tacitus, Strabo, and Ptolemy; but theſe are different from the Lombards who afterwards ſettled in Italy, and are reckoned to be the ſame with the Gepidæ, whom the Italian Lombards almoſt exterminated. The Lombards who ſettled in Italy are firſt mentioned by Proſper Aquitanus, biſhop of Rhegium in the year 379. That writer tells us, that about this time the Lombards, abandoning the moſt diſtant coaſts of the ocean, and their native country Scandinavia, and ſeeking for new ſettlements, as they were overſtocked with people at home, firſt attacked and overcame about this time the Vandals in Germany. They were then headed by two chiefs, Iboreus and Aion; who, dying about the year 389, were ſucceeded by Agilmund, who is commonly reckoned the firſt king of the Lombards.

Before the time of Odoacer, the Lombard hiſtory affords nothing remarkable: in his time, however, they ſettled on the Danube, in the country of the Rugians, whom Odoacer had almoſt totally exterminated or carried into captivity. During their ſtay in this country, they rendered themſelves formidable to the neighbouring nations, and carried on ſucceſsful wars with the Heruli and Gepidæ. In 526, they were allowed by the emperor Juſtinian to ſettle in Pannonia; and here they made war a ſecond time with the Gepidæ. Alboinus, the Lombard king, killed the king of the Gepidæ with his own hand, put his army to the rout, and cut ſuch numbers of them in pieces, that they ceaſed from that time to be a nation. Having cauſed the deceaſed king's head to be cut off, he made a cup of his ſkull, called in the language of the Lombards *ſcbala*, which he made uſe of in all public entertainments. However, having taken, among many other captives of great diſtinction, the late king's daughter, by name *Roſamunda*, he married her after the death of his former wife Clodiſvinta, the daughter of Clotaire king of France.

By this victory Alboinus gained ſuch reputation, that his friendſhip was courted by Juſtinian; and, in conſequence of the emperor's application, a body of 6000 Lombards were ſent to the aſſiſtance of Narſes againſt the Goths. The ſucceſs of the Romans in this expedition, the invaſion of Italy by the Lombards, and their ſucceſſes in that country, are noticed by all the Italian hiſtorians. At laſt Alboinus, having made himſelf maſter of Venetia, Liguria, Æmilia, Hetruria, and Umbria, was ſlain by the treachery of his wife, in the year 575, the fourth of his reign. This princeſs was the daughter of the king of the Gepidæ, whom Alboinus had killed in battle, and made a cup of his ſkull, as above related. As he was one day feaſting at Verona with his chief favourites and principal officers, in the height of his mirth he ſent for the queen, and, filling the deteſted cup, commanded her to drink merrily with her father. Roſamund, ſtruck with horror, hurried out of the room; and highly incenſed againſt her huſband for thus barbarouſly triumphing over the misfortunes of her family, reſolved, at all events, to make him pay dear for ſuch an inhuman and affronting conduct. Accordingly, ſhe diſcovered her intention to Helmichild the king's ſhield-bearer, a youth of great boldneſs and intrepidity. Helmichild peremptorily refuſed to imbrue his hands in the blood of his ſovereign, or to be any way acceſſory to his death; and in this reſolution he perſiſted, till he was, by a ſhameful ſtratagem, forced by the queen to a compliance; for ſhe, knowing that he carried on an intrigue with one of her ladies, placed herſelf one night in her bed, and, receiving the youth, indulged him as if ſhe had been his own miſtreſs in his amorous deſires; which ſhe had no ſooner done, than, diſcovering herſelf to the deceived lover, ſhe told him that he muſt now either put the king to death, or be put to death by him. Helmichild, well appriſed that, after what he had done, his ſafety depended upon the death of the king, engaged in the treaſon, which he otherwiſe abhorred. One day, therefore, while Alboinus was repoſing in his chamber after dinner, Helmichild, with ſome others whom he had made privy to his deſign, breaking in unexpectedly, fell upon the king with their daggers. Alboinus, ſtarting up at their firſt coming in, laid hold of his ſword, which he had always by him; but having in vain attempted to draw it, the queen having beforehand faſtened it in the ſcabbard, he defended himſelf for ſome time with a foot-ſtool; but was in the end overpowered, and diſpatched with many wounds.

Roſamund had promiſed to Helmichild, that as ſoon as he had diſpatched the king ſhe would marry him, and, with her perſon, beſtow upon him the kingdom of the Lombards. The firſt part of her promiſe ſhe immediately performed; but was ſo far from being able to beſtow the crown upon him, that both of them were obliged to ſave themſelves by flight. They fled to Longinus the exarch of Ravenna, taking with them all the jewels and treaſure of the late king. Longinus received her with the greateſt marks of friendſhip and kindneſs, and aſſured her of his protection. She had not been long in Ravenna, however, before the exarch, judging that a favourable opportunity now offered of making himſelf king of Italy by her means, imparted his deſign to her, and declared his intention to marry her, provided, by ſome means or other, ſhe diſpatched Helmichild.—Roſamund, highly pleaſed with the propoſal, reſolved to ſatisfy her ambition by getting rid of the perſon whom ſhe had married in order to gratify her revenge. Accordingly, having prepared a ſtrong poiſon, ſhe mixed it with wine, and gave it to her huſband as he came out of the bath and called for drink according to his cuſtom. Helmichild had not half emptied the cup, when, by the ſudden and ſtrange operation which he felt in his bowels, he concluded what it was; and, with his ſword pointed at the queen's breaſt, compelled her to drink the reſt. The poiſon had the ſame effect on both; for they died in a few hours. Longinus, on the death of the queen, laid aſide all thoughts of making himſelf king of Italy, and ſent the king's treaſure to Conſtantinople, together with Albiſoinda, the daughter of Alboinus by Roſamund, whom ſhe had brought along with her.

After the death of Alboinus, the Lombards choſe Clephis, one of the nobility, for their king. He was murdered after a ſhort reign of 18 months; upon which enſued an interreg-

num of 10 years. During this time, they extended their conquests in that country; but at last the Romans, jealous of their progress, resolved to put a stop to their victories, and, if possible, to drive them quite out. For this purpose, they designed not only to employ their own force, but entered into alliance with the Franks; which so alarmed the Lombards, that they re-established the monarchical form of government among themselves, and chose Autharis the son of Clephis for their king. This monarch, considering that the power of the dukes, who had governed Lombardy for the space of ten years, was during that length of time very much established, and that they would not probably be willing to part with the authority which they had so long enjoyed, allowed them to continue in their government; but obliged them to contribute one moiety of their revenues towards the maintenance and support of his royal dignity, suffering them to dispose of the other as they thought proper. He reserved to himself the supreme dominion and authority, and took an oath of the dukes, that, in time of war, they would readily assist him to the utmost of their power. Though he could remove the dukes at pleasure, yet he deprived none of them of their dukedoms, except in cases of treason; nor gave them to others, except when their male issue failed. Having settled matters in this manner with the dukes, he enacted several wholesome laws against theft, rapine, murder, adultery, and other vices which prevailed among his subjects, and was the first of the Lombard kings who embraced Christianity. Most of his subjects followed the example of their monarch; but, as they were all instructed by Arian bishops, they continued long infected with that heresy; which occasioned great disputes between them and the orthodox bishops of the cities subject to them.

From the re-establishment of the monarchy under Autharis, to the reign of Rotharis in 636, the history of the Lombards affords nothing memorable. This period is remarkable for the introduction of written laws among these people. Before his time they had been governed only by tradition; but Rotharis, in imitation of the Romans and Goths, undertook the publishing of written laws: and to those which he enacted, many were added by the succeeding princes. Grotius prefers the method which the Lombards followed in making laws, to that which was practised by the Romans themselves. Among the latter the emperor was the sole lawgiver; so that whatever pleased him had the force of a law. But the Lombard kings did not assume that power to themselves, since their laws were enacted in public assemblies, convened for that purpose, after they had been maturely examined and approved of by all the lords of the kingdom. From these assemblies were excluded the ecclesiastic order, and the people; so that the legislative power was lodged in the king and nobles alone.

The reign of Rotharis is remarkable, not only for his introducing written laws among his subjects, but for the conquests he made, and the successful wars carried on with the exarch of Ravenna, whom he totally defeated in several engagements, and made himself master of some part of his territories. This monarch died in 652; and the affairs of the Lombards went on prosperously, till the ambition of Luitprand laid the foundation of the total ruin of his kingdom. He ascended the throne of Lombardy in 711, and watched all opportunities of enlarging his dominions at the expence of the emperors. Of this a fair opportunity offered in 716; for the emperor Leo Hauricus, who at that time reigned in the east, having, by his famous edict, forbidden the worship of images, and ordered them to be every where pulled down, the people were so provoked at that innovation, that, in several places, they openly revolted, and, falling upon the emperor's officers, drove them out of the cities. In the east, Germanus, patriarch of Constantinople, opposed the emperor's design with great warmth; but Leo caused him to be deposed, and Anastasius to be raised to that see in his room, ordering at the same time all the images in the imperial city to be pulled down and publicly burnt. He strictly enjoined his officers in the west, especially the exarch of Ravenna, to see his edict punctually obeyed in their respective governments. In compliance with these orders, Scholasticus, then exarch, began to pull down the images in all the churches and public places in Ravenna; which incensed the superstitious multitude to such a degree, that, taking arms, they openly declared they would rather renounce their allegiance to the emperor than the worship of images.

Thus a kind of civil war being kindled in the city, Luitprand thought he had now a favourable opportunity of making himself master of the seat of the exarch, not doubting but the conquest of such an important place would be followed by that of the whole exarchate. Having therefore drawn together all his forces, he unexpectedly appeared before Ravenna, and closely besieged it. The exarch little expected such a surprise, as a friendly correspondence had been maintained for so many years between the exarchs and the Lombard kings. However, he defended the place with such courage and resolution, that Luitprand, despairing of success, broke up the siege, and led his army against Classis, at a small distance from Ravenna, which he took, plundered, and levelled with the ground. The loss of this place, and the severe treatment the inhabitants met with from the king, threw the citizens of Ravenna into the utmost consternation; which Luitprand being informed of, he resolved to take advantage of their fears, and, returning before Ravenna while the inhabitants were thus disheartened, to attempt once more the reduction of that place. Accordingly he led his whole army against it, and, by frequent attacks, tired the inhabitants and garrison to such a degree, that the exarch, finding they could hold out no longer, and despairing of relief, privately withdrew. Luitprand, informed of his retreat, attacked the town with more violence than ever; and, having carried it by storm, gave it up to be plundered by his soldiers, who found in it an immense booty, as it had been for a long time the seat of the Roman emperors, of the Gothic kings, and the exarchs. The king stripped it of most of its valuable monuments of antiquity, and caused, among the rest, an equestrian statue of an emperor, of wonderful workmanship, to be conveyed to Pavia, where it is to be seen to this day. The reduction of Ravenna was followed by the surrender of several cities of the exarchate, which Luitprand reduced to a dukedom; appointing Hildebrand his grandson to govern it with the title of duke; and giving him, as he was yet an infant, Peredeus duke of Vicenza for his guardian.

The conquest of Ravenna and the greater part of the exarchate did not a little alarm Gregory II. bishop of Rome. He was then at variance with the emperor, whose edict against the worshipping of images he had opposed with all his might, and by that means provoked Leo to such a degree, that he had threatened to drive him from the see, and send him into exile. However, the pope, no less jealous of the power of the Lombards than all his predecessors had been, resolved, by some means or other, to put a stop to their conquests. The only prince in Italy to whom he could have recourse was Ursus duke of Venice, the Venetians making already no inconsiderable figure. To him accordingly he wrote a very pressing letter; conjuring him to assist his worthy son the exarch, and, for the love of the holy faith, to attempt with him the recovery of the exarchate, which the wicked nation of the Lombards had unjustly taken from his sons Leo and Constantine emperors. Ursus and the Venetians, moved with the pope's letter, and at the same time greatly alarmed at the growth of so powerful a neighbour, promised to assist the exarch with the whole strength of their republic; and accordingly fitted out a considerable fleet, pretend-

ing it was deſigned for the ſervice of the emperor againſt the Saracens. At the ſame time the exarch, who had taken refuge in Venice, abandoning that place, as it were in deſpair of bringing the duke over to his party, raiſed, in the places ſtill ſubject to the emperor, what forces he was able; and having got together a conſiderable body, he marched with them towards Imola, giving out that he deſigned to beſiege that city; but, turning on a ſudden towards Ravenna, as had been agreed on between him and the Venetians, he laid ſiege to it by land, while they inveſted it almoſt at the ſame inſtant by ſea. Peredeus defended the town for ſome time with great courage and reſolution; obliging all thoſe who were able to bear arms to repair to the walls. But the Venetians having, in ſpite of all oppoſition, forced open one of the gates on the ſide of the ſea, the city was taken, and Peredeus ſlain, while he was attempting, at the head of a choice body, to drive the enemy from the poſts they had ſeized. As for Hildebrand, he fell into the hands of the Venetians; who, having thus recovered Ravenna to the emperor, returned home, leaving the exarch in poſſeſſion of the city. Luitprand was then at Pavia; but the town was taken before he could aſſemble his troops to relieve it.

And now Gregory biſhop of Rome, to whom the recovery of Ravenna was chiefly owing, perſuading himſelf that the emperor would, out of gratitude, give ear to his remonſtrances and admonitions, began to ſolicit him with more preſſing letters than ever to revoke his edict againſt the worſhip of images: but Leo, well appriſed that the biſhop, in all the meaſures he had taken, had been more influenced by a regard to his own intereſt than to that of the empire, inſtead of hearkening to his remonſtrances, was ſtill more provoked againſt him for thus obſtinately oppoſing the execution of his edict. Being, therefore, reſolved at all events to have it obſerved in Rome itſelf, and, on the other hand, not doubting but the pope would oppoſe it to the laſt with all his might; in order to remove all obſtacles, he ſent three officers to Rome, with private orders, either to diſpatch the pope, or to take him priſoner and convey him to Conſtantinople. At the ſame time he wrote to Mauritius duke of Rome, ſecretly enjoining him to aſſiſt his three officers in their undertaking: but no favourable opportunity offering to put their deſign in execution, the emperor, in the year 725, recalled Scholaſticus, and ſent Paul a patrician into Italy, to govern in his room, with private inſtructions to encourage the above-mentioned officers with the promiſe of great rewards, and to aſſure them of his protection.

But in the mean time the plot was diſcovered, and two of the conſpirators were apprehended by the citizens of Rome, and put to death; the third having eſcaped into a monaſtery, where he took the monaſtic habit, and ended his days. Hereupon the exarch, in compliance with the emperor's orders, reſolved to proceed no longer by ſecret plots, but by open force. Accordingly, he drew together a conſiderable body of troops, and ſet out at the head of them on his march to Rome with a deſign to ſeize on the pope, and ſend him, as he had engaged to do, in chains to Conſtantinople. But, on this occaſion, Luitprand, though highly provoked againſt Gregory for having ſtirred up the Venetians againſt him, yet reſolved to aſſiſt him and the citizens of Rome againſt the exarch, in order to keep the balance even between them, and, by aſſiſting ſometimes the one and ſometimes the other, weaken both. Purſuant to this reſolution, he ordered the Lombards of Tuſcany, and thoſe of the dukedom of Spoleto, to join the pope and the inhabitants of Rome; who, being by this reinforcement far ſuperior in ſtrength and number to the exarch, obliged him to return to Ravenna, and give over all thoughts of any further attempt on the perſon of the pope.

In the mean time, Leo, perſiſting in his former reſolution of ſuppreſſing throughout his dominions the worſhip of images, ſent freſh orders to the exarch Paul, ſtrictly enjoining him to cauſe his edict to be put in execution in all the cities of Italy under his empire, eſpecially in Rome. At the ſame time, he wrote to the pope, promiſing him his favour and protection if he complied with the edict; and declaring him, if he continued to oppoſe it, a rebel, and no longer veſted with the papal dignity. But Gregory was ſo far from yielding to the emperor's threats or promiſes, that, on the contrary, he ſolemnly excommunicated the exarch for attempting to put the imperial edict in execution; and at the ſame time wrote circular letters to the Venetians, to king Luitprand, to the Lombard dukes, and to all the chief cities of the empire, exhorting them to continue ſtedfaſt in the Catholic faith, and to oppoſe with all their might ſuch a deteſtable innovation. Theſe letters made ſuch an impreſſion on the minds of the people in Italy, that, though of different intereſts, and often at war with one another, they all united; proteſting they would defend the Catholic faith, and the life of the pope, in ſo glorious a cauſe, at the expence of their own: nay, the citizens of Rome, and the inhabitants of Pentapolis, now Marca d'Ancona, not contenting themſelves with ſuch a proteſtation, openly revolted from the emperor; and, pulling down his ſtatues, they elected, by their own authority, magiſtrates to govern them during the interregnum. We are even told, that, tranſported with a blind zeal, they were for chooſing a new emperor, and conducting him to Conſtantinople, not doubting but the people would every where join them. But the pope, thinking this reſolution unſeaſonable, and not to be eaſily put in execution, oppoſed it; ſo that it did not take place.

In the mean time the exarch Paul, having gained a conſiderable party in Ravenna, began, purſuant to the repeated orders from the emperor, to remove the images, as ſo many idols, out of the churches. Hereupon the adverſe party, ſupported and encouraged by the pope, flew to arms; and, falling upon the *iconoclaſts* or image-breakers, as they ſtyled them, gave riſe to a civil war within the walls of Ravenna. Great numbers were killed on both ſides: but thoſe who were for the worſhip of images prevailing in the end, a dreadful ſlaughter was made of the oppoſite party; and, among the reſt, the exarch himſelf was murdered. However, the city of Ravenna continued faithful to the emperor; but moſt of the cities of Romagna belonging to the exarchate, and all thoſe of Pentapolis or La Marca d'Ancona, abhorring the emperor as an heretic, ſubmitted to Luitprand king of the Lombards; who, pretending a zeal for the Catholic religion, took care to improve the diſcontent of the people to his advantage, by repreſenting to them, that they could never maintain their religious rights under a prince, who was not only an heretic, but a perſecutor of the orthodox.

In Naples, Exhilaratus, duke of that city, having received peremptory orders from the emperor to cauſe his edict to be put in execution, did all that lay in his power to perſuade the people to receive it: but finding all his endeavours thwarted by the biſhop of Rome, for whom the Neapolitans had a great veneration, he hired aſſaſſins to murder him. But the plot being diſcovered, though carried on with great ſecrecy, the Neapolitans, highly provoked againſt the duke, tore both him and his ſon to pieces, and likewiſe put to death one of his chief officers, who had compoſed a libel againſt the pope. Luitprand, and Gregory at that time duke of Benevento, laying hold of ſo favourable an opportunity to make themſelves maſters of the dukedom of Naples, did all that lay in their power to perſuade the Neapolitans to ſubmit to them. But the Neapolitans, bearing an irreconcileable hatred to the Lombards, with whom they had been conſtantly at variance, rejected every overture of that nature with the utmoſt indignation; and, continuing ſtedfaſt in their allegiance to Leo, received from Conſtantinople one Peter,

who was ſent to govern them in the room of Exhilaratus. Some writers ſuppoſe the Neapolitans, in this general revolt of the cities of Italy, to have ſhaken off the yoke with the reſt, and to have appointed magiſtrates of their own election to govern them, in the room of the officers hitherto ſent from Conſtantinople, or named by the exarch: but they are certainly miſtaken; it being manifeſt from hiſtory, that Peter ſucceeded Exhilaratus in that dukedom, and that the Neapolitans continued to live under the emperors, till they were conquered many years after by the Normans.

In the mean time, Leo hearing of the murder of the exarch, and the general revolt of the cities, and not doubting but the pope was the chief author of ſo much miſchief, ſent the eunuch Eutychius into Italy, with the title and authority of *exarch*, ſtrictly enjoining him to get the pope diſpatched by ſome means or other, ſince his death was abſolutely neceſſary for the tranquillity of Italy. The exarch ſpared no pains to get the pope into his power; but a meſſenger, whom he had ſent to Rome, being apprehended by the citizens, and an order from the emperor being found upon him to all his officers in that city, commanding them to put the pope to death at all events, the pope's friends thenceforth guarded him with ſuch care, that the exarch's emiſſaries could never afterwards find an opportunity of executing their deſign. As for the meſſenger, the Romans were for putting him to death; but the pope interpoſed, contenting himſelf with excommunicating the exarch.

And now the Romans, provoked more than ever againſt Leo, and, on the other hand, unwilling to live under the Lombards, reſolved to revolt from the emperor, and appoint their own magiſtrates, keeping themſelves united under the pope, not yet as their prince, but only as their head. This they did accordingly; and from theſe ſlender beginnings the ſovereignty of the popes in Italy took its riſe, though they did not then, as is commonly ſuppoſed by hiſtorians, but many years after, become ſovereign lords of Rome.

Eutychius failed in his deſign upon the life of the pope: but having brought with him from Conſtantinople a good number of troops, he eaſily quelled the rebellion in Ravenna, and ſeverely puniſhed the authors of the late diſturbances. As for the rebellious Romans, he was well appriſed he could never reduce them, ſo long as they were ſupported by the king of the Lombards; and therefore he employed all his art and policy to take off that prince from the party of the Romans, and bring him over to his own.

Luitprand, for ſome time, withſtood all his offers; but Thraſimund duke of Spoleto revolting at this very juncture, the exarch, laying hold of that opportunity, offered to aſſiſt the king with all his ſtrength againſt the rebellious duke, provided he would, in like manner, aſſiſt him againſt the pope and the Romans. With this propoſal Luitprand readily cloſed; and a league being concluded upon theſe terms between him and the exarch, the two armies joined, and began their march towards Spoleto. At their approach, the duke, deſpairing of being able to reſiſt two ſuch powers, came out with a ſmall attendance to meet them, and, throwing himſelf at the king's feet, ſued, in that humble poſture, for pardon; which Luitprand not only granted him, but confirmed him in the dukedom, after he had obliged him to take a new oath of allegiance, and give hoſtages for his fidelity in time to come. From Spoleto, the two armies marched, in purſuance of the treaty, to Rome, and encamped in the meadows of Nero, between the Tiber and the Vatican.

Gregory had cauſed the city of Rome to be fortified in the beſt manner he could: but being ſenſible that the Romans alone could not long hold out againſt two ſuch armies, and reflecting on the kind treatment the duke of Spoleto had met with upon his ſubmitting to the king, he reſolved to follow his example; and accordingly, taking with him ſome of the clergy, and the principal inhabitants of the city, he went to wait on the king in his camp; and there, with a pathetic ſpeech, as he was a great maſter of eloquence, ſoftened Luitprand to ſuch a degree, that, throwing himſelf at his feet in the preſence of the whole army, he begged pardon for entering into an alliance againſt him; and aſſuring him of his protection for the future, he went with him to the church of St. Peter; and there diſarming himſelf in the preſence of his chief officers, he laid his girdle, his ſword, and his gauntlet, with his royal mantle, his crown of gold, and croſs of ſilver, on the apoſtle's ſepulchre. After this, he reconciled the pope with the exarch, who was thereupon received into the city, where he continued for ſome time, maintaining a friendly correſpondence with the pope. At this time an impoſtor, taking the name of *Tiberius*, and pretending to be deſcended from the emperors, ſeduced a great many people in Tuſcany, and was by them proclaimed emperor. The exarch reſolved to march againſt him; but as he had not ſufficient forces to oppoſe the rebels, Gregory, who let no opportunity ſlip of obliging Leo, perſuaded the Romans to attend the exarch in this expedition; by which means the uſurper being taken in a caſtle, his head was ſent to the emperor, and the rebellion utterly ſuppreſſed. But the emperor ſtill inſiſting upon his edict againſt the images being received in Rome, the Romans, at the inſtigation of the pope, publicly renounced their allegiance to Leo, paid him no more tribute, and withdrew for ever their obedience to the emperors of the Eaſt.

Leo, informed of this revolt, and not queſtioning but the pope was the author of it, immediately ſeiſed all the patrimonies of the church of Rome in Sicily, Calabria, and his other dominions, to be confiſcated. At the ſame time, he ordered a powerful army to be raiſed, with a deſign to recover the towns that had revolted; to chaſtiſe the Romans for their rebellion; and, above all, to be revenged on the pope, who had raiſed all theſe diſturbances, by oppoſing himſelf, and perſuading others to oppoſe, the execution of his edict. Gregory, alarmed at the warlike preparations that were carrying on throughout the empire, and well appriſed that they were chiefly deſigned againſt him and the Romans, reſolved to recur to the protection of the French, the only nation at that time capable of coping with the emperor, and on whom, on account of their zeal for religion, he thought he might depend. The Lombards were then very powerful; but, as they wanted to be maſters of Rome, he did not think it advifable to truſt them. The Venetians, though zealous in the defence of the pope, were not yet in a condition to withſtand the power of the emperor; and, beſides, were jealous of the Lombards, who watched all opportunities of enlarging their dominions at the expence of their neighbours. As for Spain, it was then in a moſt deplorable condition, being over-run, and almoſt wholly ruined, by the Saracens.

The French nation was at this time governed by the celebrated Charles Martel, who had diſtinguiſhed himſelf in a moſt eminent manner in the wars of France and Germany; and had, not long before, gained a ſignal victory over the Saracens in the neighbourhood of Tours; whence he was generally reputed the beſt commander, and the greateſt hero, of his time. To him, therefore, Gregory ſent a ſolemn embaſſy, with a great number of relics, earneſtly entreating him to take the Romans, and the church, under his protection, and defend them againſt the attempts of Leo. The ambaſſadors were received with extraordinary marks of honour; and a treaty was ſoon concluded between them and Charles, who engaged to march into Italy in perſon, at the head of a powerful army, in defence of the Romans and the church, if they ſhould be attacked either by the emperor or the Lombards. On the other

hand, the Romans were to acknowledge him for their protector, and confer on him the honour of the conſulſhip, as it had been formerly conferred on Clovis by the emperor Anaſtaſius, after that prince had defeated the Viſigoths. The ambaſſadors returned from France loaded with rich preſents. But Gregory did not long enjoy the fruit of their negotiations; for he died the ſame year 731, and was ſucceeded by Gregory III. in whoſe time ſome place the above-mentioned embaſſy.

The French nation was at this time juſt recovered from its diſtreſſed ſituation under the deſcendants of Clovis; and, by the bravery and conduct of Charles Martel, had become the moſt powerful kingdom in the weſt. His ſucceſſor Pepin was no leſs wiſe and powerful than his father had been; and as the ambition of the Lombard princes would be ſatisfied with nothing leſs than the entire conqueſt of Italy, the French monarch, Charlemagne, under colour of aſſiſting the pope, at laſt put an end to the empire of Lombardy.

The Lombards were at firſt a cruel and barbarous nation; but diveſting themſelves by degrees of their native fierceneſs and barbarity, eſpecially after they had embraced the Chriſtian religion, they governed with ſuch equity and moderation, that moſt other nations envied the happineſs of thoſe who lived under them. Under the government of the Lombards (ſays Paulus Diaconus), no violence was committed, no one unjuſtly diſpoſſeſſed of his property, none oppreſſed with taxes; theft, robberies, murder, and adultery, were ſeldom heard of: every one went, without the leaſt apprehenſion, wherever he pleaſed. Their laws were ſo juſt and equitable, that they were retained in Italy, and obſerved there ſome ages after their kingdom was at an end.—According to Paulus Diaconus, alſo, their dreſs was looſe, and for the moſt part of linen, ſuch as the Anglo-Saxons wore, being interwoven with various colours; that their ſhoes were open to the end of their foot, and that they uſed to button or lace them. From ſome ancient paintings, it appears, that they ſhaved the back part of their heads, but that their hair was long before; their locks being parted, and laid on each each ſide their foreheads.

LOMENTACEÆ, in botany (from *lomentum*, a colour uſed by painters), the name of the 33d order in Linnæus's Fragments of a Natural Method, conſiſting of the following genera, many of which furniſh beautiful tinctures that are uſed in dyeing; viz. adenanthera, bauhinia, cæſalpina, caſſia, ceratonia, cercis, gleditſia, guilandina, hæmatoxylon, hymenæa, mimoſa, parkinſonia, poinciana, polygama. See BOTANY.

LOCH LOMOND, a large lake of Dunbarton or Lenoxſhire in Scotland, of which Mr. Pennant gives the following deſcription: "Loch-Lomond, the laſt, the moſt beautiful of the Caledonian lakes. The firſt view of it from Tarbat preſents an extenſive ſerpentine winding amidſt lofty hills; on the north, barren, black, and rocky, which darken with their ſhade that contracted part of the water. On the weſt ſide, the mountains are clothed near the bottom with woods of oak quite to the water-edge; their ſummits lofty, naked, and craggy. On the eaſt ſide, the mountains are equally high; but the tops form a more even ridge parallel to the lake, except where Ben-Lomond, like Saul amidſt his companions, overtops the reſt. The upper parts were black and barren; the lower had great marks of fertility, or at leaſt of induſtry, for the yellow corn was finely contraſted with the verdure of the groves intermixed with it.

"This eaſtern boundary is part of the Grampian hills, which extend from hence through the counties of Perth, Angus, Mearns, and Aberdeen. The road runs ſometimes through woods, at others is expoſed and naked; in ſome, ſo ſteep as to require the ſupport of a wall; the whole the work of the ſoldiery: bleſſed exchange of inſtruments of deſtruction for thoſe that give ſafety to the traveller, and a poliſh to the once inacceſſible native! Two great head-lands covered with trees ſeparate the firſt ſcene from one totally different; the laſt is called the *Point of Firkin*. On paſſing this cape an expanſe of water burſts at once on your eye, varied with all the ſofter beauties of nature. Immediately beneath is a flat covered with wood and corn: beyond, the headlands ſtretch far into the water, and conſiſt of gentle riſings; many have their ſurfaces covered with wood, others adorned with trees looſely ſcattered either over a fine verdure or the purple bloom of the heath. Numbers of iſlands are diſperſed over the lake, of the ſame elevated form as the little capes, and wooded in the ſame manner; others juſt peep above the ſurface, and are tufted with trees; and numbers are ſo diſpoſed as to form magnificent viſtos between.

"Oppoſite Luſs, at a ſmall diſtance from ſhore, is a mountainous iſle almoſt covered with wood; is near half a mile long, and has a moſt fine effect. I could not count the number of iſlands, but was told there are 28; the largeſt two miles long, and ſtocked with deer.

"The length of this charming lake is 24 Scotch miles; its greateſt breadth 8; its greateſt depth, which is between the point of Firkin and Ben-Lomond, is 120 fathoms. Beſides the fiſh common to the lochs are guiniads, called here *poans*.

"The ſurface of Loch Lomond has for ſeveral years paſt been obſerved gradually to increaſe, and invade the adjacent ſhore: and there is reaſon to ſuppoſe that churches, houſes, and other buildings, have been loſt in the water. Near Luſs is a large heap of ſtones at a diſtance from the ſhore, known by the name of the old church; and about a mile to the ſouth of that, in the middle of a large bay, between Camſtraddan and the iſle Inch-lavanack, is another heap, ſaid to have been the ruins of a houſe. To confirm this, it is evident by a paſſage in Cambden's Atlas Britannica, that an iſland, exiſting in his time, is now loſt; for he ſpeaks of the iſle of Camſtraddan, placed between the lands of the ſame name and Inch-lavanack, in which, adds he, was an houſe and orchard. Beſides this proof, large trees with their branches ſtill adhering are frequently found in the mud near the ſhore, overwhelmed in former times by the increaſe of water. This is ſuppoſed to be occaſioned by the vaſt quantities of ſtone and gravel that are continually brought down by the mountain rivers, and by the falls of the banks of the Leven; the firſt filling the bed of the lake, the laſt impeding its diſcharge through the bed of the river."

LOMONOZOF, a celebrated Ruſſian poet, the great refiner of his native tongue, was the ſon of a perſon who trafficked in fiſh at Kolmogori: he was born in 1711, and was fortunately taught to read; a rare inſtance for a perſon of ſo low a ſtation in Ruſſia. His natural genius for poetry was firſt kindled by the peruſal of the Song of Solomon, done into verſe by Polotſki, whoſe rude compoſitions, perhaps ſcarcely ſuperior to our verſion of the pſalms by Sternhold and Hopkins, inſpired him with ſuch an irreſiſtible paſſion for the muſes, that he fled from his father, who was deſirous of compelling him to marry, and took refuge in the Kaikonoſpaſki monaſtery at Moſcow: there he had an opportunity of indulging his taſte for letters, and of ſtudying the Greek and Latin languages. In this ſeminary he made ſo conſiderable a progreſs in polite literature, as to be noticed and employed by the Imperial academy of ſciences. In 1736 he was ſent, at the expence of that ſociety, to the univerſity of Marpurgh in Heſſe Caſſel, where he became a ſcholar of the celebrated Chriſtian Wolf, under whom he ſtudied univerſal grammar, rhetoric, and philoſophy. He continued at Marpurgh four years, during which time he applied himſelf with indefatigable diligence to chemiſtry, which he afterwards purſued with ſtill greater ſucceſs under the famous Henckel at Freyberg in Saxony. In 1741 he returned into Ruſſia; was choſen in

1742 adjunct to the imperial academy; and in the enſuing year member of that ſociety and profeſſor of chemiſtry. In 1760 he was appointed inſpector of the ſeminary, then annexed to the academy; in 1764 he was gratified by the late empreſs with the title of counſellor of ſtate; and died April 4th that year, in the 54th year of his age. Lomonozof excelled in various kinds of compoſition; but his chief merit, by which he bears the firſt rank among the Ruſſian writers, is derived from his poetical compoſitions, the fineſt of which are his odes. The firſt was written in 1739, while he ſtudied in Germany, upon the taking of Kotſchin, a fortreſs of Crim Tartary, by Marſhal Munich. The odes of Lomonozof are greatly admired for originality of invention, ſublimity of ſentiment, and energy of language; and compenſate for the turgid ſtyle which, in ſome inſtances, have been imputed to them, by that ſpirit and fire which are the principal characteriſtics in this ſpecies of compoſition. Pindar was his great model; and if we may give credit to a perſon well verſed in the Ruſſian tongue, he has ſucceeded in this daring attempt to imitate the Theban bard, without incurring the cenſure of Horace. In this, as well as ſeveral other ſpecies of compoſition, he enriched his native language with various kinds of metre, and ſeems to have merited the appellation beſtowed upon him of the *Father of Ruſſian Poetry*. A brief recapitulation of the principal works of Lomonozof, which were printed in three volumes octavo, will ſerve to ſhow the verſatility of his genius, and his extenſive knowledge in various branches of literature. The firſt volume, beſide a Preface on the advantages derived to the Ruſſian tongue from the eccleſiaſtical writings, contains ten ſacred and nineteen panegyric odes, and ſeveral occaſional pieces of poetry. The ſecond compriſes An Eſſay in Proſe on the Rules for Ruſſian Poetry; Tranſlation of a German Ode; Idylls; Tamira and Selim, a tragedy; Demophoon, a tragedy; Poetical Epiſtle on the Utility of Glaſs; two cantos of an epic poem, entitled Peter the Great; A Congratulatory Copy of Verſes; An Ode; Tranſlation of Baptiſt Rouſſeau's Ode *Sur le Bonheur*; Heads of a Courſe of Lectures on Natural Philoſophy; certain paſſages tranſlated in verſe and proſe, according to the original, from Cicero, Eraſmus, Lucian, Ælian, Ammianus Marcellinus, Quintus Curtius, Homer, Virgil, Martial, Ovid, Horace, and Seneca, which Ruſſian tranſlations were brought as examples in his Lectures upon Rhetoric; laſtly, Deſcription of the Comet which appeared in 1744. The third volume conſiſts chiefly of Speeches and Treatiſes read before the Academy; Panegyric on the Empreſs Elizabeth; on Peter the Great; Treatiſe on the Advantages of Chemiſtry; on the Phenomena of the Air occaſioned by the Electrical Fire, with a Latin tranſlation of the ſame; on the Origin of Light as a new Theory of Colours; Methods to determine with preciſion the Courſe of a Veſſel; on the Origin of Metals by the means of Earthquakes; Latin Diſſertation on Solidity and Fluidity; on the Tranſit of Venus in 1761, with a German tranſlation. Beſide theſe various ſubjects, Lomonozof made no inconſiderable figure in hiſtory, having publiſhed two ſmall works relative to that of his own country. The firſt, ſtyled Annals of the Ruſſian Sovereigns, is a ſhort chronology of the Ruſſian monarchs; and the ſecond is, the Ancient Hiſtory of Ruſſia, from the Origin of that Nation to the Death of the Great Duke Yaroſlaf I. in 1054; a performance of great merit, as it illuſtrates the moſt difficult and obſcure period in the annals of this country.

LONDON, a large city in the county of Middleſex, the metropolis of Great Britain, and one of the moſt wealthy and populous places in the world, is ſituated on the river Thames, in 51° 31′ north latitude, 400 miles ſouth of Edinburgh, and 270 ſouth-eaſt of Dublin; 180 miles weſt of Amſterdam, 210 north-weſt of Paris, 500 ſouth-weſt of Copenhagen, 600 north-weſt of Vienna, 790 ſouth-weſt of Stockholm, 800 north-eaſt of Madrid, 820 north-weſt of Rome, 850 north-eaſt of Liſbon, 1360 north-weſt of Conſtantinople, and 1414 ſouth-weſt of Moſcow.

This city was by the Romans firſt called *Londinium* or *Lundinum*, as we find it in Tacitus, Ptolemy, Antoninus, and Ammianus. That name was afterwards changed into *Auguſta*; in honour, as ſome ſay, of Helena Auguſta, the mother of Conſtantine the Great; while others think it more probable that it had this name from the ſecond legion, whoſe peculiar title was *Auguſta*; and ſome imagine that the honourable appellation of *Auguſta* was conferred upon this city by the Romans, as upon other principal cities of their empire, on account of its being grown up to be the capital of their Britiſh province. How long the name of *Auguſta* prevailed, is not now certainly known; but after the eſtabliſhment of the Saxons we find no more mention of Auguſta. It was then called *Caer Lundain, Lundoun Byrig, Lunden Ceaſter, Lunden-wye, Lundenne, Lunden-berh*, or *Lundenburg*; ſince the conqueſt the records call it *Londinia, Lundonia, Londine, Londres*; and, for ſeveral ages paſt, it has been called *London*, a manifeſt corruption from Tacitus's *Londinium*. The moſt probable derivation of theſe names appears to be, either from the Britiſh words *lhong* "a ſhip," and *din* "a town," *i. e.* a town or harbour for ſhips; or from *Llin* "a lake," *i. e. Llin din*, "the town upon the lake," the Surry ſide being ſuppoſed, upon very probable grounds, to have been anciently a great expanſe of water.

Londinium, however, was not the primitive name of this famous place, which exiſted before the invaſion of the Romans; being, at the time of Cæſar's arrival in the iſland, the capital of the *Trinobantes* or *Trinouantes*. The name of this nation, as appears from Baxter's Britiſh Gloſſary, was derived from the three following Britiſh words, *tri, nou, hant*, which ſignify the "inhabitants of the new city." This name, it is ſuppoſed, might have been given them by their neighbours, on account of their having newly come from the continent into Britain, and having there founded a city called *tri-now*, or the "new city;" the moſt ancient name of the renowned metropolis of Britain. The Trinobantes had come ſo lately from Belgium, that they ſeem ſcarcely to have been firmly eſtabliſhed in Britain at the time of the firſt Roman invaſion: For their new city, which ſoon after became ſo famous, was then ſo inconſiderable, that it is not mentioned by Cæſar, though he muſt have been within ſight of the place where it was ſituated. His ſilence about this place, indeed, is brought as a proof that he did not croſs the Thames; while Norden by the *firmiſſima civitas* of the Trinobantes underſtands the city in queſtion; the Trinobantes themſelves having been among the firſt of the Britiſh ſtates who ſubmitted to that conqueror.

By Ptolemy, and ſome other ancient writers of good authority, indeed, Londinium is placed in Cantium, or Kent, on the ſouth ſide of the Thames; and it is the opinion of ſome moderns, that the Romans probably had a ſtation there, to ſecure their conqueſts on that ſide of the river, before they reduced the Trinobantes. The place fixed upon for this ſtation is St. George's fields, a large plat of ground ſituated between Lambeth and Southwark, where many Roman coins, bricks, and chequered pavements, have been found. Three Roman ways from Kent, Surry, and Middleſex, interſected each other in this place: this therefore is ſuppoſed to be the original Londinum, which it is thought became neglected after the Romans reduced the Trinobantes, and ſettled on the other ſide of the Thames; and the name was transferred to the new city.

The ſituation of this city, as Mr. Pennant obſerves, was juſt ſuch as the people would ſelect according to the rule eſtabliſhed among the Britons. An immenſe foreſt originally extended to the river-ſide, and even as late as the reign of

Henry II, covered the northern neighbourhood of the city, and was filled with various ſpecies of beaſts of chace. It was defended naturally by foſſes; one formed by the creek which ran along Fleet-ditch, the other afterwards known by that of Walbrook; the ſouth ſide was guarded by the Thames; the north they might think ſufficiently protected by the adjacent foreſt.

The Romans poſſeſſed themſelves of London, on their ſecond invaſion in the reign of Claudius, about 105 years after their firſt under Cæſar. They had begun with Camalodunum, the preſent Maldon in Eſſex; and, having taken it, planted there a colony conſiſting of veterans of the 14th legion. London and Verulam were next taken poſſeſſion of about one and the ſame time. Camalodunum was made a *colonia*, or place governed entirely by Roman laws and cuſtoms; Verulam (on the ſite of which St. Alban's now ſtands), a *municipium*, in which the natives were honoured with the privileges of Roman citizens, and enjoyed their own laws and conſtitutions; and Londinium only a *præfectura*, the inhabitants, a mixture of Romans and Britons, being ſuffered to enjoy no more than the name of citizens of Rome, being governed by præfects ſent annually from thence, without having either their own laws or magiſtrates. "It was even then of ſuch concourſe (ſays Mr. Pennant), and ſuch vaſt trade, that the wiſe conquerors did not think fit to truſt the inhabitants with the ſame privileges as other places of which they had leſs reaſon to be jealous." But others obſerve, that this is a miſtake; and that the Romans, in order to ſecure their conqueſt, and to gain the affections of thoſe Britons who had already ſubmitted to their authority, made London equally a municipium or free city with Verulamium, as may be ſeen by referring to Aulus Gellius, l. 16. c. 13. and to Spanhem. orbis Roman. p. 37, 38. tom. ii.

It is difficult to ſay what were the particular articles of commerce exported from and imported into the port of London at this period. The imports and exports of the iſland in general we know: Strabo ſays, "Britain produceth corn, cattle, gold, ſilver, iron; beſides which, ſkins, ſlaves, and dogs naturally excellent hunters, are exported from that iſland." It is probable that the two firſt and three laſt articles were exported from London; and perhaps, too, the *gagates* or jet-ſtone mentioned by Solinus as one of the productions of Britain, together with horſes, were exported from thence. The imports were at firſt ſalt, earthen ware, and works in braſs, poliſhed bits of bones emulating ivory, horſe-collars, toys of amber, glaſſes, and other articles of the ſame material.

In the reign of Nero, as Tacitus informs us, London was become a city highly famous for the great conflux of merchants, her extenſive commerce, and plenty of all things. No fewer than ſeven of the fourteen itinera of Antoninus begin or end at London; which tends to corroborate the many proofs which might be adduced, that this city was the capital of Britain in the Roman times.

At firſt London had no walls or other fortifications to defend it, and was therefore expoſed to the attacks of every enemy; and thus it ſuffered ſeverely about the year 64, being burnt by the Britons under Boadicea, and all the inhabitants maſſacred. But it was ſoon reſtored by the Romans; and increaſed ſo much, that in the reign of the emperor Severus it is called by Herodian *a great and rich city*. It continued, however, in a defenceleſs ſtate for more than a century after this laſt period; when at laſt a wall of hewn ſtone and Britiſh bricks was erected round it.

London at this time extended in length from Ludgate-hill to a ſpot a little beyond the Tower. The breadth was not half equal to the length, and at each end grew conſiderably narrower. Maitland aſcribes the building of the walls to Theodoſius governor of Britain in 369. Dr. Woodward, with more probability, ſuppoſes them to have been founded under the auſpices of Conſtantine the Great; and this ſeems to be confirmed by the numbers of coins of that emperor's mother Helena, which have been diſcovered under them, placed there by him in compliment to her. The ſame emperor made it a biſhop's ſee; for it appears that the biſhops of London and York, and another Engliſh biſhop, were at the council of Ailes in the year 314: he alſo ſettled a mint in it, as is plain from ſome of his coins. The ancient courſe of the wall was as follows: It began with a fort near the preſent ſite of the Tower, was continued along the Minories, and the back of Houndſditch, acroſs Biſhopſgate-ſtreet, in a ſtraight line by London-wall to Cripplegate; then returned ſouthward by Crowder's Well Alley, (where ſeveral remnants of lofty towers were lately to be ſeen) to Alderſgate; thence along the back of Bull and Mouth-ſtreet to Newgate, and again along the back of the houſes in the Old Bailey to Ludgate; ſoon after which it probably finiſhed with another fort, where the houſe, late the king's printing-houſe, in Black Friars, now ſtands: from hence another wall ran near the river ſide, along Thames-ſtreet, quite to the fort on the eaſtern extremity. The walls were three miles a hundred and ſixty-five feet in circumference, guarded at proper diſtances on the land ſide with fifteen lofty towers; ſome of them were remaining within theſe few years. In Maitland's Hiſtory mention is made of one twenty ſix feet high, near Gravel-lane, on the weſt ſide of Houndſditch; another, about eighty paces ſouth-eaſt towards Aldgate; and the baſes of another, ſupporting a modern houſe, at the lower end of the ſtreet called the Vinegar-yard, ſouth of Aldgate. The walls, when perfect, are ſuppoſed to have been twenty-two feet high, the towers forty. Theſe, with the remnants of the wall, proved the Roman ſtructure, by the tiles and diſpoſition of the maſonry. London wall, near Moorfields, is now the moſt entire part left of that ancient precinct. The gates, which received the great military roads, were four. The Prætorian way, the Saxon Watling-ſtreet, paſſed under one, on the ſite of the late Newgate; veſtiges having been diſcovered of the road in digging above Holborn-bridge: it turned down to Dowgate, or more properly Dwr-gate or Water-gate, where there was a trajectus or ferry, to join it to the Watling-ſtreet, which was continued to Dover. The Hermin-ſtreet paſſed under Cripplegate; and a vicinal way went under Aldgate by Bethnal green, towards Oldford, a paſs over the river Lee to Duroleiton, the modern Leiton in Eſſex.

After the Romans deſerted Britain, a new and fierce race ſucceeded. The Saxons, under their leaders Hengiſt and Horſa, landed in 418, having been invited over by the provincials as auxiliaries againſt the Scots and Picts; but quarrelling with their friends, they found means to eſtabliſh themſelves in the iſland, and in proceſs of time entirely ſubdued them, as formerly related under the article ENGLAND. London fell into the hands of thoſe invaders about the year 457; and became the chief city of the Saxon kingdom in Eſſex. It ſuffered much in the wars carried on between the Britons and Saxons: but it ſoon recovered; ſo that Bede calls it a *princely mart-town*, under the government of a chief magiſtrate, whoſe title of *portgrave*, or *portreve* (for we find him called by both names), conveys a grand idea of the mercantile ſtate of London in thoſe early ages, that required a governor or guardian of the port. During the civil wars of the Saxons with each other, the Londoners had always the addreſs to keep themſelves neuter; and about the year 819, when all the ſeven Saxon kingdoms fell under the power of Egbert, London became the metropolis of England, which it has ever ſince continued.

During the invaſions of the Danes, London ſuffered greatly. In 849, theſe invaders entered the Thames with 250 ſhips,

plundered and burnt the city, and maſſacred the inhabitants; and two years after they returned with a fleet of 350 ſail, fully determined to deſtroy every thing that had eſcaped their barbarity in the former expedition. At this time, however, they were diſappointed; moſt of their troops being cut in pieces by king Ethelwolf and his ſon Athelbald; yet ſuch was the deſtruction made by thoſe barbarians at London, that it ſuffered more from theſe two incurſions than ever it had done before.

In the reign of king Alfred the Great, London began to recover from its former ruinous ſtate. He rebuilt its walls, drove out the Daniſh inhabitants who had ſettled there, reſtored the city to its former liberties and beauty, and committed the care of it to his ſon-in-law, Ethelred duke of Mercia, in hopes that this might always be a place of ſecure retreat within its ſtrong walls, whatever might happen from a foreign or domeſtic enemy. In 893, however, he had the mortification to ſee his capital totally reduced to aſhes by an accidental fire, which could not be extinguiſhed, as the houſes at that time were all built of wood. The walls, however, being conſtructed of incombuſtible materials, continued to afford the ſame protection as before; the houſes were quickly rebuilt, and the city divided into wards and precincts for its better order and government. This king alſo inſtituted the office of ſheriff, the nature of which office made it neceſſary to have it alſo in London: ſo that here we have the glimmerings of the order of magiſtrates afterwards ſettled in the city of London; in the perſon of the portreve, or portgrave, or governor of the city, as ſupreme magiſtrate; in the ſheriff, and in the officer or ſubordinate magiſtrate by what name ſoever then diſtinguiſhed, which, being placed at the head of each ward or precinct, were analogous to the more modern title of *aldermen*, and *common council men*.

Alfred having ſettled the affairs of England in the moſt prudent manner, directed his attention to the ornamenting, as much as poſſible, the city of London. For this purpoſe, he ſpirited up the Engliſh to an emulation in building their houſes of ſtronger and more durable materials than formerly. At that time their houſes were moſtly of wood; and an houſe built of any other materials was looked upon as a kind of wonder. But Alfred having begun to raiſe his palaces of ſtone and brick, the opulent Londoners, and the nobility reſident in and about London, followed the example, though the cuſtom did not come into general uſe till ſome ages after.

In 1013 a foreign enemy again appeared before London. Canute king of Denmark having invaded and plundered the counties of Dorſet, Somerſet, and Wilts, ſailed up the Thames with 200 ſhips, and laid ſiege to the city. The citizens continued faithful, notwithſtanding the defection of the greateſt part of the kingdom; and made ſuch a brave reſiſtance, that Canute thought fit to withdraw his army, leaving only his fleet to blockade the city by water, that when he found a fair opportunity he might renew the ſiege with better ſucceſs. At laſt, however, being defeated in ſeveral battles by Edmund Ironſide, he was obliged to call off his ſhips to cover his own army in caſe of neceſſity. In the compromiſe, however, which was afterwards made between Edmund and Canute, the city of London was given to the latter, and owned him for its lawful ſovereign. We have a ſtrong proof of the opulence of London even at this time, from the tax laid upon it by Canute in order to pay his army; this being no leſs than 10,500l. while the reſt of the nation was at the ſame time taxed only at 72,000l.

In 1046, we have the firſt inſtance of the Londoners ſending repreſentatives to parliament. This happened on ſettling the ſucceſſion to the throne after Canute's death. The Engliſh in general declared for Edward ſon of King Ethelred; or, if that could not be carried, for Hardicanute, ſon of Canute by queen Emma, and then abſent on a tour to Denmark. The city of London eſpouſed the claim and intereſt of Harold Hareſoot, ſon alſo of Canute, by queen Elgiva of Northampton. Edward's party ſoon declined; and the Londoners agreed, for the peace of the realm, that the two brothers ſhould divide the kingdom between them; but as Hardicanute did not return in proper time to England, a *wittenage-mote* was held at Oxford, where earl Leofric, and moſt of the thanes on the north of the Thames, with the pilots of London, choſe Harold for their king. Here, by *pilots* we are to underſtand the directors, magiſtrates, or leading men of the city: and this manifeſtly ſhows, that London was then of ſuch conſequence, that no important national affair was tranſacted without the conſent of the inhabitants; for the Saxon annals aſſure us, that none were admitted into this aſſembly of election but the nobility and the pilots of London.

On the invaſion of the Normans under William I. London ſubmitted as well as the reſt of the kingdom; and received two charters from that prince, confirming all the privileges they had under the Saxon kings, and adding ſeveral new ones. But while the citizens were promiſing themſelves all manner of ſecurity and tranquillity under the new government, it was almoſt entirely reduced to aſhes by an accidental fire in 1077. It had ſcarcely recovered from this calamity, when it was viſited by another of the ſame kind in 1086, which began at Ludgate, and deſtroyed the beſt and moſt opulent part of the city; conſuming, among other buildings, the cathedral of St. Paul's; which, however, was ſoon rebuilt more magnificently than before. Under the reign of William Rufus, London ſuffered conſiderably by fires, hurricanes, and inundations, and ſeems to have been depreſſed by the tyranny of that prince; but Henry I. granted large immunities to the city, which again revived its trade, and was favourable to the progreſs of the arts. The king, however, ſtill retained the privilege of appointing the portreve, or chief magiſtrate; but the immunities granted to the Londoners ſecured their affections, and tended much to ſecure him on the throne. At the ſame time, there was ſuch a plenty of all kinds of proviſions, that as much corn was ſold for 1s. as would ſuffice 100 people for a day; 4d. would purchaſe as much hay and corn as would maintain 20 horſes for a day; and a ſheep could be bought for a groat.

Henry thought proper alſo to check the licentious behaviour of the Normans, which, by the favour ſhowed them under the two Williams, had carried them into the moſt barbarous practices. Thoſe who followed William Rufus in his excurſions, haraſſed and plundered the country at diſcretion. Many of them were ſo extravagant in their barbarity, that what they could not eat or drink in their quarters, they either obliged the people to carry to market and ſell for their uſe, or elſe they would throw it into the fire: and, at their going off, they frequently waſhed their horſes heels with the drink, and ſtaved the caſks containing the remainder. King Henry reſolved to put a ſtop to theſe exceſſes and ſavage cuſtoms; and therefore publiſhed a proclamation at London, commanding that thenceforward all perſons who ſhould be convicted of ſuch barbarities ſhould have their eyes pulled out, or their hands or feet cut off, as the miniſters of juſtice ſhould think fit. This effectually checked the inſolence of the Normans, and the city continued to flouriſh throughout the reigns of Henry I. and Stephen. The attachment of the citizens to Stephen, however, was a crime which never could be forgiven by Henry II. and, of conſequence, he made them ſenſible of his diſpleaſure, by making frequent demands of money from them. About this time, indeed, the Londoners were arrived at ſuch a pitch of licentiouſneſs, that their proſperity ſeemed a curſe rather than

a bleſſing. The ſons of the moſt eminent and wealthy citizens entered into a confederacy to commit burglaries, and to rob and murder all that came in their way in the night-time. The king took an opportunity from theſe irregularities to enrich himſelf. He demanded ſeveral loans and free gifts; till at laſt the Londoners, to prevent further inquiries into their conduct, paid into the exchequer 5000l. in three years. Theſe diſorders, however, were at laſt ſtopped by the execution of John Senex; who, though a very rich and reputable citizen, had engaged in theſe enterpriſes. He offered 500lb. weight of ſilver, a prodigious ſum in thoſe days, for his pardon, but was refuſed. The king, however, ſtill continued to drain the citizens of their money by free gifts; and at laſt fined every ſeparate guild, fraternity, or company, that had preſumed to act as bodies corporate without the royal letters patent.

On the death of Henry II. the title of the firſt magiſtrate of London was changed from *portgreve* to that of *bailiff*; and in 1189 claimed and acted in the office of the *chief butler* at the coronation of Richard I. In 1191 this monarch permitted the bailiff, named *Henry Fitz Alwine*, to aſſume the title of *mayor*. For, in 1192, we find certain orders of the mayor and aldermen to prevent fires; whereby it was ordained, that "all houſes thereafter to be erected in London and the liberties thereof, ſhould be built of ſtone, with party-walls of the ſame; and covered either with ſlates or tiles, to prevent thoſe dreadful calamities by fire, which were frequently and chiefly occaſioned by houſes built of wood, and thatched with ſtraw or reeds." And for this purpoſe, it was alſo provided by the diſcreeter men of the city, "that 12 aldermen of the city ſhould be choſen in full huſtings, and there ſworn to aſſiſt the mayor in appeaſing contentions that might ariſe among neighbours in the city upon incloſure betwixt land and land, and to regulate the dimenſions of party-walls, which were to be of ſtone, 16 feet high and three feet thick; and to give directions about girders, windows, gutters, and wells." Such confidence alſo did Richard put in the wiſdom and faithfulneſs of the city of London, that when it was reſolved to fix a ſtandard for weights and meaſures for the whole realm, his majeſty committed the execution thereof to the ſheriffs of London and Middleſex, whom he commanded to provide meaſures, gallons, iron rods, and weights for ſtandards, to be ſent to the ſeveral counties of England. This happened in 1198, at which time corn was advanced to the enormous price of 18s. 4d. per quarter.

The city of London was much favoured by King John, who granted them three charters ſoon after his acceſſion. The firſt was a recital and confirmation of thoſe granted by Henry I. and II. with the farther privilege of being free from toll and every other duty or cuſtom in his majeſty's foreign dominions; for which they paid the ſum of 3000 merks. The ſecond was a confirmation of one granted by King Richard. By this the citizens of London had the juriſdiction and conſervancy of the river Thames; with a clauſe to extend that juriſdiction, and the powers therewith granted, to the river Medway; and with another clauſe to enable the ſaid city, as conſervators of the rivers Thames and Medway, to inflict a penalty of 10l. upon any perſon that ſhould preſume to erect a wear in either of theſe rivers. The third charter contains a fee-farm-rent of the ſheriffwicks of London and Middleſex at the ancient rent, of which they had been deprived by Queen Maud; granting them alſo the additional power of chooſing their own ſheriffs. This charter was given by way of conveyance from the crown to the citizens for a valuable conſideration, by which the ſheriffwick became their freehold; and this is the firſt covenant or conveyance we find on record with the legal terms of *to have and to hold*, which are at this time accounted an eſſential part in all conveyances of property.

During the reign of Henry III. the city of London was oppreſſed in many different ways. In 1218, he exacted a fine of 40 marks for ſelling a ſort of cloth not two yards within the liſts; and a 15th of the citizens, perſonal eſtates for the enjoyment of their ancient rights and privileges. In 1221, he commanded by proclamation all the foreign merchants to depart the city; which drew 30 marks from the Anſeatic company of the *Steelyard*, to have ſeiſin of their guild or hall in Thames-ſtreet. But it was the wreſtling-match at St. Giles's in the fields that brought on their greateſt burden. In the year 1221, on St. James's day, the citizens of London having carried off the victory from the people of Weſtminſter and other neighbouring villages, the ſteward of the abbot of Weſtminſter, meditating revenge againſt the Londoners, propoſed another wreſtling-match with them, and gave a ram for the prize. The citizens reſorted to the place at the time appointed; but were unexpectedly aſſaulted by a great number of armed men, who killed and wounded many, and diſperſed the reſt. This raiſed a great commotion in the city. The populace breathed revenge; and, by the inſtigation of Conſtantine Fitz-Arnulph, a great favourer of the French party during the troubles in king John's reign, they proceeded to Weſtminſter, and pulled down the houſes both of the ſteward and abbot. Hearing afterwards that the abbot was come into the city with his complaint to Philip Daubney the king's counſel, they purſued him, beat his ſervants cruelly, took away 12 of his horſes, and would have murdered himſelf, had he not eſcaped by a back-door. Upon this tumult, Hubert de Bury, then chief juſticiary, ſummoned the mayor and many of the principal citizens to attend him in the tower of London; and inquiring for the authors of the riot, Conſtantine, the ringleader, boldly anſwered, that "he was one; that they had done no more than they ought; and that they were reſolved to avow what they had done, let the conſequence be what it would." In this he was ſeconded by his nephew and one Geoffery; but the juſticiary, having diſmiſſed all the reſt, detained theſe three, and ordered them to be hanged next morning, though Conſtantine offered 15,000 marks for his pardon. Hubert then coming into the city with a ſtrong guard, cauſed the hands and feet of moſt of the principal rioters he could ſeize to be cut off: all which was executed without any legal proceedings or form of trial. After theſe arbitrary cruelties, he degraded the mayor and all the magiſtrates; placed a *cuſtos* over the city, and obliged 30 perſons of his own chooſing to become ſecurities for the good behaviour of the whole city. Several thouſand marks were alſo exacted by the king, before he would conſent to a reconciliation.

This arbitrary behaviour alarmed the whole nation. The parliament of 1224 began to be uneaſy for themſelves, and addreſſed his majeſty that he would be pleaſed to confirm the charter of liberties which he had ſworn to obſerve; and the conſequence of this application was a confirmation of the magna charta in the full parliament at Weſtminſter in the year 1225. At this time alſo, the rights and privileges of the citizens were confirmed. They were exempted from proſecutions for burels, *i. e.* liſted cloth; and were granted the right of having a common ſeal. The neceſſitous circumſtances of this monarch, however, made him often exact money arbitrarily as long as he lived.

Under the ſucceeding reigns, as the liberty of the people in general was augmented, ſo the liberty, opulence, and power of the citizens of London increaſed, until they became a kind of balance to the power of the crown itſelf, which in ſome meaſure they ſtill continue to be. Riots indeed, for which they generally ſuffered, were by no means unfrequent; the city often ſuffered by fires and plagues. Nothing, however, happened which materially affected the welfare of the city, till the reign of Charles II. in 1665.—This year London was ravaged

by the moſt violent plague ever known in Britain. The whole ſummer had been remarkably ſtill and warm, ſo that the weather was ſometimes ſuffocating even to people in perfect health; and by this unuſual heat and ſultry atmoſphere, people were undoubtedly prepared for receiving the infection, which appeared with violence in the months of July, Auguſt, and September. A violent plague had raged in Holland in the year 1663; on which account the importation of merchandiſe from that country was prohibited by the Britiſh legiſlature in 1664. Notwithſtanding this prohibition, however, it ſeems the plague had actually been imported; for in the cloſe of the year 1664, two or three perſons died ſuddenly in Weſtminſter, with marks of the plague on their bodies. Some of their neighbours, terrified at the thoughts of their danger, removed into the city; but their removal proved too late for themſelves, and fatal to thoſe among whom they came to reſide. They ſoon died of the plague; and communicated the infection to ſo many others, that it became impoſſible to extinguiſh the ſeeds of it by ſeparating thoſe that were infected from ſuch as were not. It was confined, however, through a hard froſty winter, till the middle of February, when it again appeared in the pariſh of St. Giles's, to which it had been originally brought; and after another long reſt till April, ſhowed its malignant force afreſh, as ſoon as the warmth of the ſpring gave it opportunity.—At firſt, it took off one here and there, without any certain proof of their having infected each other, and houſes began to be ſhut up, with a deſign to prevent its ſpreading. But it was now too late; the infection gained ground every day, and the ſhutting up of houſes only made the diſeaſe ſpread wider. People, afraid of being ſhut up, and ſequeſtered from all communications with ſociety, concealed their illneſs, or found means to eſcape from their places of confinement; while numbers expired in the greateſt torments, deſtitute of every aſſiſtance; and many died both of the plague and other diſeaſes, who would in all probability have recovered, had they been allowed their liberty, with proper exerciſe and air.—A houſe was ſhut up on account of a maid-ſervant, who had only ſpots, and not the gangrenous plague-blotches, upon her, ſo that her diſtemper was probably a petechial fever. She recovered; but the people of the houſe obtained no liberty to ſtir, either for air or exerciſe, for 40 days. The bad air, fear, anger, and vexation, attending this injurious treatment, caſt the miſtreſs of the family into a fever. The viſitors appointed to ſearch the houſes, ſaid it was the plague, though the phyſicians were of a different opinion: the family, however, were obliged to begin their quarantine anew, though it had been almoſt expired before; and this ſecond confinement affected them ſo much, that moſt of the family fell ſick, ſome of one diſtemper and ſome of another. Every illneſs that appeared in the family produced a freſh prolongation of their confinement; till at laſt the plague was actually brought in by ſome of thoſe who came to inquire into the health of the family, and almoſt every perſon in the houſe died.—Many examples of a ſimilar kind happened, and this was one of the worſt conſequences of ſhutting up houſes. All means of putting a ſtop to the infection were evidently ineffectual. Multitudes fled into the country; many merchants, owners of ſhips, &c. ſhut themſelves up, on board their veſſels, being ſupplied with proviſions from Greenwich, Woolwich, and ſingle farm-houſes on the Kentiſh ſide. Here, however, they were ſafe; for the infection never reached below Deptford, though the people went frequently on ſhore to the country towns, villages, and farm-houſes, to buy freſh proviſions. As the violence of the plague increaſed, the ſhips which had families on board removed farther off; ſome went quite out to ſea, and then put into ſuch harbours and roads as they could beſt get at.

In the mean time, the diſtemper made the moſt rapid advances within the city. In the laſt week of July, the number of deaths amounted to 2010; but the firſt week of Auguſt it roſe to 3817; thence to 3800; then to 4237; the next week, to 6102; and at laſt to 7000 and 8000 weekly. In the laſt week of September, however, the fury of the diſeaſe began to abate; though vaſt numbers were ſick, yet the number of burials decreaſed from 7155 to 5538; the next week there was a farther decreaſe to 4929, then to 4327, next to 2665, then to 1421, and the next week to 1031.

All this while, the poor people had been reduced to the greateſt diſtreſſes, by reaſon of the ſtagnation of trade, and the ſickneſſes to which they were peculiarly liable on account of their manner of living. The rich, however, contributed to their ſubſiſtence in a moſt liberal manner. The ſums collected on this occaſion, are indeed almoſt incredible; being ſaid to amount to 100,000 l. per week. The king is reported to have contributed 1000 l. weekly; and in the pariſh of Cripplegate alone 17,000 l. was diſtributed weekly among the poor inhabitants.—By the vigilance alſo of the magiſtrates, proviſions continued remarkably cheap throughout the whole time of this dreadful calamity, ſo that all riots and tumults on that account were prevented; and at laſt, on the ceſſation of the diſeaſe in the winter of 1665, the inhabitants who had fled returned to their habitations, and London to appearance became as populous as ever, though it was computed that 100,000 perſons had been carried off by this dreadful malady.

The city was ſcarcely recovered from this deſolation, when it was almoſt totally laid in aſhes by a fire, which broke out in a baker's ſhop in Pudding-lane, on Saturday-night, September 2, 1666. In a few hours Billingſgate ward was entirely burnt down; and before morning the fire had croſſed Thames-ſtreet, and deſtroyed the church of St. Magnus. From thence it proceeded to the bridge, and conſumed a great pile of buildings there; but was ſtopped by the want of any thing more to deſtroy. The flames, however, being ſcattered by a ſtrong eaſt wind, continued their devaſtations in other quarters. All efforts to ſtop it proved unſucceſsful throughout the Sunday. That day it proceeded up as far as Garlick-hithe; and deſtroying Canon-ſtreet, invaded Cornhill and the exchange. On Monday, the flames having proceeded eaſtward againſt the wind through Thames-ſtreet, invaded Tower-ſtreet, Grace-church-ſtreet, Fenchurch-ſtreet, Dowgate, Old-fiſh-ſtreet, Watling-ſtreet, Threadneedle-ſtreet, and ſeveral others, from all which it broke at once into Cheapſide. In a few hours Cheapſide was all in flames, the fire having reached it from ſo many places at once. The fire then continuing its courſe from the river on one ſide, and from Cheapſide on the other, ſurrounded the cathedral of St. Paul's. This building ſtood by itſelf at ſome diſtance from any houſes; yet ſuch was the violence of the flames, and the heat of the atmoſphere occaſioned by them, that the cathedral took fire at top. The great beams and maſſy ſtones broke through into Faith-church underneath, which was quickly ſet on fire; after which, the flames invaded Paternoſter-row, Newgate-ſtreet, the Old Bailey, Ludgate-hill, Fleet-ſtreet, Ironmonger-lane, Old-Jury, Laurence-lane, Milk-ſtreet, Wood-ſtreet, Gutter-lane, Foſter-lane, Lothbury, Cateaton-ſtreet; and, having deſtroyed Chriſt-church, burnt furiouſly through St. Martin's Le Grand towards Alderſgate.

The fire had now attained its greateſt extent, and was ſeveral miles in compaſs. The vaſt clouds of ſmoke obſcured the ſun ſo, that he either could not be ſeen at all, or appeared through it as red as blood. The flames reached an immenſe way up into the air, and their reflection from the ſmoke, which in the night time ſeemed alſo like flame, made the appearance ſtill more terrible. The atmoſphere was illuminated to a great extent, and this illumination is ſaid to have been viſible as far as Jedburgh in Scotland. Some of the light aſhes alſo are ſaid to have been carried to the diſtance of 16 miles. Guildhall

exhibited a ſingular appearance. The oak with which it was built was ſo ſolid that it would not flame, but burnt like charcoal, ſo that the building appeared for ſeveral hours like an enchanted palace of gold or burniſhed braſs.

At laſt, on Wedneſday morning, when every one expected that the ſuburbs as well as the city were to have been burnt, the fire began of itſelf to abate by reaſon of the wind having ceaſed, and ſome other changes no doubt taken place in the atmoſphere. It was checked at the great building in Leadenhall-ſtreet, and in other ſtreets by the blowing up ſeveral houſes with gun-powder. The damage ſuſtained was calculated at the ſum of 10,689,000l.

It was never certainly known whether this fire was accidental or deſigned. A ſuſpicion fell upon the Papiſts; and this gained ſuch general credit, that it is aſſerted for a truth on the monument which is erected in memory of the conflagration. Of the truth of this aſſertion, however, though there was not ſufficient proof, it had the effect of making the Papiſts moſt violently ſuſpected and abhorred by the Proteſtants, which ſome time after proved very prejudicial to the city itſelf.

From this calamity, great as it was, London ſoon recovered itſelf, and became much more magnificent than before; the ſtreets, which were formerly crooked and narrow, being now built wide and ſpacious; and the induſtry of its inhabitants repaired the loſſes they had ſuſtained. In 1679, the city was again alarmed by the diſcovery of a deſign to deſtroy it by fire a ſecond time, and Elizabeth Oxly ſervant to one Rind in Fetter-lane, having ſet her maſter's houſe on fire, was apprehended on ſuſpicion, and confeſſed, that ſhe had been hired to it by one Stubbs, a Papiſt, for a reward of five pounds. Stubbs being taken into cuſtody, acknowledged that he had perſuaded her to it; and that he himſelf had been prevailed upon by one father Gifford his confeſſor, who had aſſured him, that by burning the houſes of heretics he would do a great ſervice to the church. He alſo owned that he had ſeveral conferences with Gifford and two Iriſhmen on the affair. The maid and Stubbs alſo agreed in declaring, that the Papiſts intended to riſe in London, expecting to be powerfully ſupported by a French army. In conſequence of this diſcovery, the Papiſts were baniſhed from the city and ten miles round, and five Jeſuits were hanged for the abovementioned plot.

The Papiſts thought to revenge themſelves, by forging what was called the *meal-tub plot*, in which the Preſbyterians were ſuppoſed to hatch treacherous deſigns againſt the life of the king. Sir Edmondbury Godfrey, alſo, who had been very active in his proceedings againſt the Papiſts, was murdered by ſome unknown perſons; and this murder, together with their diſcovering the falſehood of the meal-tub plot, ſo exaſperated the Londoners, that they reſolved to ſhow their deteſtation of Popery, by an extraordinary exhibition on the 17th of November, Queen Elizabeth's acceſſion to the throne, on which day they had uſually burnt the pope in effigy. The proceſſion began with a perſon on horſeback perſonating Sir Edmondbury Godfrey, attended by a bell-man, proclaiming his execrable murder. He was followed by a perſon carrying a large ſilver croſs, with prieſts in copes, Carmelites, and Gray-friars, followed by ſix Jeſuits: then proceeded divers waiters, and after them ſome biſhops with lawn ſleeves, and others with copes and mitres. Six cardinals preceded the pope, enthroned in a ſtately pageant, attended by divers boys with pots of incenſe, and the devil whiſpering in his ear. In this order they marched from Biſhopſgate to Fleet-ſtreet, and there, amidſt a great multitude of ſpectators, committed his holineſs to the flames.

This proceſſion gave great offence to the court, at which the duke of York, afterwards James II. had a great influence. The breach was farther widened by the choice of Sheriffs for that year. The candidates ſet up by the court were rejected by a majority of almoſt two to one; but this did not deter their party from demanding a poll in their behalf, upon which a tumult enſued. This was repreſented by the Popiſh party in ſuch colours to the king, that he iſſued out a commiſſion that ſame evening for trying the rioters; which, however, was ſo far from intimidating the reſt, that they grew more and more determined, not only to oppoſe the Popiſh party, but to exclude the duke of York from his ſucceſſion to the crown.

In the mean time the king prorogued the parliament, to prevent them from proceeding in their enquiry concerning the Popiſh plot, and the excluſion-bill. Upon this the lord mayor, aldermen, and common-council, preſented a petition to his majeſty, in which they requeſted, that he would permit the parliament to ſit, in order to complete their ſalutary meaſures and councils. This petition was highly reſented by the king; who, inſtead of granting it, diſſolved the parliament, and could never afterwards be reconciled to the city. From this time it was determined to ſeize their charter; and freſh provocations having been given about the election of ſheriffs, a *quo warranto* was at laſt produced by the attorney-general, in order to overthrow their charter, and thereby to deprive the citizens of the power to chooſe ſheriffs. This information ſet forth, That "the mayor and commonalty and citizens of the city of London, by the ſpace of a month then laſt paſt and more, uſed, and yet do claim to have and uſe, without any lawful warrant or regal grant, within the city of London aforeſaid, and the liberties and privileges of the ſame city, the liberties and privileges following, viz. 1. To be of themſelves a body corporate and politic, by the name of *mayor and commonalty and citizens of the city of London*. 2. To have ſheriffs *civitat. et com. London. & com. Middleſex*, and to name, make, and elect, and conſtitute them. 3. That the mayor and aldermen of the ſaid city ſhould be juſtices of the peace, and hold ſeſſions of the peace. All which liberties, privileges, and franchiſes, the ſaid mayor and commonalty, and citizens of London, upon the king did by the ſpace aforeſaid uſurp, and yet do uſurp."

Though nothing could be more unjuſt than this proſecution, the miniſtry were determined at all events to cruſh the Londoners; rightly judging, that it would be an eaſy matter to make all other corporations ſurrender their charters into the king's hand, and that they had no other body in the nation to fear. Accordingly they diſplaced ſuch judges as would not approve of their proceedings; and, on the 12th of June, 1683, Juſtice Jones pronounced the following ſentence; "That a city might forfeit its charter; that the malverſations of the common-council were acts of the whole city; and that the points ſet forth in the pleadings were juſt grounds for the forfeiting of a charter."

Notwithſtanding this ſentence, however, the attorney general, contrary to the uſual cuſtom in ſuch caſes, was directed to move that the judgment might not be recorded; being afraid of the conſequences. Yet it was judged that the king might ſeize the liberties of the city. A common-council was immediately ſummoned to deliberate on this exigency. The country party moved to have the judgment entered; but they were over-ruled by the court-party, who inſiſted upon an abſolute ſubmiſſion to the king before judgment was entered; and though this was in effect a voluntary ſurrender of the city liberties, and depriving themſelves of the means of getting the judgment reverſed, the act of ſubmiſſion was carried by a great majority: and in a petition from the lord-mayor, aldermen and common council, they "acknowledged their own miſ-government, and his majeſty's lenity; begged his pardon, and promiſed conſtant loyalty and obedience; and humbly begged his majeſty's commands and directions." To this his majeſty

anſwered, that he would not reject their ſuit, if they would agree upon the following particulars. 1. That no lord-mayor, ſheriff, recorder, common-ſerjeant, town-clerk, or coroner, of the city of London, or ſteward of the borough of Southwark, ſhall be capable of, or admitted to, the exerciſe of their reſpective offices before his majeſty ſhall have approved of them under his ſign manual. 2. That if his majeſty ſhall diſapprove the choice of any perſon to be lord-mayor, and ſignify the ſame under his ſign manual to the lord-mayor, or, in default of a lord-mayor, to the recorder or ſenior alderman, the citizens ſhall, within one week, proceed to a new choice: and if his majeſty ſhall in like manner diſapprove the ſecond choice, his majeſty may, if he pleaſes, nominate a perſon to be lord mayor for the year enſuing. 3. If his majeſty ſhall, in like manner, diſapprove the perſons choſen to be ſheriffs, or either of them, his majeſty may appoint ſheriffs for the year enſuing. 4. That the lord mayor and court of aldermen may, with the leave of his majeſty, diſplace any alderman, recorder, &c. 5. Upon the election of an alderman, if the court of aldermen ſhall judge and declare the perſon preſented to be unfit, the ward ſhall chooſe again; and upon a diſapproval of a ſecond choice, the court may appoint another in his room. 6. That the juſtices of the peace ſhould be by the king's commiſſion; and the ſettling of thoſe matters to be left to his majeſty's attorney-general, and counſel learned in the law."

To theſe the lord keeper added, in the king's name, "That theſe regulations being made, his majeſty would not only pardon this proſecution, but would confirm their charter in ſuch a manner as ſhould be conſiſtent with them;" concluding thus: "My lord-mayor, the term draws towards an end, and Midſummer-day is at hand, when ſome of the officers uſed to be choſen, whereof his majeſty will reſerve the approbation. Therefore, it is his majeſty's pleaſure, that you return to the city, and conſult the common-council, that he may ſpeedily know your reſolutions thereupon, and accordingly give his directions. That you may ſee the king is in earneſt, and the matter is not capable of delay, I am commanded to let you know he hath given orders to his attorney-general to enter upon judgment on Saturday next, unleſs you prevent it by your compliance in all theſe particulars."

A common-council was ſummoned, when the friends of liberty treated thoſe ſlaviſh conditions as they deſerved; and even declared, that they were ready to ſacrifice all that was near or dear to them, rather than ſubmit to ſuch arbitrary impoſitions: but when it was put to the vote, there appeared a majority of 18 for ſubmiſſion.

Thus the king got the government of the city into his own hands, though he and his brothers entirely loſt the affections of the Londoners. But not content with their ſubmiſſion, his majeſty departed from his promiſe; commanded the judgment upon the *quo warranto* to be entered; and commiſſioned Sir William Pritchard, the lord-mayor, to hold the ſame office during his majeſty's pleaſure. In the ſame manner he appointed or diſplaced the other magiſtrates as he thought proper; after which the miniſtry, having nothing to fear, proceeded in the moſt arbitrary manner.

In this ſubjection to the will of the court the city of London continued till the Revolution; for in 1689 the immediate reſtoration of the Londoners to their franchiſes was ordered; and in ſuch a manner and form, as to put out of the powers of an arbitrary miniſtry and a corrupt judge and jury to deprive them of their chartered liberties for the time to come. Accordingly a bill was brought into parliament, and paſſed, for reverſing the judgment of the *quo warranto* againſt the city of London, and for reſtoring the ſame to its ancient rights and privileges. Since that time it hath enjoyed tranquillity; its commerce hath been carried to the higheſt pitch; and for the politeneſs, riches, and number of its inhabitants, as well as its extent and the magnificence of its buildings, is inferior to no city in Europe, if not ſuperior to every one.

That part of this immenſe capital which is diſtinguiſhed by the name of *The City*, ſtands on the north ſhore of the river, from the Tower to the Temple, occupying only that ſpace formerly encompaſſed by the wall, which in circumference meaſures but three miles and 165 feet. In this wall there were ſeven gates by land, viz. Ludgate, Aldgate, Cripplegate, Alderſgate, Moorgate, Biſhopſgate, which were all taken down in 1760; and Newgate, the county gaol, which was alſo taken down in 1776, and a maſſive building erected a little ſouth of it, which by the rioters in 1780 received damage to the amount of 80,000l. On the ſide of the water there were Dowgate and Billingſgate, long ſince demoliſhed, as well as the poſtern-gate near the Tower. In the year 1670 there was a gate erected called Temple bar, which terminates the bounds of the city weſtward. The *liberties*, or thoſe parts of this great city which are ſubject to its juriſdiction and lie without the walls of London, are bounded on the eaſt, in Whitechapel, the Minories, and Biſhopſgate, by bars, which were formerly poſts and chains, that were frequently taken away by arbitrary power, when it was thought proper to ſeize the franchiſes of the city of London: on the north, they are bounded in the ſame manner in Pick-ax ſtreet, at the end of Fan-alley, and in St. John's ſtreet: on the weſt, by bars in Holborn: at the eaſt end of Middle-row, and at the weſt end of Fleet ſtreet, by the gate called Temple bar, already mentioned: on the ſouth, we may include the juriſdiction which the city holds on the river Thames, and over the borough of Southwark.

The city, including the borough, is at preſent divided into 26 wards; viz. 1. Alderſgate ward. 2. Aldgate. 3. Baſſiſhaw or Baſinghall ward. 4. Billingſgate ward. 5. Biſhopſgate ward. 6. Bread-ſtreet ward. 7. Bridge ward within. 8. Broad-ſtreet ward. 9. Candlewick ward, Candlewick-ſtreet, or Candlewright ſtreet ward as it is called in ſome ancient records. 10. Caſtle Baynard ward. 11. Cheap ward. 12. Coleman-ſtreet ward. 13. Cordwainers ward. 14. Cornhill ward. 15. Cripplegate ward. 16. Dowgate ward. 17. Farringdon ward within. 18. Farringdon ward without. 19. Langborn ward. 20. Lime-ſtreet ward. 21. Portſoken ward. 22. Queenhithe ward. 23. Tower ward, or Tower-ſtreet ward. 24. Vintry ward. 25. Wallbrook ward. 26. The ward of Bridge without, which includes the borough of Southwark, and the pariſhes of Rotherhithe, Newington, and Lambeth.

The city and liberties of London are under an eccleſiaſtical, a civil, and a military government.

As to its *eccleſiaſtical* government, London is a biſhop's ſee, the dioceſe of which comprehends not only Middleſex, Eſſex, and part of Hertfordſhire, but the Britiſh plantations in America. The biſhop of London takes precedency next to the archbiſhops of Canterbury and York; but the following pariſhes of this city are exempt from his juriſdiction, being peculiars under the immediate government of the archbiſhop of Canterbury; viz. All-hallows in Bread-ſtreet, All-hallows Lombard-ſtreet, St. Dionys Back-church, St. Dunſtan in the Eaſt, St. John Baptiſt, St. Leonard Eaſtcheap, St. Mary Aldermary, St. Mary Bothaw, St. Mary le Bow, St. Michael Crooked-lane, St. Michael Royal, St. Pancras Soper lane, and St. Vedaſt Foſter-lane.

The *civil* government of London divides it into wards and precincts, under a lord-mayor, aldermen, and common council.

The mayor, or lord mayor, is the ſupreme magiſtrate, choſen annually by the citizens, purſuant to a charter of king John. The preſent manner of electing a lord-mayor is by the livery-

men of the ſeveral companies, aſſembled in Guildhall annually on Michaelmas day, according to an act of common-council in A. D. 1476, where and when the liverymen chooſe, or rather nominate, two aldermen below the chair, who have ſerved the office of ſheriff, to be returned to the court of aldermen, who may chooſe either of the two; but generally declare the ſenior of the two, ſo returned, to be lord-mayor elect. The election being over, the lord mayor elect, accompanied by the recorder and divers aldermen, is ſoon after preſented to the lord-chancellor (as his majeſty's repreſentative in the city of London), for his approbation; and on the 9th of November following is ſworn into the office of mayor at Guildhall; and on the day after, before the barons of the exchequer at Weſtminſter; the proceſſion on which occaſion is exceedingly grand and magnificent.

The lord-mayor ſits every morning at the manſion-houſe, or place where he keeps his mayoralty, to determine any difference that may happen among the citizens, and to do other buſineſs incident to the office of a chief magiſtrate. Once in ſix weeks, or eight times in the year, he ſits as chief judge of Oyer and Terminer, or gaol delivery of Newgate for London and the county of Middleſex. His juriſdiction extends all over the city and ſuburbs, except ſome places that are exempt. It extends alſo from Colneyditch, above Staines-bridge in the weſt, to Yeudale, or Yenſlete, and the mouth of the river Medway, and up that river to Upnor caſtle, in the eaſt: by which he exerciſes the power of puniſhing or correcting all perſons that ſhall annoy the ſtreams, banks, or fiſh. For which purpoſe his lordſhip holds ſeveral *courts of conſervancy* in the counties adjacent to the ſaid river, for its conſervation, and for the puniſhment of offenders. See the article MAYOR'*s-Court*.

The title of dignity, *alderman*, is of Saxon original, and of the greateſt honour, anſwering to that of earl; though now it is no where to be found but in chartered ſocieties. And from hence we may account for the reaſon why the aldermen and commonalty of London were called *barons* after the conqueſt. Theſe magiſtrates are properly the ſubordinate governors of their reſpective wards under the lord-mayor's juriſdiction: and they originally held their aldermanries either by inheritance or purchaſe; at which time the aldermanries or wards changed their names as often as their governors or aldermen. The oppreſſions, to which the citizens were ſubject from ſuch a government, put them upon means to aboliſh the perpetuity of that office; and they brought it to an annual election. But that manner of election being attended with many inconveniences, and becoming a continual bone of contention among the citizens, the parliament, 17 Richard II. A. D. 1394, enacted, That the aldermen of London ſhould continue in their ſeveral offices during life or good behaviour. And ſo it ſtill continues: though the manner of electing has ſeveral times varied. At preſent it is regulated by an act of parliament, paſſed in the year 1724-5: and the perſon ſo elected is to be returned by the lord-mayor (or other returning officer in his ſtead, duly qualified to hold a court of wardmote) to the court of lord-mayor and aldermen, by whom the perſon ſo returned muſt be admitted and ſworn into the office of alderman before he can act. If the perſon choſen refuſeth to ſerve the office of alderman, he is finable 500l.

Theſe high officers conſtitute a ſecond part of the city legiſlature when aſſembled in a corporate capacity, and exerciſe an executive power in their reſpective wards. The aldermen who have paſſed the chair, or ſerved the high office of lord-mayor, are juſtices of the quorum; and all the other aldermen are not only juſtices of the peace, but by the ſtatute of 43 Eliz. entitled, *An act for the relief of the poor*, "every alderman of the city of London, within his ward, ſhall and may do and execute, in every reſpect, ſo much as is appointed and allowed by the ſaid act to be done or executed by one or *two* juſtices of peace of any county within this realm." They every one keep their *wardmote*, or *court*, for chooſing ward-officers and ſettling the affairs of the ward, to redreſs grievances, and to preſent all defaults found within their reſpective wards.

The next branch of the legiſlative power in this city is the *common council*. The many inconveniences that attended popular aſſemblies, which were called *folkmote*, determined the commonalty of London to chooſe repreſentatives to act in their name, and for their intereſt, with the lord-mayor and aldermen, in all affairs relating to the city. At firſt theſe repreſentatives were choſen out of the ſeveral companies; but that not being found ſatisfactory, nor properly the repreſentatives of the whole body of the inhabitants, it was agreed to chooſe a certain number of diſcreet men out of each ward; which number has from time to time increaſed according to the dimenſions of each ward: and at preſent the 25 wards into which London is divided, being ſubdivided into 236 precincts, each precinct ſends a repreſentative to the common-council, who are elected after the ſame manner as an alderman, only with this difference, that as the lord-mayor preſides in the wardmote, and is judge of the poll at the election of an alderman ſo the alderman of each ward is judge of the poll at the election of a common-council man.

Thus the lord-mayor, aldermen, and common-council, when aſſembled, may be deemed the city parliament, reſembling the great council of the nation. For it conſiſts of two houſes; one for the lord-mayor and aldermen, or the upper-houſe; another for the commoners or repreſentatives of the people, commonly called the *common-council men*. And they have power in their incorporate capacity to make and repeal bye-laws; and the citizens are bound to obey or ſubmit to thoſe laws. When they meet in their incorporate capacity, they wear deep blue ſilk gowns; and their aſſemblies are called the *court of common-council*, and their ordinances *acts of common-council*. No act can be performed in the name of the city of London without their concurrence. But they cannot aſſemble without a ſummons from the lord-mayor; who, nevertheleſs, is obliged to call a common-council, whenever it ſhall be demanded, upon extraordinary occaſions, by ſix reputable citizens and members of that court.

This corporation is aſſiſted by two ſheriffs and a recorder. The ſheriffs are chartered officers, to perform certain ſuits and ſervices, in the king's name, within the city of London and county of Middleſex, choſen by the liverymen of the ſeveral companies on Midſummer-day. Their office, according to Cambden, in general, is to collect the public revenues within their ſeveral juriſdictions; to gather into the exchequer all fines belonging to the crown; to ſerve the king's writs of proceſs; to attend the judges, and execute their orders; to impannel juries; to compel headſtrong and obſtinate men by the *poſſe comitatus* to ſubmit to the deciſions of the law; and to take care that all condemned criminals be duly puniſhed and executed. In particular, in London, they are to execute the orders of the common-council, when they have reſolved to addreſs his majeſty, or to petition parliament.

The ſheriffs, by virtue of their office, hold a court at Guildhall every Wedneſday and Friday, for actions entered at Woodſtreet Compter; and on Thurſdays and Saturdays for thoſe entered at the Poultry Compter: of which the ſheriffs being judges, each has his aſſiſtant or deputy, who are called the judges of thoſe courts; before whom are tried actions of debt, treſpaſs, covenant, &c. and where the teſtimony of any abſent witneſs in writing is allowed to be good evidence. To each of theſe courts belong four attornies, who, upon their being admitted by the court of aldermen, have an oath adminiſtered to them.

To each of theſe courts, likewiſe, belong a ſecondary, a

clerk of the papers, a prothonotary, and four clerks-ſitters. The ſecondary's office is to allow and return all writs brought to remove clerks out of the ſaid courts; the clerk of the papers files and copies all declarations upon actions; the prothonotary draws and engroſſes all declarations; the clerk-ſitters enter actions and attachments, and take bail and verdicts. To each of the compters, or priſons belonging to theſe courts, appertain 16 ſerjeants at mace, with a yeoman to each, beſides inferior officers, and the priſon-keeper.

In the ſheriffs court may be tried actions of debt, caſe, treſpaſs, account, covenant, and all perſonal actions, attachments, and ſequeſtrations. When an erroneous judgment is given in either of the ſheriffs courts of the city, the writ of error to reverſe this judgment muſt be brought in the court of huſtings before the lord mayor; for that is the ſuperior court. The ſheriffs of London may make arreſts and ſerve executions on the river Thames.

We do not read of a recorder till the year 1304, who, by the nature of his office, ſeems to have been intended as an aſſiſtant to, or aſſeſſor with, the lord-mayor, in the execution of his high office, in matters of juſtice and law. He is choſen by the lord mayor and aldermen only; and takes place in all courts, and in the common council, before any one that hath not been mayor. Of whom we have the following deſcription in one of the books of the chamber: "He ſhall be, and is wont to be, one of the moſt ſkilful and virtuous apprentices of the law of the whole kingdom; whoſe office is always to ſit on the right hand of the mayor, in recording pleas, and paſſing judgments; and by whom records and proceſſes, had before the lord-mayor and aldermen at Great St. Martin's, ought to be recorded by word of mouth before the judges aſſigned there to correct errors. The mayor and aldermen have therefore uſed commonly to ſet forth all other buſineſſes, touching the city, before the king and his council, as alſo in certain of the king's courts, by Mr. Recorder, as a chief man, endued with wiſdom, and eminent for eloquence."—Mr. Recorder is looked upon to be the mouth of the city, to deliver all addreſſes to the king, &c. from the corporation; and he is the firſt officer in order of precedence that is paid a ſalary, which originally was no more than 10l. ſterling *per annum*, with ſome few perquiſites; but it has from time to time been augmented to 1000l. *per annum*, and become the road to preferment in the law. This office has ſometimes been executed by a deputy.

The next chartered officer of this corporation is the chamberlain; an office of great repute and truſt, and is in the choice of the livery annually. This officer, though choſen annually on Midſummer-day, is never diſplaced during his life, except ſome very great crime can be made out againſt him. He has the keeping of the moneys, lands, and goods, of the city orphans, or takes good ſecurity for the payment thereof when the parties come to age. And to that end he is deemed in the law a ſole corporation, to him and his ſucceſſors, for orphans; and therefore a bond or a recognizance made to him and his ſucceſſors is recoverable by his ſucceſſors. This officer hath a court peculiarly to him. His office may be termed a public treaſury, collecting the cuſtoms, moneys, and yearly revenues, and all other payments belonging to the corporation of the city. It was cuſtomary for government to appoint the chamberlain receiver of the land tax; but this has been diſcontinued for ſeveral years paſt.

The other officers under the lord-mayor are, 1. The common ſerjeant. He is to attend the lord-mayor and court of aldermen on court-days, and to be in council with them on all occaſions, within or without the precincts or liberties of the city. He is to take care of orphans' eſtates, either by taking account of them, or to ſign their indentures before their paſſing the lord-mayor and court of aldermen. And likewiſe he is to let, ſet, and manage the orphans' eſtates, according to his judgment, to the beſt advantage. 2 The town-clerk; who keeps the original charter of the city, the books, rolls, and other records, wherein are regiſtered the acts and proceedings of the city; ſo that he may not be improperly termed the city-regiſter: he is to attend the lord mayor and aldermen at their courts, and ſigns all public inſtruments. 3. The city remembrancer; who is to attend the lord-mayor on certain days, his buſineſs being to put his lordſhip in mind of the ſelect days he is to go abroad with the aldermen, &c. He is to attend daily at the parliament-houſe, during the ſeſſions, and to report to the lord-mayor their tranſactions. 4. The ſword-bearer; who is to attend the lord mayor at his going abroad, and to carry the ſword before him, being the emblem of juſtice. This is an ancient and honourable office, repreſenting the ſtate and princely office of the king's moſt excellent majeſty, and his repreſentative the lord-mayor: and, according to the rule of armory, "He muſt carry the ſword upright, the hilts being holden under his bulk, and the blade directly up the midſt of his breaſt, and ſo forth between the ſword-bearer's brows." 5. The common hunt; whoſe buſineſs it is to take care of the pack of hounds belonging to the lord-mayor and citizens, and to attend them in hunting in thoſe grounds to which they are authoriſed by charter. 6. The common-crier. It belongs to him and the ſerjeant at arms to ſummon all executors and adminiſtrators of freemen to appear, and to bring in inventories of the perſonal eſtates of freemen, within two months after their deceaſe: and he is to have notice of the appraiſements. He is alſo to attend the lord mayor on ſet days, and at the courts held weekly by the mayor and aldermen. 7. The water-bailiff; whoſe office is to look after the preſervation of the river Thames againſt all encroachments: and to look after the fiſhermen for the preſervation of the young fry, to prevent the deſtroying them by unlawful nets. For that end, there are juries for each county that hath any part of it lying on the ſides or ſhores of the ſaid river; which juries, ſummoned by the water-bailiff at certain times, do make inquiry of all offences relating to the river and the fiſh, and make their preſentments accordingly. He is alſo bound to attend the lord mayor on ſet days in the week.—Theſe ſeven purchaſe their places; except the town-clerk, who is choſen by the livery.

There are alſo three ſerjeant-carvers; three ſerjeants of the chamber; a ſerjeant of the channel; four yeomen of the water ſide; an under water bailiff; two yeomen of the chamber; two meal-weighers; two yeomen of the wood-wharfs; a foreign taker; city marſhals. There are, beſides theſe, ſeven gentlemen's men; as, the ſword-bearer's man, the common-hunt's two men, the common-crier's man, and the carver's three men.

Nine of the foregoing officers have liveries of the lord-mayor, viz. the ſword-bearer and his man, the three carvers, and the four yeomen of the water-ſide. All the reſt have liveries from the chamber of London.

The following officers are likewiſe belonging to the city; farmer of the markets, auditor, clerk of the chamber, clerk to the commiſſioners of the ſewers, clerk of the court of conſcience, beadle of the ſame court, clerk of the city-works, printer to the city, juſtice of the Bridge-yard, clerk-comptroller of the bridge-houſe, ſteward of the borough, bailiff of the borough.

There is alſo a coroner, called ſo from *corona*, i. e. a *crown*, becauſe he deals principally with the crown, or in matters appertaining to the imperial crown of England. See the article CORONER.

Beſides theſe officers, there are ſeveral courts in this city for the executing of juſtice; viz. the court of huſtings, lord-mayor's

court, &c. In the city there are alſo two ſubordinate kinds of government One executed by the alderman, deputy, and common-council men, and their inferior officers, in each ward; under which form are comprehended all the inhabitants, free or not free, of the city. Every ward is therefore like a little free ſtate, and at the ſame time ſubject to the lord mayor as chief magiſtrate of the city. The houſekeepers of each ward elect their repreſentatives, the common-council, who join in making bye-laws for the government of the city. The officers and ſervants of each ward manage the affairs belonging to it, without the aſſiſtance of the reſt; and each has a court called the *wardmote*, as has been already deſcribed, for the management of its own affairs. The other, by the maſter, wardens, and court of aſſiſtants, of the incorporate companies; whoſe power reaches no further than over the members of their reſpective guilds or fraternities; except that in them is inveſted the power to chooſe repreſentatives in parliament for the city, and all thoſe magiſtrates and officers elected by a common hall; which companies are inveſted with diſtinct powers, according to the tenor of their reſpective charters.

The *military* government of the city is lodged in a lieutenancy, conſiſting of the lord mayor, aldermen, and other principal citizens, who receive their authority by a commiſſion from the king. Theſe once had under their command the city trained bands, conſiſting of ſix regiments of foot, diſtinguiſhed by the names of the *white*, *orange*, *yellow*, *blue*, *green*, and *red*, each containing eight companies of 150 men, amounting in all to 7200. This military force, however, having, from diſuſe, fallen into neglect and contempt, a new act of parliament has been obtained, under which a regular militia have been raiſed and well diſciplined for ſervice. There is alſo a corps called the *artillery company*, from its being taught the military exerciſe in the artillery-ground. This company is independent of the reſt, and conſiſts of 700 or 800 volunteers. To theſe may be added two regiments of foot commanded by the lieutenant of the Tower of London, making the whole militia of this city a reſpectable force.

The *trading part* of the city of London is divided into 89 companies; though ſome of them can hardly be called ſo, becauſe they have neither charters, halls, nor liveries. Of theſe 89 companies 55 have each a hall for tranſacting the buſineſs of the corporation; and this conſiſts of a maſter or prime warden, a court of aſſiſtants, and livery.—Twelve of theſe companies are ſuperior to the reſt both in antiquity and wealth; and of one of thoſe 12 the lord mayors have generally made themſelves free at their election. Theſe companies are the mercers, grocers, drapers, fiſh-mongers, goldſmiths, ſkinners, merchant-taylors, haberdaſhers, ſalters, iron-mongers, vintners, and cloth-workers. The principal incorporated ſocieties of the merchants of this city are, the Hamburgh Company, the Hudſon's Bay Company, the Ruſſia Company, the Turkey Company, the Eaſt India Company, the Royal African Company, the South Sea Company, and ſome Inſurance Companies. The moſt of theſe companies have ſtately houſes for tranſacting their buſineſs, particularly the Eaſt India and South Sea companies. See COMPANY.

The public buildings in London and its liberties are too generally known, as well as far too numerous for a particular deſcription in this work. Beſides a great number of ſpacious ſtreets, which are daily increaſing, the weſtern part of it is ornamented with ſeveral magnificent ſquares, viz. Groſvenor-ſquare, Berkeley-ſquare, Portman-ſquare, Cavendiſh-ſquare, Hanover-ſquare, St. James's ſquare, Soho-ſquare, Bloomſbury-ſquare, Queen's-ſquare, Lincoln's-Inn-ſquare, Leiceſter-ſquare, Red-Lion-ſquare, &c.; not to mention others that are at preſent building. In general the new buildings in the liberty of Weſtminſter have increaſed to a prodigious degree; inſomuch that they reach as far as Marybone to the north, Piccadilly to the ſouth, and Hyde-Park-wall to the weſt.

Before the conflagration in 1666, LONDON (which, like moſt other great cities, had ariſen from ſmall beginnings) was totally inelegant, inconvenient, and unhealthy, of which latter misfortune many melancholy proofs are authenticated in hiſtory, and which, without doubt, proceeded from the narrowneſs of the ſtreets, and the unaccountable projections of the buildings, that confined the putrid air, and joined with other circumſtances, ſuch as the want of water, rendered the city ſeldom free from peſtilential deva ſtation. The fire which conſumed the greateſt part of the city, dreadful as it was to the inhabitants at that time, was productive of conſequences which made ample amends for the loſſes ſuſtained by individuals; a new city aroſe on the ruins of the old; but, though more regular, open, convenient, and healthful, than the former, yet it by no means anſwered to the characters of magnificence or elegance, in many particulars; and it is ever to be lamented (ſuch was the infatuation of thoſe times), that the magnificent, elegant, and uſeful plan of the great Sir Chriſtopher Wren was totally diſregarded, and ſacrificed to the mean and ſelfiſh views of private property; views which did irreparable injury to the citizens themſelves and to the nation in general: for, had that great architect's plan been followed, what has often been aſſerted muſt have been the reſult; the metropolis of this kingdom would inconteſtably have been the moſt magnificent and elegant city in the univerſe, and of conſequence muſt, from the prodigious reſort of foreigners of diſtinction and taſte who would have viſited it, have become an inexhauſtible fund of riches to this nation. But as the deplorable blindneſs of that age has deprived us of ſo valuable an acquiſition, it is become abſolutely neceſſary that ſome efforts ſhould be made to render the preſent plan in a greater degree anſwerable to the character of the richeſt and moſt powerful people in the world.

The plan of London, in its preſent ſtate, will in many inſtances appear to very moderate judges to be as injudicious a diſpoſition as can eaſily be conceived for a city of trade and commerce, on the borders of ſo noble a river as the Thames. The wharfs and quays on its banks are extremely mean and inconvenient; and the want of regularity and uniformity in the ſtreets of the city of London, and the mean avenues to many parts of it, are alſo circumſtances that greatly leſſen the grandeur of its appearance. Many of the churches and other public buildings are likewiſe thruſt up in corners, in ſuch a manner as might tempt foreigners to believe that they were deſigned to be concealed. The improvements of the city of London for ſome years paſt have, however, been very great; and the new ſtreets, which are numerous, are in general more ſpacious, and built with greater regularity and elegance.

The very elegant and neceſſary method of paving and lighting the ſtreets is alſo felt in the moſt ſenſible manner by all ranks and degrees of people. The roads are continued for ſeveral miles around upon the ſame model; and, excluſive of lamps regularly placed on each ſide, at ſhort diſtances, are rendered more ſecure by watchmen ſtationed within call of each other. Nothing can appear more brilliant than thoſe lights when viewed at a diſtance, eſpecially where the roads run acroſs; and even the principal ſtreets, ſuch as Pall-Mall, New Bond-ſtreet, Oxford-ſtreet, &c. convey an idea of elegance and grandeur.

London, then, in its large ſenſe, including Weſtminſter, Southwark, and part of Middleſex, forms one great metropolis, of vaſt extent and of prodigious wealth. When conſidered with all its advantages, it is now what ancient Rome once was; the ſeat of liberty, the encourager of arts, and

the admiration of the whole world. It is the centre of trade; has an intimate connection with all the counties in the kingdom; and is the grand mart of the nation, to which all parts ſend their commodities, from whence they are again ſent back into every town in the nation and to every part of the world. From hence innumerable carriages by land and water are conſtantly employed: and from hence ariſes that circulation in the national body which renders every part healthful, vigorous, and in a proſperous condition; a circulation that is equally beneficial to the head and the moſt diſtant members. Merchants are here as rich as noblemen; witneſs their incredible loans to government: and there is no place in the world where the ſhops of tradeſmen make ſuch a noble and elegant appearance, or are better ſtocked.

The Thames, on the banks of which London is ſituated, is a river which, though not the largeſt, is the richeſt and moſt commodious for commerce of any in the world. It is continually filled with fleets, ſailing to or from the moſt diſtant climates: and its banks, from London bridge to Blackwall, form almoſt one continued great magazine of naval ſtores; containing three large wet-docks, 32 dry-docks, and 33 yards for the building of ſhips for the uſe of the merchants; beſides the places allotted for the building of boats and lighters, and the king's yards lower down the river for the building of men of war. Yet beſides theſe it is propoſed to conſtruct docks near Wapping for the accommodation of the ſhipping which at preſent crowds the river. This undertaking is prodigious in its extent, and for its accompliſhment a bill is now ſoliciting in parliament by the corporation. As the city is about 60 miles diſtant from the ſea, it enjoys, by means of this beautiful river, all the benefits of navigation, without the danger of being ſurpriſed by foreign fleets, or of being annoyed by the moiſt vapours of the ſea. It riſes regularly from the water-ſide, and, extending itſelf on both ſides along its banks, reaches a prodigious length from eaſt to weſt in a kind of amphitheatre towards the north, and is continued for near 20 miles on all ſides, in a ſucceſſion of magnificent villas and populous villages, the country-ſeats of gentlemen and tradeſmen; whither the latter retire for the benefit of freſh air, and to relax their minds from the hurry of buſineſs. The regard paid by the legiſlature to the property of the ſubject, has hitherto prevented any bounds being fixed for its extenſion.

The irregular form of London makes it difficult to aſcertain its extent. However, its length from eaſt to weſt is generally allowed to be above ſeven miles from Hyde-park corner to Poplar; and its breadth in ſome places three, in others two, and in others again not much above half a mile. Hence the circumference of the whole is almoſt 18 miles; or, according to a later meaſurement, the extent of continued buildings is 35 miles two furlongs and 39 roods. But it is much eaſier to form an idea of the large extent of a city ſo irregularly built by the number of the people, who are computed to be a million; and from the number of edifices devoted to the ſervice of religion.

Of theſe, beſide St. Paul's cathedral and the collegiate church at Weſtminſter, here are 102 pariſh-churches, and 69 chapels, of the eſtabliſhed religion: 21 French proteſtant chapels; 11 chapels belonging to the Germans, Dutch, Danes, &c.; 26 independent meetings; 34 preſbyterian meetings; 20 baptiſt meetings; 19 popiſh chapels, and meeting-houſes for the uſe of foreign ambaſſadors and people of various ſects; and three Jews ſynagogues. So that there are 305 places devoted to religious worſhip in the compaſs of this vaſt pile of buildings, without reckoning the 21 out-pariſhes uſually included in the bills of mortality, and a great number of methodiſt tabernacles.

There are alſo in and near this city 100 alms-houſes, about 20 hoſpitals and infirmaries, 3 colleges, 10 public priſons, 15 fleſh-markets; one market for live cattle; two other markets more particularly for herbs; and 23 other markets for corn, coals, hay, &c.; 15 inns of court, 27 public ſquares, beſides thoſe within ſingle buildings, as the Temple, &c.; 3 bridges, 55 halls for companies, 8 public ſchools, called free-ſchools; and 131 charity-ſchools, which provide education for 5034 poor children; 207 inns, 447 taverns, 551 coffee houſes, 5975 alehouſes; 1000 hackney coaches; 7000 ſtreets, lanes, courts, and alleys, and 150,000 dwelling-houſes, containing, as has been already obſerved, about 1,000,000 inhabitants.

The common firing is pit-coal, commonly called *ſea-coal*, of which there are conſumed upwards of 766,880 chaldrons every year. The annual conſumption of oil in London and Weſtminſter for lamps, amounts to 400,000*l.* In 1787, the quantity of porter brewed in London for home-conſumption and foreign exportation, amounted to 1,176,856 barrels.

This great and populous city is happily ſupplied with abundance of freſh water from the Thames and the New River; which is not only of inconceivable ſervice to every family, but by means of fire-plugs every where diſperſed, the keys of which are depoſited with the pariſh officers, the city is in a great meaſure ſecured from the ſpreading of fire; for theſe plugs are no ſooner opened, than there are vaſt quantities of water to ſupply the engines. This plenty of water has been attended with another advantage, it has given riſe to ſeveral companies, who inſure houſes and goods from fire; an advantage that is not to be met with in any other nation on earth: the premium is ſmall, and the recovery in caſe of loſs is eaſy and certain. Every one of theſe offices keep a ſet of men in pay, who are ready at all hours to give their aſſiſtance in caſe of fire; and who are on all occaſions extremely bold, dexterous and diligent: but though all their labours ſhould prove unſucceſsful, the perſon who ſuffers by this devouring element has the comfort that muſt ariſe from a certainty of being paid the value (upon oath) of what he has inſured.

The places for diverſion are, Vauxhall, Ranelagh-gardens, the two play-houſes, one of them lately rebuilt, the Pantheon, and the little theatre in the Hay-market, with Sadlers-wells, Jones's Circus, and Aſtley's Royal-Grove, &c. The fineſt repoſitories of rarities and natural hiſtory, are Sir Hans Sloane's, in the Britiſh Muſeum; and another collected by the late Sir Aſhton Lever, now the private property of Mr. Parkinſon, and depoſited in proper apartments for public inſpection, near the ſouth end of Blackfriars bridge.

LONDONDERRY, or Colerain, a county of Ireland, in the province of Ulſter. It is bounded on the ſouth and ſouth-weſt by the county of Tyrone; by Antrim on the eaſt, from which it is parted by the river Bann; by Donegal on the weſt; and that county and the Deucaledonian ocean on the north. Its greateſt length is about 36 miles, its breadth 30, containing about 251,510 acres. The bogs and heaths of this county are manured with ſea-ſhells, as thoſe of Donegal. Like that, too, it is pretty champaign, and not unfruitful. It is particularly noted for a very clear river, called the *Bann*, abounding with ſalmon, a fiſh ſaid to delight in limpid ſtreams. This river, to diſtinguiſh it from a leſſer of the ſame name, is called the *Greater* or *Lower Bann*. In order to cultivate, ſettle, and civilize this county, king James I. granted it, by letters patent, to a ſociety, by the name of the *Governor and Aſſiſtants at London of the new plantation of Ulſter in the realm of Ireland*. It contains ſix baronies; and, beſides the two knights of the ſhire, ſends to parliament two members for the city of Londonderry, and two each for Colcraine and Newton-Limavady or Lamnevady.

Londonderry, or *Derry*, the capital of the county, and

the ſee of a biſhop, ſtands at the bottom of Lough-Foyle. This city has a very good port, to which ſhips of the greateſt burden have acceſs, and a conſiderable trade. It will be ever famous for the gallantry and perſeverance with which it defended itſelf in three memorable ſieges, in defiance of the greateſt hardſhips and diſcouragements, namely, 1ſt, in 1641, when the rebels could not reduce it either by fraud or force. 2dly, in 1649, when it was beſieged by the lord Ardes, and reduced almoſt to extremity by famine, till at laſt relieved by troops ſent from England. 3dly, when it held out againſt the French and Iriſh from the 7th of December 1688 to the laſt day of July 1689, though it was neither well fortified nor provided with a garriſon or ſtores of proviſion and ammunition, and hardly any attempt made to relieve it during ſo long a time. Though the city is 20 miles up the river, yet very large ſhips can come up to the quay, where there are four or five fathoms of water. It is now well fortified with a ſtrong wall, beſides outworks; and along the banks of the river are ſeveral caſtles and a fort. This city is of no great antiquity, having been built and planted in the reign of James I. by a colony ſent by the ſociety abovementioned. The trade of the town is very conſiderable, having not only a large ſhare in the herring-fiſhery, but ſending ſhips alſo to the Weſt-Indies, New-England, and Newfoundland, for which they are ſo advantageouſly ſituated, that a veſſel bound from thence to America often arrives there before a London ſhip can get clear of the ſoundings, or arrive in the latitude of Londonderry. Though there are a great many ſhallows in Lough-Foyle, which ſerve it inſtead of a road; yet they are eaſily avoided, as there are deep channels between them. Thoſe points called *Emiſtone, Ryſterhull*, or *Caldy-head*, which lie a little to the weſt of the mouth of the harbour, are counted the moſt northerly of Ireland, lying in lat. 55. 20. The inhabitants of this city are almoſt all proteſtants. It gave title of *earl* and *baron* to a branch of the family of Pitt, which became extinct in 1764; but part of the title was revived in Robert Stewart, who was created Baron Londonderry in 1789. A late traveller ſays, "Derry is, perhaps, the cleaneſt, beſt built, and moſt beautifully ſituated town in Ireland; and, excepting Corke, as convenient as any for commerce, foreign and domeſtic." The lake almoſt ſurrounds it; and the whole ground plot both of it and its liberties belongs to the 12 great companies of London. Great quantities of ſalmon, ſalted and barrelled, are exported from hence to America.

LONG, an epithet given to whatever exceeds the uſual ſtandard of length.

LONG-*Boat*, the largeſt and ſtrongeſt boat belonging to any ſhip. It is principally employed to carry great burdens, as anchors, cables, ballaſt, &c. See BOAT.

LONG (ROGER), D. D. maſter of Pembroke-hall in Cambridge, Lowndes's profeſſor of aſtronomy in that univerſity, rector of Cherryhinton in Huntingdonſhire, and of Bradwell *juxta mare* in Eſſex, was author of a well-known and much approved treatiſe of aſtronomy, and the inventor of a remarkably curious aſtronomical machine, thus deſcribed by himſelf: "I have, in a room lately built in Pembroke-hall, erected a ſphere of 8 feet diameter, wherein above 30 perſons may ſit conveniently; the entrance into it is over the ſouth pole by ſix ſteps; the frame of the ſphere conſiſts of a number of iron meridians, not complete ſemicircles, the northern ends of which are ſcrewed to a large round plate of braſs, with an hole in the centre of it; through this hole, from a beam in the ceiling, comes the north pole, a round iron rod, about three inches long, and ſupports the upper parts of the ſphere to its proper elevation for the latitude of Cambridge; the lower part of the ſphere, ſo much of it as is inviſible in England, is cut off; and the lower or ſouthern ends of the meridians, or truncated ſemicircles, terminate on, and are ſcrewed down to, a ſtrong circle of oak, of about 13 feet diameter; which, when the ſphere is put into motion, runs upon large rollers of lignum vitæ, in the manner that the tops of ſome windmills are made to turn round. Upon the iron meridians is fixed a zodiac of tin painted blue, whereon the ecliptic and heliocentric orbits of the planets are drawn, and the conſtellations and ſtars traced: the Great and Little Bear and Draco are already painted in their places round the north pole; the reſt of the conſtellations are propoſed to follow: the whole is turned round with a ſmall winch, with as little labour as it takes to wind up a jack, though the weight of the iron, tin, and wooden circle, is about 1000 pounds. When it is made uſe of, a planetarium will be placed in the middle thereof. The whole, with the floor, is well ſupported by a frame of large timber." Thus far Dr. Long, before this curious piece of mechaniſm was perfected. Since the above was written, the ſphere has been completely finiſhed; all the conſtellations and ſtars of the northern hemiſphere, viſible at Cambridge, are painted in their proper places upon plates of iron joined together, which form one concave ſurface. Dr. Long publiſhed a Commencement Sermon 1728; and an anſwer to Dr. Galley's pamphlet on Greek Accents; and died December 16th 1770, at the age of 91. As the materials for this article are ſcanty, we ſhall ſubjoin, from the Gentleman's Magazine for 1783, a few traits of him, as delineated in 1769 by Mr. Jones. "He is now in the 88th year of his age, and for his years vegete and active. He was lately (in October) put in nomination for the office of vice-chancellor. He executed that truſt once before, I think in the year 1737; a very ingenious perſon, and ſometimes very facetious. At the public commencement in the year 1713, Dr. Greene (maſter of Bennet college, and afterwards biſhop of Ely) being then vice-chancellor, Mr. Long was pitched upon for the tripos-performance; it was witty and humourous, and has paſſed through divers editions. Some that remembered the delivery of it, told me, that in addreſſing the vice-chancellor (whom the univerſity wags uſually ſtyled *Miſs Greene*), the tripos-orator, being a native of Norfolk, and aſſuming the Norfolk dialect, inſtead of ſaying, *Domine Vice-Cancellarie*, did very archly pronounce the words thus, *Domina Vice-Cancellaria*; which occaſioned a general ſmile in that great auditory. His friend the late Mr. Bonfoy of Ripton told me this little incident, 'That he and Dr. Long walking together in Cambridge in a duſky evening, and coming to a ſhort *poſt* fixed in the pavement, which Mr. B. in the midſt of chat and inattention, took to be a *boy* ſtanding in his way, he ſaid in a hurry, 'Get out of my way, boy.' 'That *boy, Sir*,' ſaid the Doctor very calmly and ſlily, 'is a poſt-boy, *who turns out of his way for nobody*.'—I could recollect ſeveral other ingenious repartees, if there were occaſion. One thing is remarkable, he never was a hale and hearty man, always of a tender and delicate conſtitution, yet took great care of it. His common drink water; he always dines with the fellows in the hall. Of-late years he has left off eating fleſh meats; in the room thereof, puddings, vegetables, &c. ſometimes a glaſs or two of wine."

LONGEVITY, length of life. From the different longevities of men in the beginning of the world, after the flood, and in theſe ages, Mr. Derham draws an argument for the interpoſition of a divine Providence.

Immediately after the creation, when the world was to be peopled by one man and one woman, the ordinary age was 900 and upwards.—Immediately after the flood, when there were three perſons to ſtock the world, their age was cut ſhorter, and none of thoſe patriarchs, but Shem, arrived at 500. In the ſecond century we find none that reached 240: in the third, none but Terah that came to 200 years; the world, at leaſt a part of it, by that time being ſo well peopled, that they had built cities, and were cantoned out into diſtinct nations.—By degrees, as the number of people increaſed, their

longevity dwindled, till it came down at length to 70 or 80 years: and there it ſtood, and has continued to ſtand ever ſince the time of Moſes.—This is found a good medium, and by means hereof the world is neither overſtocked, nor kept too thin; but life and death keep a pretty equal pace.

That the common duration of man's life has been the ſame in all ages ſince the above period, is plain both from ſacred and profane hiſtory. To paſs by others, Plato lived to 81, and was accounted an old man: and the inſtances of *longevity* produced by Pliny, l. vii. c. 48. as very extraordinary, may moſt of them be matched in modern hiſtories.—In the following Tables are collected into one point of view the moſt memorable inſtances of long lived perſons of whoſe age we have any authentic records. The firſt and ſecond are extracted from *Mr. Whitehurſt's Inquiry into the Origin and State of the Earth*, with ſome additions by Dr. Fothergill; who inſerted them, accompanied by a third, together with a number of uſeful obſervations, in the firſt volume of the Memoirs of the Mancheſter Literary Society.

Names of the perſons.	Ages	Places of Abode.	Living or Dead.
Thomas Parre	152	Shropſhire	Died November 16, 1635. Phil. Tranſ. N° 44.
Henry Jenkins	169	Yorkſhire	Died December 8, 1670. Phil. Tranſ. N° 221.
Robert Montgomery	126	Ditto	Died in — — 1670.
James Sands	140	Staffordſhire	Do. Fuller's Worthies, p. 47.
His Wife	120	Ditto	Do. Fuller's Worthies, p. 47.
Counteſs of Deſmond	140	Ireland	Raleigh's Hiſt. p. 166.
——— Eccleſton	143	Ditto	Died — — 1691[a].
J. Sagar	112	Lancaſhire	—— — — 1668[b].
— Laurence	140	cotland	Living —— —— [c].
Simon Sack	141	Trionia	Died May 30, 1764.
Col. Thomas Winſlow	146	Ireland	—— Aug. 26, 1766.
Francis Conſiſt	150	Yorkſhire	—— Jan. — 1768.
Chriſt. J. Drakenberg	146	Norway	—— June 24, 1770[d].
Margaret Forſter	136	Cumberland	Both living 1771.
——— her daughter	104	Ditto	Both living 1771.
Francis Bons	121	France	Died Feb. 6, 1769.
John Brookey	134	Devonſhire	Living — — 1777[e].
James Bowels	152	Killingworth	Died Aug. 15, 1656[f].
John Tice	125	Worceſterſhire	—— March, 1774[g].
John Mount	136	Scotland	—— Feb. 27, 1766[h].
A. Goldſmith	140	France	—— June — 1766[i].
Mary Yates	128	Shropſhire	—— — — 1766[k].
John Bales	126	Northampton	—— April 5, 1766[l].
William Ellis	130	Liverpool	—— Aug. 16, 1780[m].
Louiſa Truxo a Negreſs	175	Tucomea, S. America	Living October 5, 1780[n].
Margaret Patten	138	Lochneugh near Paiſley	Lynche's Guide to Health.
Janet Taylor	108	Fintray, Scotland	Died Oct. 10, 1780.
Richard Lloyd	133	Montgomery	Lynche's Guide to Health.
Suſannah Hilliar	100	Piddington, Northamptſh.	Died Feb. 19, 1781[o].
Ann Cockbolt	105	Stoke-Bruerne, *Ib.*	—— April 5, 1775[p].
James Hayley	112	Middlewich, Cheſhire	—— March 17, 1781[q].

William Walker, aged 112, not mentioned above, who was a ſoldier at the battle of Edge-hill.

If we look back to an early period of the Chriſtian æra, we ſhall find that Italy has been, at leaſt about that time, peculiarly propitious to longevity. Lord Bacon obſerves that the year of our Lord 76, in the reign of Veſpaſian, was memorable; for in that year was a taxing which afforded the moſt authentic method of knowing the ages of men. From it, there were found in that part of Italy lying between the Apennine mountains and the river Po 124 perſons who either equalled or exceeded 100 years of age, namely:

54 perſons of	100	Years	each.
57 - -	110		
2 - -	125		
	4 - -	130	Years
	4 - -	136	
	3 - -	140	
In Parma	3 - -	120	
	2 - -	130	
In Bruſſels	1 - -	125	
In Placentia	1 - -	131	
In Faventia	1 - -	132	
	6 - -	110	
	4 - -	120	
In Rimino	1 - -	150	Years, *viz.* Marcus Aponius.

[a] Fuller's Worthies, p. 140.
[b] Phil. Tranſ. abridged by Lowthorp, vol. iii. p. 30, 6.
[c] Derham's Phyſico-Theology, p. 173.
[d] Annual Regiſter.
[e] Daily Advertiſer, Nov. 18, 1777.
[f] Warwickſhire.
[g] Daily Advertiſer, March 1774.
[h] Morning Poſt, Feb. 29, 1776.
[i] Daily Advertiſer, June 24, 1776.
[k] Daily Advertiſer, Aug. 22, 1776.
[l] See Inſcription in the portico of All-Saints church.
[m] London Even. Poſt, Aug. 22, 1780.
[n] London Chronicle, Oct. 5, 1780.
[o] Northamp. Mercury, Feb. 19, 1781.
[p] Well known to perſons of credit of Northampton.
[q] Gen. Evening Poſt, March 24, 1781.

Mr. Carew, in his Survey of Cornwall, aſſures us, that it is no unuſual thing with the inhabitants of that county to reach 90 years of age and upwards, and even to retain their ſtrength of body and perfect uſe of their ſenſes. Beſides Brown, the Corniſh beggar, who lived to 120, and one Polezew to 130 years of age, he remembered the deceaſe of four perſons in his own pariſh, the ſum of whoſe years, taken collectively, amounted to 340. Now, although longevity evidently prevails more in certain diſtricts than in others, yet it is by no means confined to any particular nation or climate; nor are there wanting inſtances of it in almoſt every quarter of the globe, as appears from the preceding as well as the ſubſequent Tables; which might have been conſiderably enlarged, had it appeared neceſſary; but we have only added, in the laſt, three recent inſtances that are peculiarly remarkable.

Names of the Perſons.	Age.	Places of Abode.	Where recorded.
Hippocrates, Phyſician	104	Iſland of Cos	Lynche on Health, chap. 3.
Democritus, Philoſopher	109	Abdera	Bacon's Hiſtory, 1095.
Galen, Phyſician	140	Pergamus	Voſſ. Inſt. or lib. 3.
Albuna, Marc	150	Eth opia	Hakewell's Ap. lib. 1.
Dumitur Raduly	140	Haromſzeck, Tranſylvania	Died Jan. 18, 1782. Gen. Gazetteer, April 18th.
Titus Fullonius	150	Bononia	Fulgoſus, lib. 8.
Abraham Paiba	142	Charleſtown, South-Car.	General Gazetteer
L. Tertulla	137	Arminium	Bulgoſus, lib. 8.
Lewis Cornaro	100	Venice	Bacon's Hiſt. of Life, p. 134.
Robert Blakeney, Eſq.	114	Armagh, Ireland	General Gazetteer.
Margaret Scott	125	Dalkeith, Scotland	Inſcrip. on her tomb there.
W. Gulſtone	140	Ireland	Fuller's Worthies.
J. Bright	10[illegible]	Ludlow	Lynche on Health.
William Poſtell	120	France	Bacon's Hiſtory, p. 134.
Jane Reeves	103	Eſſex	St. J. Chron. June 14, 1781.
W. Paulet, Marquis of Winchester	106	Hampſhire	Baker's Chron. p. 502.
John Wilſon	116	Suffolk	Gen. Gaz. Oct. 29, 1782.
Patrick Wian	11	eſbury, Northumberl.	Plemp Fundammed, § 4. c. 8.
M. Laurence	140	Orcades	Buchanan's Hiſt. of Scotland.
Evan Williams	145	Caermarthen work-houſe, ſtill alive	Gen. Gazetteer, Oct. 12, 1782.
John Jacobs *	121	Mount Jura	All the public prints, Jan. 1790.
Matthew Tait †	123	Auchinleck, Airſhire.	Died Feb. 9, 1792. Edin. Even. Cour. Mar. 8, 1792.
Donald Macleod ‡	104	Iſle of Sky. Alive Jan. 1792.	All the public prints at the end of 1790; and *Memoirs*, &c.

* This man, in 1789, at the age of 120, quitted his native hills, and from the ſummit of Mount Jura undertook a journey to Verſailles, to behold and return thanks to the National Aſſembly for the vote which had freed him and his poor countrymen from the feudal yoke. In the early part of his life, he was a ſervant in the family of the prince de Beaufremont. His memory continued good to the laſt day of his life; and the principal inconveniences which he felt from his great age were, that his ſight was weakened, and the natural heat of his body was ſo diminiſhed, that he ſhivered with cold in the middle of the dog-days if he was not ſitting by a good fire. This old man was received in the body of the houſe by the National Aſſembly, indulged with a chair, and directed to keep on his hat leſt he ſhould catch cold if he was to ſit uncovered. A collection was made for him by the members, which exceeded 500l. ſterling; but he lived not to return to Mount Jura. He was buried on Saturday the 31ſt of January 1790, with great funeral pomp, in the pariſh-church of St. Euſtace at Paris.

† He ſerved as a private at the taking of Gibraltar in 1704.

‡ *Memoirs of the Life and gallant Exploits of the Old Highlander Serjeant Donald Macleod*, &c. publiſhed Jan. 1791, in the 103d year of his age.—This old gentleman, for it appears that he really is a gentleman both by birth and by behaviour, was born in the year of the Revolution, in the pariſh of Bracadill, in the iſle of Sky and county of Inverneſs, North Britain. He is a cadet of the family of Uliniſh in Sky; and deſcended, through his mother, from Macdonald of Slate, the anceſtor of the preſent Lord Macdonald. The earlier part of his life coincided with the famine of ſeven years in Scotland; which was ſo great as to ſuggeſt, even to the patriotic Mr. Fletcher, the idea of the people ſelling themſelves as ſlaves for immediate ſubſiſtence. He was bred in the midſt of want and hardſhips, cold, hunger, and for the years of his apprenticeſhip with a maſon and ſtone-cutter in Inverneſs, in inceſſant fatigue. He inliſted, when a boy, in the Scottiſh ſervice, in the town of Perth, in the laſt year of the reign of King William. The regiment into which he enliſted was the Scots Royals, commanded by the earl of Orkney. That old military corps, at that time, uſed bows and arrows as well as ſwords, and wore ſteel caps. He ſerved in Germany and Flanders under the duke of Marlborough, under the duke of Argyle in the rebellion 1715, in the Highland Watch, or companies raiſed for enforcing the laws in the Highlands; in the ſame companies when, under the name of the 42d regiment, they were ſent abroad to Flanders, to join the army under the duke of Cumberland; in the ſame regiment in Ireland, and on the breaking out of the French war, 1757 in America. From the 42d he was draughted to act as a drill ſerjeant in the 78th regiment, in which he ſerved at the reduction of Louiſburg and Quebec: after this he became an out-penſioner of Chelſea Hoſpital. But ſuch was the ſpirit of this brave and hardy veteran, that he ſerved in 1761 as a volunteer in Germany under the marquis of Granby; and offer-

The Antediluvians are purpoſely omitted, as bearing too little reference to the preſent race of mortals, to afford any ſatisfactory concluſions; and as they have been already taken notice of in a ſeparate article; (ſee ANTEDILUVIANS). As the improbable ſtories of ſome perſons who have almoſt rivalled them in modern times, border too much upon the marvellous to find a place in theſe tables, the preſent examples are abundantly ſufficient to prove, that longevity does not depend, ſo much as has been ſuppoſed, on any particular climate, ſituation, or occupation in life: for we ſee, that it often prevails in places where all theſe are extremely diſſimilar; and it would, moreover, be very difficult, in the hiſtories of the ſeveral perſons above mentioned, to find any circumſtance common to them all, except, perhaps, that of being born of healthy parents, and of being inured to daily labour, temperance, and ſimplicity of diet. Among the inferior ranks of mankind, therefore, rather than among the ſons of eaſe and luxury, ſhall we find the moſt numerous inſtances of longevity; even frequently, when other external circumſtances ſeem extremely unfavourable: as in the caſe of the poor ſexton at Peterborough, who, notwithſtanding his unpromiſing occupation among dead bodies, lived long enough to bury two crowned heads, and to ſurvive two complete generations. The livelihood of Henry Jenkins and old Parre is ſaid to have conſiſted chiefly of the coarſeſt fare, as they depended on precarious alms. To which may be added the remarkable inſtance of Agnes Milbourne, who, after bringing forth a numerous offspring, and being obliged, through extreme indigence, to paſs the latter part of her life in St. Luke's work-houſe, yet reached her 106th year in that ſordid and unfriendly ſituation. The plain diet and invigorating employments of a country life are acknowledged on all hands to be highly conducive to health and longevity, while the luxury and refinements of large cities are allowed to be equally deſtructive to the human ſpecies; and this conſideration alone, perhaps, more than counterbalances all the boaſted privileges of ſuperior elegance and civilization reſulting from a city life.

From country villages, and not from crowded cities, have the preceding inſtances of longevity been chiefly ſupplied. Accordingly it appears, from the London bills of mortality, during a period of 30 years, viz. from the year 1728 to 1758, the ſum of the deaths amounted to 750,332, and that, in all this prodigious number, only 242 perſons ſurvived the 100th year of their age! This overgrown metropolis is computed by Dr. Price to contain a ninth part of the inhabitants of England, and to conſume annually 7000 perſons, who remove into it from the country every year, without increaſing it. He moreover obſerves, that the number of inhabitants in England and Wales has diminiſhed about one-fourth part ſince the Revolution; and ſo rapidly of late, that in 11 years, near 200,000 of our common people have been loſt. If the calculation be juſt, however alarming it may appear in a national view, there is this conſolation, when conſidered in a philoſophical light, that without partial evil there can be no general good; and that what a nation loſes in the ſcale of population at one period, it gains at another; and thus probably, the average number of inhabitants on the ſurface of the globe continues at all times nearly the ſame. By this medium, the world is neither overſtocked with inhabitants nor kept too thin, but life and death keep a tolerably equal pace. The inhabitants of this iſland, comparatively ſpeaking, are but as the duſt of the balance; yet inſtead of being diminiſhed, we are aſſured by other writers, that within theſe 30 years they are greatly increaſed.

The deſire of ſelf-preſervation, and of protracting the ſhort ſpan of life, is ſo intimately interwoven with our conſtitution, that it is juſtly eſteemed one of the firſt principles of our nature, and, in ſpite even of pain and miſery, ſeldom quits us to the laſt moments of our exiſtence. It ſeems, therefore, to be no leſs our duty than our intereſt, to examine minutely into the various means that have been conſidered as conducive to health and long life; and, if poſſible, to diſtinguiſh ſuch circumſtances as are eſſential to that great end from thoſe which are merely accidental. But here it is much to be regretted, that an accurate hiſtory of the lives of all the remarkable perſons in the above table, ſo far as relates to the diet, regimen, and the uſe of the non-naturals, has not been faithfully handed down to us; without which it is impoſſible to draw the neceſſary inferences. Is it not then a matter of aſtoniſhment, that hiſtorians and philoſophers have hitherto paid ſo little attention to longevity? If the preſent imperfect liſt ſhould excite others, of more leiſure and better abilities, to undertake a full inveſtigation of ſo intereſting a ſubject, the inquiry might prove not only curious but highly uſeful to mankind. In order to furniſh materials for a future hiſtory of longevity, the bills of mortality throughout the kingdom ought firſt to be reviſed, and put on a better footing, agreeable to the ſcheme of which Mancheſter and Cheſter have already given a ſpecimen highly worthy of imitation. The plan, however, might be further improved with very little trouble, by adding a particular account of the diet and regimen of every perſon who dies at 80 years of age or upwards; and mentioning whether his parents were healthy, long-lived people, &c. An accurate regiſter, thus eſtabliſhed throughout the Britiſh dominions, would be productive of many important advantages to ſociety, not only in a medical and philoſophical, but alſo in a political and moral view.

All the circumſtances that are moſt eſſentially neceſſary to life, may be compriſed under the ſix following heads: 1. Air and climate; 2. Meat and drink; 3. Motion and reſt; 4. The ſecretions and excretions; 5. Sleep and watching; 6. Affections of the mind. Theſe, though all perfectly natural to the conſtitution, have by writers been ſtyled the non-naturals, by a ſtrange perverſion of language; and have been all copiouſly handled under that improper term. However, it may not be amiſs to offer a few ſhort obſervations on each, as they are ſo immediately connected with the preſent ſubject.

1. *Air*, &c. It has long been known that freſh air is more immediately neceſſary to life than food; for a man may live two or three days without the latter, but not many minutes without the former. The vivifying principle

ed his ſervices in the American war to Sir Henry Clinton; who, though he declined to employ the old man in the fatigues and dangers of war, treated him with great kindneſs, allowed him a liberal weekly penſion out of his own pocket, and ſent him home in a ſhip charged with diſpatches to government.—The ſerjeant, "as his memory, according to the obſervation of his biographer, is impaired, does not pretend to make an exact enumeration of all his offſpring: but he knows of 1[illegible] ſons now living, 14 of whom are in the army and navy, beſides daughters; the eldeſt of whom by his preſent wife is a mantuamaker in Newcaſtle.—His eldeſt ſon is now 83 years old, and the youngeſt only nine. Nor, in all probability, would this lad cloſe the rear of his immediate progeny, if his preſent wife, the boy's mother, had not attained to the 49th year of her age."—In his prime, he did not exceed five feet and ſeven inches. He is now inclined through age to five feet five inches. He has an intereſting phyſiognomy expreſſive of ſincerity, ſenſibility, and manly courage. His biographer very properly ſubmits it to the conſideration of the Polygraphic Society, whether they might not do a thing worthy of themſelves and their ingenious art, if they ſhould multiply likeneſſes of this living antiquity, and circulate them at an eaſy rate throughout Britain and Europe. They would thus gratify a very general curioſity; a curioſity not confined to the preſent age.

contained in the atmoſphere, ſo eſſential to the ſupport of flame, as well as animal life, concerning which authors have propoſed ſo many conjectures, appears now to be nothing elſe but that pure dephlogiſticated fluid lately diſcovered by that ingenious philoſopher Dr. Prieſtley. The common atmoſphere may well be ſuppoſed to be more or leſs healthy in proportion as it abounds with this animating principle. As this exhales in copious ſtreams from the green leaves of all kinds of vegetables, even from thoſe of the moſt poiſonous kind, may we not, in ſome meaſure, account why inſtances of longevity are ſo much more frequent in the country than in large cities; where the air, inſtead of partaking ſo largely of this ſalutary impregnation, is daily contaminated with noxious animal effluvia and phlogiſton?

With reſpect to climate, various obſervations conſpire to prove, that thoſe regions which lie within the temperate zones are beſt calculated to promote long life. Hence, perhaps, may be explained, why Italy has produced ſo many long livers, and why iſlands in general are more ſalutary than continents; of which Bermudas and ſome others afford examples. And it is a pleaſing circumſtance that our own iſland appears from the above table (notwithſtanding the ſudden viciſſitudes to which it is liable) to contain far more inſtances of longevity than could well be imagined. The ingenious Mr. Whitehurſt aſſures us, from certain facts, that Engliſhmen are in general longer lived than North Americans; and that a Britiſh conſtitution will laſt longer, even in that climate, than a native one. But it muſt be allowed in general, that the human conſtitution is adapted to the peculiar ſtate and temperature of each reſpective climate, ſo that no part of the habitable globe can be pronounced too hot or too cold for its inhabitants. Yet, in order to promote a friendly intercourſe between the moſt remote regions, the Author of nature has wiſely enabled the inhabitants to endure great and ſurpriſing changes of temperature with impunity.

2. *Foods and drink.* Though foods and drink of the moſt ſimple kinds are allowed to be the beſt calculated for ſupporting the body in health, yet it can hardly be doubted but variety may be ſafely indulged occaſionally, provided men would reſtrain their appetites within the bounds of temperance; for bountiful Nature cannot be ſuppoſed to have poured forth ſuch a rich profuſion of proviſions, merely to tantalize the human ſpecies, without attributing to her the part of a cruel ſtep-dame, inſtead of that of the kind and indulgent parent. Beſides, we find, that by the wonderful powers of the digeſtive organs, a variety of animal and vegetable ſubſtances, of very diſcordant principles, are happily aſſimilated into one bland homogeneous chyle; therefore it ſeems natural to diſtruſt thoſe cynical writers, who would rigidly confine mankind to one ſimple diſh, and their drink to the mere water of the brook. Nature, it is true, has pointed out that mild inſipid fluid as the univerſal diluent, and therefore moſt admirably adapted for our daily beverage. But experience has equally proved, that vinous and ſpirituous liquors, on certain occaſions, are no leſs ſalutary and beneficial, whether it be to ſupport ſtrength againſt ſickneſs or bodily fatigue, or to exhilarate the mind under the preſſure of heavy misfortunes. But, alas! what Nature meant for innocent and uſeful cordials, to be uſed only occaſionally, and according to the direction of reaſon, cuſtom and caprice have, by degrees, rendered habitual to the human frame, and liable to the moſt enormous and deſtructive abuſes. Hence it may be juſtly doubted, whether gluttony and intemperance have not depopulated the world more than even the ſword, peſtilence, and famine. True, therefore, is the old maxim, "*Modus utendi ex veneno facit medicamentum, ex medicamento venenum.*"

3. and 4. *Motion and reſt, ſleep and watching.* It is allowed on all hands, that alternate motion and reſt, and ſleep and watching, are neceſſary conditions to health and longevity; and that they ought to be adapted to age, temperament, conſtitution, temperature of the climate, &c.; but the errors which mankind daily commit in theſe reſpects become a fruitful ſource of diſeaſes. While ſome are bloated and relaxed with eaſe and indolence, others are emaciated, and become rigid through hard labour, watching, and fatigue.

5. *Secretions and excretions.* Where the animal functions are duly performed, the ſecretions go on regularly; and the different evacuations ſo exactly correſpond to the quantity of aliment taken in, in a given time, that the body is found to return daily to nearly the ſame weight. If any particular evacuation happen to be preternaturally diminiſhed, ſome other evacuation is proportionally augmented, and the equilibrium is commonly preſerved; but continued irregularities, in theſe important functions, cannot but terminate in diſeaſe.

6. *Affections of the mind.* The due regulation of the paſſions, perhaps, contributes more to health and longevity than that of any other of the non-naturals. The animating paſſions, ſuch as joy, hope, love, &c. when kept within proper bounds, gently excite the nervous influence, promote an equable circulation, and are highly conducive to health; while the depreſſing affections, ſuch as fear, grief, and deſpair, produce the contrary effect, and lay the foundation of the moſt formidable diſeaſes.

From the light which hiſtory affords us, as well as from ſome inſtances in the above table, there is great reaſon to believe, that longevity is in a great meaſure hereditary; and that healthy long-lived parents would commonly tranſmit the ſame to their children, were it not for the frequent errors in the non-naturals, which ſo evidently tend to the abbreviation of human life.

Where is it, but from theſe cauſes, and the unnatural modes of living, that, of all the children which are born in the capital cities of Europe, nearly one half die in early infancy? To what elſe can we attribute this extraordinary mortality? Such an amazing proportion of premature deaths is a circumſtance unheard of among ſavage nations, or among the young of other animals! In the earlieſt ages, we are informed, that human life was protracted to a very extraordinary length; yet how few perſons, in theſe latter times, arrive at that period which nature ſeems to have deſigned! Man is by nature a field-animal, and ſeems deſtined to riſe with the ſun, and to ſpend a large portion of his time in the open air, to inure his body to robuſt exerciſes and the inclemency of the ſeaſons, and to make a plain homely repaſt only when hunger dictates. But art has ſtudiouſly defeated the kind intentions of nature; and, by enſlaving him to all the blandiſhments of ſenſe, has left him, alas! an eaſy victim to folly and caprice. To enumerate the various abuſes which take place from the earlieſt infancy, and which are continued through the ſucceeding ſtages of modiſh life, would carry us far beyond our preſent intention. Suffice it to obſerve, that they prevail more particularly among people who are the moſt highly poliſhed and refined. To compare their artificial mode of life with that of nature, or even with the long-livers in the liſt, would probably afford a very ſtriking contraſt; and at the ſame time ſupply an additional reaſon why, in the very large cities, inſtances of longevity are ſo very rare.

LONGFORD, a county of Ireland, in the province of Leinſter, bounded by the county of Leitrim and Cavan on the north, Meath on the eaſt and ſouth, and Roſcommon on the weſt. It contains 134,700 Iriſh plantation acres, 24 pariſhes, 6 baronies, and 4 boroughs; and returns 10 members to par-

liament. It is ſmall, and much encumbered with bog, intermixed with a tolerably good ſoil; and is about 25 miles long and 15 broad.

LONGFORD, a town of Ireland, ſituated on the river Cromlin, in the county of Longford and province of Leinſter, 64 miles from Dublin; which river falls a few miles below this place into the Shannon. It is a borough, poſt, market, and fair town; and returns two members to parliament; patron, Lord Longford. It gave title of *earl* to the family of Aungier; of *viſcount*, to the family of Micklethwaite; and now gives that of *baron* to the family of Packenham. Within a mile and a half of the town is a charter-ſchool for above 40 children. This place has a barrack for a troop of horſe. It is large and well built; and in a very early age an abbey was founded here, of which St. Idus, one of St. Patrick's diſciples, was abbot. In the year 1400, a fine monaſtery was founded to the honour of the Virgin Mary, for Dominican friars, by O'Ferral prince of Annaly. This monaſtery being deſtroyed by fire, Pope Martin V. by a bull in the year 1429, granted an indulgence to all who ſhould contribute to the rebuilding of it. In 1433, Pope Eugene IV. granted a bull to the ſame purpoſe; and in 1438 he granted another to the like effect. The church of this friary, now the pariſh-church, is in the dioceſe of Ardagh. The fairs are four in the year.

LONG-ISLAND, is an iſland of North America, belonging to the ſtate of New-York, which is ſeparated from the continent by a narrow channel. It extends from the city of New-York eaſt 140 miles, terminating with Montauk point; and is not more than 10 miles in breadth on a medium. It is divided into three counties, King's, Queen's, and Suffolk. The ſouth ſide of the iſland is flat land, of a light ſandy ſoil, bordered on the ſea-coaſt with large tracts of ſalt meadow, extending from the weſt point of the iſland to Southampton. This ſoil, however, is well calculated for raiſing grain, eſpecially Indian corn. The north ſide of the iſland is hilly, and of a ſtrong ſoil, adapted to the culture of grain, hay, and fruit. A ridge of hills extends from Jamaica to South-hold. Large herds of cattle feed upon Hampſtead plain and on the ſalt marſhes upon the ſouth ſide of the iſland. Hampſtead plain in Queen's county is a curioſity. It is 16 miles in length, eaſt and weſt, and 7 or 8 miles wide. The ſoil is black, and to appearance rich, and yet it was never known to have any natural growth, but a kind of wild graſs and a few ſhrubs. It is frequented by vaſt numbers of plover. Rye grows tolerably well on ſome parts of the plain. The moſt of it lies common for cattle, horſes, and ſheep. As there is nothing to impede the proſpect in the whole length of this plain, it has a curious but tireſome effect upon the eye, not unlike that of the ocean. The iſland contains 30,863 inhabitants.

LONGIMETRY, the art of meaſuring lengths, both acceſſible and inacceſſible. See GEOMETRY and TRIGONOMETRY.

LONGING, is a preternatural appetite in pregnant women, and in ſome ſick perſons when about to recover. It is called *pica* from the bird of that name, which is ſaid to be ſubject to the ſame diſorder. The diſorder conſiſts of both a deſire of unuſual things to eat and drink, and in being ſoon tired of one and wanting another. It is called *malacia*, from μαλακος, "weakneſs." In pregnant women it is ſomewhat relieved by bleeding, and in about the fourth month of their pregnancy it leaves them. Chlorotic girls, and men who labour under ſuppreſſed hemorrhoids, are very ſubject to this complaint, and are relieved by promoting the reſpective evacuations. In general, whether this diſorder is obſerved in pregnant women, in perſons recovering from an acute fever, or in thoſe who labour under obſtructions of the natural evacuations, this craving of the appetite ſhould be indulged.

LONGINICO, a town of Turkey in Europe, in the Morea, anciently called *Olympia*, famous for being the place where the Olympic games were celebrated, and for the temple of Jupiter Olympus, about a mile diſtant. It is now but a ſmall place, ſeated on the river Alpheus, 10 miles from its mouth, and 50 ſouth of Lepanto. E. long. 22. 0. N. lat. 37. 30.

LONGINUS (DIONYSIUS), a celebrated Greek critic of the third century, was probably an Athenian. His father's name is unknown, but by his mother he was allied to the celebrated Plutarch. His youth was ſpent in travelling with his parents, which gave him an opportunity to increaſe his knowledge, and improve his mind. After his travels, he fixed his reſidence at Athens, and with the greateſt aſſiduity applied to ſtudy. Here he publiſhed his Treatiſe on the Sublime; which raiſed his reputation to ſuch a height, and gave the Athenians ſuch an opinion of his judgment and taſte, that they made him ſovereign judge of all authors, and every thing was received and rejected by the public according to his deciſions. He ſeems to have ſtaid at Athens a long time; here he taught the academic philoſophy, and among others had the famous Porphyry for his pupil. But it was at length his fortune to be drawn from Athens, and to mix in more active ſcenes; to train up young princes to virtue and glory; to guide the buſy paſſions of the great to noble objects; to ſtruggle for, and at laſt to die, in the cauſe of liberty. Zenobia, queen of the Eaſt, prevailed on him to undertake the education of her ſons; and he ſoon gained an uncommon ſhare in her eſteem: ſhe ſpent the vacant hours of her life in his converſation, and modelled her ſentiments and conduct by his inſtructions. That princeſs was at war with Aurelian; and, being defeated by him near Antioch, was compelled to ſhut herſelf up in Palmyra, her capital city. The emperor wrote her a letter, in which he ordered her to ſurrender; to which ſhe returned an anſwer, drawn up by Longinus, which filled him with reſentment. The emperor laid ſiege to the city; and the Palmyrians were at length obliged to open their gates and receive the conqueror. The Queen and Longinus endeavoured to fly into Perſia; but were unhappily overtaken and made priſoners when they were on the point of croſſing the Euphrates. The Queen, intimidated, weakly laid the blame of vindicating the liberty of her country on its true author; and the brave Longinus, to the diſgrace of the conqueror, was carried away to immediate execution. The writings of Longinus were numerous, ſome on philoſophical, but the greater part on critical ſubjects. Dr. Pearce has collected the titles of 25 treatiſes, none of which, excepting that on the Sublime, have eſcaped the depredations of time and barbarians. On this imperfect piece the great fame of Longinus is raiſed, who, as Pope expreſſes it—"is himſelf the great ſublime he draws." The beſt edition of his works is that by Tollius, printed at Utrecht in 1694, *cum notis variorum*. It has been tranſlated into Engliſh by Mr. Smith.

LONGISSIMUS DORSI. See ANATOMY, *Table of the Muſcles*.

LONGITUDE, in geography and navigation, is the diſtance of any place from another eaſtward or weſtward, counted in degrees upon the equator; but when the diſtance is reckoned by leagues or miles and not in degrees, or in degrees on the meridian, and not of the parallel of latitude, in which caſe it includes both latitude and longitude, it is called *departure*.

To find the longitude at ſea, is a problem to which the attention of navigators and mathematicians has been drawn ever ſince navigation began to be improved.—The importance of this problem ſoon became ſo well known, that, in 1598, Philip III. of Spain offered a reward of 1000 crowns for the ſolu-

tion; and his example was ſoon followed by the States General, who offered 10,000 florins. In 1714 an act was paſſed in the Britiſh parliament, impowering certain commiſſioners to make out a bill for a ſum not exceeding 2000l. for defraying the neceſſary expences of experiments for aſcertaining this point; and likewiſe granting a reward to the perſon who made any progreſs in the ſolution, proportionable to the degree of accuracy with which the ſolution was performed: 10,000l. was granted if the longitude ſhould be determined to one degree of a great circle, or 60 geographical miles; 15,000 if to two thirds of that diſtance; and 20,000 if to half the diſtance.

In conſequence of theſe proffered rewards, innumerable attempts were made to diſcover this important ſecret. The firſt was that of John Morin profeſſor of mathematics at Paris, who propoſed it to Cardinal Richelieu; and though it was judged inſufficient on account of the imperfection of the lunar tables, a penſion of 2000 livres *per annum* was procured for him in 1645 by Cardinal Mazarine. Gemma Friſius had indeed, in 1530, projected a method of finding the longitude by means of watches, which at that time were newly invented: but the ſtructure of theſe machines was then by far too imperfect to admit of any attempt; nor even in 1631, when Metius made an attempt to this purpoſe, were they advanced in any conſiderable degree. About the year 1664, Dr. Hooke and Mr. Huygens made a very great improvement in watchmaking, by the application of the pendulum ſpring. Dr. Hooke having quarrelled with the miniſtry, no experiment was made with any of his machines; but many were made with thoſe of Mr. Huygens. One experiment, particularly, made by Major Holmes, in a voyage from the Coaſt of Guinea in 1665, anſwered ſo well, that Mr. Huygens was encouraged to improve the ſtructure of his watches; but it was found that the variations of heat and cold produced ſuch alterations in the rate of going of the watch, that, unleſs this could be remedied, the watches could be of little uſe in determining the longitude.

In 1714 Henry Sully, an Engliſhman, printed a ſmall tract at Vienna upon the ſubject of watchmaking. Having afterwards removed to Paris, he applied himſelf to the improvement of time-keepers for the diſcovery of the longitude. He taught the famous Julian de Roy; and this gentleman, with his ſon, and Mr. Berthoud, are the only perſons who, ſince the days of Sully, have turned their thoughts this way. But though experiments have been made at ſea with ſome of their watches, it does not appear that they have been able to accompliſh any thing of importance with regard to the main point. The firſt who ſucceeded in any conſiderable degree was Mr. John Harriſon; who, in 1726, produced a watch which went ſo exactly, that for ten years together it did not err above one ſecond in a month. In 1736 it was tried in a voyage to Liſbon and back again, on board one of his Majeſty's ſhips; during which it corrected an error of a degree and an half in the computation of the ſhip's reckoning. In conſequence of this he received public encouragement to go on; and by the year 1761 had finiſhed three time-keepers, each of them more accurate than the former. The laſt turned out ſo much to his ſatisfaction, that he now applied to the commiſſioners of longitude for leave to make an experiment with his watch in a voyage to the Weſt Indies. Permiſſion being granted, his ſon Mr. William Harriſon ſet out in his Majeſty's ſhip the Deptford for Jamaica in the month of November 1761. This trial was attended with all imaginable ſucceſs. The longitude of the iſland, as determined by the time-keeper, differed from that found by aſtronomical obſervations only one minute and a quarter of the equator; the longitudes of places ſeen by the way being alſo determined with great exactneſs. On the ſhip's return to England, it was found to have erred no more during the whole voyage than $1' 51\frac{1}{2}''$ in time, which is little more than 28 miles in diſtance; which being within the limits preſcribed by the act, the inventor claimed the whole 20,000l. offered by government. Objections to this, however, were ſoon ſtarted. Doubts were pretended about the real longitude of Jamaica, as well as the manner in which the time had been found both there and at Portſmouth. It was alleged alſo, that although the time-keeper happened to be right at Jamaica, and after its return to England, this was by no means a proof that it had always been ſo in the intermediate times; in conſequence of which allegations, another trial was appointed in a voyage to Barbadoes. Precautions were now taken to obviate as many of theſe objections as poſſible. The commiſſioners ſent out proper perſons to make aſtronomical obſervations at that iſland; which, when compared with others in England, would aſcertain beyond a doubt its true ſituation. In 1764, then, Mr. Harriſon junior ſet ſail for Barbadoes; and the reſult of the experiment was, that the difference of longitude betwixt Portſmouth and Barbadoes was ſhown by the time-keeper to be 3h. 55′ 3″; and by aſtronomical obſervations to be 3h. 54′ 20″; the error being now only 43″ of time, or 10′ 45″ of longitude. In conſequence of this and the former trials, Mr. Harriſon received one half of the reward promiſed, upon making a diſcovery of the principles upon which his time keepers were conſtructed. He was likewiſe promiſed the other half of the reward as ſoon as time-keepers ſhould be conſtructed by other artiſts which ſhould anſwer the purpoſe as well as thoſe of Mr. Harriſon himſelf. At this time he delivered up all his time-keepers, the laſt of which was ſent to Greenwich to be tried by Mr. Nevil Maſkelyne the aſtronomer-royal. On trial, however, it was found to go with much leſs regularity than had been expected; but Mr. Harriſon attributed this to his having made ſome experiments with it which he had not time to finiſh when he was ordered to deliver up the watch. Soon after this an agreement was made by the commiſſioners with Mr. Kendall to conſtruct a watch upon Mr. Harriſon's principles; and this upon trial was found to anſwer the purpoſe even better than any that Harriſon himſelf had conſtructed. The watch was ſent out with Captain Cook in 1772; and during all the time of his voyage round the world in 1772, 1773, 1774, and 1775, never erred quite $14\frac{1}{2}$ ſeconds per day: in conſequence of which, the houſe of commons, in 1774, ordered the other 10,000l to be paid to Mr. Harriſon. Still greater accuracy, however, has been attained. A watch was lately conſtructed by Mr. Arnold, which during a trial of 13 months, from February 1779 to February 1780, varied no more than 6.69″ during any two days; and the greateſt difference between its rates of going on any day and the next to it was 4.11″. The greateſt error it would have committed therefore in the longitude during any ſingle day would have been very little more than one minute of longitude; and thus might the longitude be determined with as great exactneſs as the latitude generally can.—This watch, however, has not yet been tried at ſea.

Thus the method of conſtructing time-keepers for diſcovering the longitude ſeems to be brought to as great a degree of perfection as can well be expected. Still, however, as theſe watches are ſubject to accident, and may thus alter the rate of their going without any poſſibility of a diſcovery, it is neceſſary that ſome other method ſhould be fallen upon, in order to correct from time to time thoſe errors which may ariſe either from the natural going of the watch, or from any accident which may happen to it. Methods of this kind are all founded upon celeſtial obſervations of ſome kind or other; and for theſe methods, or even for an improvement in time-keepers, rewards are ſtill held out by government. After the diſcoveries made by Mr. Harriſon, the act concerning the longitude was repealed, excepting ſo much of it as related to the conſtructing, printing, publiſhing, &c. of nautical almanacks and other aſſe-

ful tables. It was enacted alſo, that any perſon who ſhall diſcover a method for finding the longitude by means of a time-keeper, the principles of which have not hitherto been made public, ſhall be entitled to a reward of 5000l. if, after certain trials made by the commiſſioners, the ſaid method ſhall enable a ſhip to keep her longitude during a voyage of ſix months within 60 geographical miles or a degree of a great circle. If the ſhip keeps her longitude within 40 geographical miles for that time, the inventor is entitled to a reward of 7500l. and to 10,000l. if the longitude is kept within half a degree. If the method is by improved aſtronomical tables, the author is entitled to 5000l. when they ſhow the diſtance of the moon from the ſun and ſtars within 15 ſeconds of a degree, anſwering to about 7 minutes of longitude, after allowing half a degree for errors of obſervation, and under certain reſtrictions, and after compariſon with aſtronomical obſervations for a period of 18½ years, during which the lunar irregularities are ſuppoſed to be completed. The ſame rewards are offered to the perſon who ſhall with the like accuracy diſcover any other method of finding the longitude.

Theſe methods require celeſtial obſervations; and any of the phenomena, ſuch as the different apparent places of ſtars with regard to the moon, the beginning and ending of eclipſes, &c. will anſwer the purpoſe: only it is abſolutely neceſſary that ſome variation ſhould be perceptible in the phenomenon in the ſpace of two minutes; for even this ſhort ſpace of time will produce an error of 30 miles in longitude. The moſt proper phenomena therefore for determining the longitude in this manner are the eclipſes of Jupiter's ſatellites. Tables of their motions have been conſtructed, and carefully corrected from time to time, as the mutual attractions of theſe bodies are found greatly to diſturb the regularity of their motions. The difficulty here, however, is to obſerve theſe eclipſes at ſea; and this difficulty has been found ſo great, that no perſon ſeems able to ſurmount it. The difficulty ariſes from the violent agitation of a ſhip in the ocean, for which no adequate remedy has ever yet been found, nor probably will ever be found. Mr. Chriſtopher Irwin indeed invented a machine which he called a *marine chair*, with a view to prevent the effects of this agitation; but on trying it in a voyage to Barbadoes, it was found to be totally uſeleſs.

A whimſical method of finding the longitude was propoſed by Meſſrs. Whiſton and Ditton from the report and flaſh of great guns. The motion of ſound is known to be nearly equable, from whatever body it proceeds or whatever be the medium. Suppoſing therefore a mortar to be fired at any place the longitude of which is known, the difference between the moment that the flaſh is ſeen and the report heard will give the diſtance between the two places; whence, if we know the latitudes of theſe places, their longitudes muſt alſo be known. If the exact time of the exploſion be known at the place where it happens, the difference of time at the place where it is heard will likewiſe give the difference of longitude. Let us next ſuppoſe the mortar to be loaded with an iron ſhell filled with combuſtible matter, and fired perpendicularly upward into the air, the ſhell will be carried to the height of a mile, and will be ſeen at the diſtance of near 100; whence, ſuppoſing neither the flaſh of the mortar ſhould be ſeen nor the report heard, ſtill the longitude might be determined by the altitude of the ſhell above the horizon.

According to this plan, mortars were to be fired at certain times and at proper ſtations along all frequented coaſts for the direction of mariners. This indeed might be of uſe, and in ſtormy weather might be a kind of improvement in light-houſes, or a proper addition to them; but with regard to the determination of longitudes, is evidently ridiculous.

We ſhall now proceed to give ſome practical directions for finding the longitude at ſea by proper celeſtial obſervations; excluſive of thoſe from Jupiter's ſatellites, which, for reaſons juſt mentioned, cannot be practiſed at ſea. In the firſt place, however, it will be neceſſary to point out ſome of thoſe difficulties which ſtand in the way, and which render even this method of finding the longitude precarious and uncertain. Theſe lie principally in the reduction of the obſervations of the heavenly bodies made on the ſurface of the earth to ſimilar obſervations ſuppoſed to be made at the centre; which is the only place where the celeſtial bodies appear in their proper ſituation. It is alſo very difficult to make proper allowances for the refraction of the atmoſphere, by which all objects appear higher than they really are; and another difficulty ariſes from their parallaxes, which makes them, particularly the moon, appear lower than they would otherwiſe do, excepting when they are in the very zenith. It is alſo well known, that the nearer the horizon any celeſtial body is, the greater its parallax will be; and as the parallax and refraction act in oppoſite ways to one another, the former depreſſing and the latter raiſing the object, it is plain, that great difficulties muſt ariſe from this circumſtance. The ſun, for inſtance, whoſe parallax is leſs than the refraction, muſt always appear higher than he really is; but the moon, whoſe parallax is greater than her refraction, muſt always appear lower.

To render obſervations of the celeſtial bodies more eaſy, the commiſſioners of longitude have cauſed an Ephemeris or Nautical Almanack to be publiſhed annually, containing every requiſite for ſolving this important problem which can be put into the form of tables. But whatever may be done in this way, it will be neceſſary to make the neceſſary preparations concerning the dip of the horizon, the refraction, ſemidiameters, parallax, &c. in order to reduce the apparent to the true altitudes and diſtances; for which we ſhall here ſubjoin two general rules.

The principal obſervation for finding the longitude at ſea is that of the moon from the ſun, or from ſome remarkable ſtar near the zodiac. To do this, the operator muſt be furniſhed with a watch which can be depended upon for keeping time within a minute for ſix hours; and with a good Hadley's quadrant, or, which is preferable, a ſextant: and this laſt inſtrument will ſtill be more fit for the purpoſe if it be furniſhed with a ſcrew for moving the index gradually; likewiſe an additional dark glaſs, but not ſo dark as the common kind, for taking off the glare of the moon's light in obſerving her diſtance from a ſtar. A ſmall teleſcope, which may magnify three or four times, is alſo neceſſary to render the contact of a ſtar with the moon's limb more diſcernible. A magnifying glaſs of 1½ or 2 inches focus will likewiſe aſſiſt the operator in reading off his obſervations with the greater facility.

1. *To make the obſervation.* Having examined and adjuſted his inſtrument as well as poſſible, the obſerver is next to proceed in the following manner: If the diſtance of the moon from the ſun is to be obſerved, turn down one of the ſcreens; look at the moon directly through the tranſparent part of the horizon-glaſs; and keeping her in view, gently move the index till the ſun's image be brought into the ſilvered part of that glaſs. Bring the neareſt limbs of both objects into contact, and let the quadrant librate a little on the lunar ray; by which means the ſun will appear to riſe and fall by the ſide of the moon; in which motion the neareſt limbs muſt be made to touch one another exactly by moving the index. The obſervation is then made; and the diviſion coinciding with that on the Vernier ſcale, will ſhow the diſtance of the neareſt limbs of the objects.

When the diſtance of the moon from a ſtar is to be obſerved when the moon is very bright, turn down the lighteſt ſcreen, or uſe a dark glaſs lighter than the ſcreens, and deſigned for this particular purpoſe; look at the ſtar directly through the

tranſparent part of the horizon-glaſs; and keeping it there, move the index till the moon's image is brought into the ſilvered part of the ſame glaſs. Make the quadrant librate gently on the ſtar's ray, and the moon will appear to riſe and fall by the ſtar: move the index between the librations, until the moon's enlightened limb is exactly touched by the ſtar, and then the obſervation is made. In theſe operations, the plane of the quadrant muſt always paſs through the two objects, the diſtance of which is to be obſerved; and for this purpoſe it muſt be placed in various poſitions according to the ſituation of the objects, which will ſoon be rendered eaſy by practice.

The obſervation being made, ſomebody at the very inſtant the operator calls muſt obſerve by the watch the exact hour, minute, and quarter minute, if there be no ſecond hand, in order to find the apparent time; and at the ſame inſtant, or as quick as poſſible, two aſſiſtants muſt take the altitudes of thoſe objects the diſtance of which is obſerved; after which, the obſervations neceſſary for finding the longitude are completed.

The ephemeris ſhows the moon's diſtance from the ſun, and likewiſe from proper ſtars, to every three hours of apparent time for the meridian of Greenwich; and that the greater number of opportunities of obſerving this luminary may be given, her diſtance is generally ſet down from at leaſt one object on each ſide of her. Her diſtance from the ſun is ſet down while it is between 40 and 120 degrees; ſo that, by means of a ſextant, it may be obſerved for two or three days after her firſt and before her laſt quarter. When the moon is between 40 and 90 degrees from the ſun, her diſtance is ſet down both from the ſun and from a ſtar on the contrary ſide; and, laſtly, when the diſtance is above 120 degrees, the diſtance is ſet down from two ſtars, one on each ſide of her. The diſtance of the moon from objects on the eaſt ſide of her is found in the ephemeris in the 8th and 9th pages of the month; and her diſtance from objects on the weſt is found in the 10th and 11th pages of the month.

When the ephemeris is uſed, the diſtance of the moon muſt only be obſerved from thoſe ſtars the diſtance of which is ſet down there; and theſe afford a ready means of knowing the ſtar from which her diſtance ought to be obſerved. The obſerver has then nothing more to do than to ſet his index to the diſtance roughly computed at the apparent time, eſtimated nearly for the meridian at Greenwich; after which he is to look to the eaſt or weſt of the moon, according as the diſtance of the ſtar is found in the 8th or 9th, or in the 10th or 11th, pages of the month; and having found the moon upon the horizon-glaſs, the ſtar will eaſily be found by ſweeping with the quadrant to the right or left, provided the air be clear, and the ſtar be in the line of the moon's ſhorteſt axis produced. The time at Greenwich is eſtimated by turning into time the ſuppoſed longitude from that place, and adding it to the apparent time at the ſhip, or ſubtracting it from it as occaſion requires. The diſtance of the moon from the ſun, or a ſtar, is roughly found at this time, by ſaying, As 180 minutes (the number contained in three hours) is to the difference in minutes between this nearly eſtimated time and the next preceding time ſet down in the ephemeris; ſo is the difference in minutes between the diſtances in the ephemeris for the next preceding and next following times, to a number of minutes; which being added to the next preceding diſtance, or ſubtracted from it, according as it is increaſing or decreaſing, will give the diſtance nearly at the time the obſervation is to be made, and to which the index muſt be ſet.

An eaſier method of finding the angular diſtance is by bringing the objects nearly into contact in the common way, and then fixing the index tight to a certain degree and minute; waiting until the objects are nearly in contact, giving notice to the aſſiſtants to get ready with the altitudes, and when the objects are exactly in contact to call for the altitudes and the exact time by the watch. The obſerver may then prepare for taking another diſtance, by ſetting his index three or four minutes backwards or forwards, as the objects happen to be receding from or approaching to each other; thus proceeding to take the diſtance, altitudes, and time, by the watch, as before. Thus the obſerver may take as many diſtances as he thinks proper; but four at the diſtance of three minutes, or three at the diſtance of four minutes, will at all times be ſufficient. Thus not only the eye of the obſerver will be leſs fatigued, but he will likewiſe be enabled to manage his inſtrument with much greater facility in every direction, a vertical one only excepted. If in taking the diſtances the middle one can be taken at any even diviſion on the arch, ſuch as a degree, or a degree and 20 or 40 minutes, that diſtance will be independent of the Nonius diviſion, and conſequently free of thoſe errors which frequently ariſe from the inequality of that diviſion in ſeveral parts of the graduated arch. The obſervation ought always to be made about two hours before or after noon; and the true time may be found by the altitude of the ſun taken at the preciſe time of the diſtance. If three diſtances are taken, then find the time by the altitude correſponding with the middle diſtance; and thus the obſervation will be ſecured from any error ariſing from the irregularity of the going of the watch. As the time, however, found by the altitude of a ſtar cannot be depended upon, becauſe of the uncertainty of the horizon in the night, the beſt way of determining the time for a night obſervation will be by two altitudes of the ſun; one taken on the preceding afternoon, before he is within ſix degrees of the horizon; and the other on the next morning, when he is more than ſix degrees high. It muſt be obſerved, however, that in order to follow theſe directions, it is neceſſary that the atmoſphere ſhould be pretty free from clouds, otherwiſe the obſerver muſt take the obſervations at ſuch times as he can beſt obtain them.

2. *To reduce the obſerved diſtance of the ſun or a ſtar from the moon to the true diſtance.* 1. Turn the longitude into time, and add it to the time at the ſhip if the longitude be weſt, but ſubtract it if it be eaſt, which will give the ſuppoſed time at Greenwich; and this we may call *reduced time.* 2. Find the neareſt noon or midnight both before and after the reduced time in the ſeventh page of the month in the ephemeris. 3. Take out the moon's ſemidiameter and horizontal parallaxes correſponding to theſe noons and midnights, and find their differences. Then ſay, As 12 hours is to the moon's ſemidiameter in 12 hours, ſo is the reduced time to a number of ſeconds: which, either added to or ſubtracted from the moon's ſemidiameter at the noon or midnight juſt mentioned, according as it is increaſing or decreaſing, will give her apparent ſemidiameter; to which add the correction from Table VIII. of the ephemeris, and the ſum will be her true ſemidiameter at the reduced time. And as 12 hours is to the difference of the moon's horizontal parallax in 12 hours, ſo is the reduced time to a fourth number; which, being added to or ſubtracted from the moon's horizontal parallax at the noon or midnight before the reduced time, according as it is increaſing or decreaſing, the ſum or difference will be the moon's horizontal parallax at the reduced time. 4. If the reduced time be nearly any even part of 12 hours, viz. $\frac{1}{6}$th, $\frac{1}{4}$th, &c. theſe parts of the difference may be taken, and either added or ſubtracted according to the directions already given, without being at the trouble of working by the rule of proportion. 5. To the obſerved altitude of the ſun's lower limb add the difference betwixt his ſemidiameter and dip; and that ſum will be his apparent altitude. 6. From the ſun's refraction take his parallax in altitude, and the remainder will be the correction of the ſun's altitude. 7. From the ſtar's obſerved altitude take the dip of the horizon, and the remainder will be the apparent altitude.

8. The refraction of a ſtar will be the correction of its altitude. 9. Take the difference between the moon's ſemidiameter and dip, and add it to the obſerved altitude if her lower limb was taken, or ſubtract it if her upper limb was taken; and the ſum or difference will be the apparent altitude of her centre. 10. From the proportional logarithm of the moon's horizontal parallax, taken out of the nautical almanac (increaſing its index by 10) take the logarithmic coſine of the moon's apparent altitude, the remainder will be the proportional logarithm of her parallax in altitude; from which take her refraction, and the remainder will be the correction of the moon's altitude. 11. To the obſerved diſtance of the moon from a ſtar add her ſemidiameter if the neareſt limb be taken, but ſubtract it if the fartheſt limb was taken, and the ſum or difference will be the apparent diſtance. 12. To the obſerved diſtance of the ſun and moon add both their ſemidiameters, and the ſum will be the apparent diſtance of their centres.

3. *To find the true diſtance of the objects, having their apparent altitudes and diſtances.* 1. To the proportional logarithm of the correction of the ſun or ſtar's altitude, add the logarithmic coſine of the ſun or ſtar's apparent altitude; the logarithmic ſine of the apparent diſtance of the moon from the ſun or ſtar; and the logarithmic co-ſecant of the moon's apparent altitude The ſum of theſe, rejecting 20 from the index, will be the proportional logarithm of the firſt angle. 2. To the proportional logarithm of the correction of the ſun or ſtar's altitude, add the logarithmic co tangent of the ſun or ſtar's apparent altitude, and the logarithmic tangent of the apparent diſtance of the moon from the ſun or ſtar. The ſum of theſe, rejecting 20 in the index, will be the proportional logarithm of the ſecond angle. 3. Take the difference between the firſt and ſecond angles, adding it to the apparent diſtance if it be leſs than 90, and the firſt angle be greater than the ſecond; but ſubtracting it if the ſecond be greater than the firſt. If the diſtance be greater than 90, the ſum of the angles muſt be added to the apparent diſtance, which will give the diſtance corrected for the refraction of the ſun or ſtar. 4. To the proportional logarithm of the correction of the moon's altitude add the logarithmic coſine of her apparent altitude: the logarithmic ſine of the diſtance corrected for the ſun or ſtar's refraction, and the logarithmic co-ſecant of the ſun or ſtar's apparent altitude. The ſum, rejecting 30 in the index, will be the proportional logarithm of the third angle. 5 To the proportional logarithm of the correction of the moon's apparent altitude, add the logarithmic co-tangent of her apparent altitude, and the tangent of the diſtance corrected for the ſun or ſtar's refraction; their ſum, rejecting 20 in the index, will be the proportional logarithm of the fourth angle. 6. Take the difference between the third and fourth angles, and ſubtract it from the diſtance corrected for the ſun or ſtar's refraction if leſs than 90, and the third angle be greater than the fourth; or add it to the diſtance if the fourth angle be greater than the third: but if the diſtance be more than 90, the ſum of the angles muſt be ſubtracted from it, to give the diſtance corrected for the ſun or ſtar's refraction, and the principal effects of the moon's parallax. 7. In Table XX. of the ephemeris, look for the diſtance corrected for the ſun and ſtar's refraction, and the moon's parallax in the top column, and the correction of her altitude in the left hand ſide column: take out the number of ſeconds that ſtand under the former, and oppoſite to the latter. Look again in the ſame table for the corrected diſtance in the top column, and the correction of the moon's altitude in the left hand ſide column; take out the number of ſeconds that ſtand under the former and oppoſite to the latter. Look again in the ſame table for the corrected diſtance in the top column, and the correction of the moon's altitude in the left-hand ſide column; take out the number of ſeconds that ſtand under the former and oppoſite to the latter. Look again in the ſame table for the corrected diſtance in the top column, and the principal effects of the moon's parallax in the left-hand ſide column, and take out the number of ſeconds. The difference between theſe two numbers muſt be added to the corrected diſtance if leſs than 90, but ſubtracted from it if greater; and the ſum or difference will be the true diſtance.

4. *To determine the Longitude after having obtained the true diſtance.* Look in the ephemeris among the diſtances of the objects for the computed diſtance betwixt the moon and the other object obſerved on the given day. If it be found there, the time at Greenwich will be at the top of the column; but if it falls between two diſtances in the ephemeris which ſtand immediately before and after it, and alſo the difference between the diſtance ſtanding before and the computed diſtance; then take the proportional logarithms of the firſt and ſecond differences, and the difference between theſe two logarithms will be the proportional logarithm of a number of hours, minutes, and ſeconds; which being added to the time ſtanding over the firſt diſtance, will give the true time at Greenwich. Or it may be found by ſaying, As the firſt difference is to three hours, ſo is the ſecond difference to a proportional part of time; which being added as above directed, will give the time at Greenwich. The difference between Greenwich time and that at the ſhip, turned into longitude, will be that at the time the obſervations were made; and will be eaſt if the time at the ſhip is greateſt, but weſt if it is leaſt.

Having given theſe general directions, we ſhall next proceed to ſhow ſome particular examples of finding the longitude at ſea by all the different methods in which it is uſually tried.

1. *To find the longitude by computation from the ſhip's courſe.*—Were it poſſible to keep an accurate account of the diſtance the ſhip has run, and to meaſure it exactly by the LOG or any other means, then both latitude and longitude would eaſily be found by ſettling the ſhip's account to that time. For the courſe and diſtance being known, the difference of latitude and departure is readily found by the Traverſe Table; and the difference of longitude being known, the true longitude and latitude will alſo be known. A variety of cauſes, however, concur to render this computation inaccurate; particularly the ſhip's continual deflection from the courſe ſet by her playing to the right and left round her centre of gravity; the unequal care of thoſe at the helm, and the diſtance ſuppoſed to be ſailed being erroneous, on account of ſtormy ſeas, unſteady winds, currents, &c. for which it ſeems impoſſible to make any allowance. The place of the ſhip, however, is judged of by finding the latitude every day, if poſſible, by obſervations; and if the latitude found by obſervation agrees with that by the reckoning, it is preſumed that the ſhip's place is properly determined; but if they diſagree, it is concluded that the account of the longitude ſtands in need of correction, as the latitude by obſervation is always to be depended upon.

Currents very often occaſion errors in the computation of a ſhip's place. The cauſes of theſe in the great depths of the ocean are not well known, though many of the motions near the ſhore can be accounted for. It is ſuppoſed that ſome of thoſe in the great oceans are owing to the tide following the moon, and a certain libration of the waters ariſing from thence; likewiſe that the unſettled nature of theſe currents may be owing to the changes in the moon's declination. In the torrid zone, however, a conſiderable current is occaſioned by the trade-winds, the motion being conſtantly to the weſt, at the rate of eight or ten miles per day. At the extremities of the trade-winds or near the 30th degree of north or ſouth latitude, the currents are probably compounded of this motion to the weſtward, and of one towards the equator; whence all ſhips ſail-

ing within theſe limits ought to allow a courſe each day for the current.

When the error is ſuppoſed to have been occaſioned by a current, it ought if poſſible to be tried whether the caſe is ſo or not; or we muſt make a reaſonable eſtimate of its drift and courſe. Then with the ſetting and drift, as a courſe and diſtance, find the difference of latitude and departure; with which the dead reckoning is to be increaſed or diminiſhed: and if the latitude thus corrected agrees with that by obſervation, the departure thus corrected may be ſafely taken as true, and thus the ſhip's place with regard to the longitude determined.

Exam. Suppoſe a ſhip in 24 hours finds, by her dead reckoning, that ſhe has made 96 miles of difference of latitude north and 38 miles of departure weſt; but by obſervation finds her difference of latitude 112, and on trial that there is a current which in 24 hours makes a difference of 16 miles latitude north and 10 miles of departure eaſt: Required the ſhip's departure.

	miles.		miles.
Diff. lat. by account	96 N.	Departure by account	38 W.
Diff. lat. by current	16 N.	Departure by current	10
True diff. lat.	112		28 W.

Here the dead reckoning corrected by the current gives the difference of latitude 112 miles, which is the ſame as that found by obſervation; whence the departure 28 is taken as the true one.

When the error is ſuppoſed to ariſe from the courſes and diſtances, we muſt obſerve, that if the difference of latitude is much more than the departure, or the direct courſe has been within three points of the meridian, the error is moſt probably in the diſtance. But if the departure be much greater than the difference of latitude, or the direct courſe be within three points of the parallel, or more than five points from the meridian, the error is probably to be aſcribed to the courſe. But if the courſes in general are near the middle of the quadrant, the error may be either in the courſe, or in the diſtance, or both. This method admits of three caſes.

1. When, by the dead reckoning, the difference of latitude is more than once and an half the departure; or when the courſe is leſs than three points: Find the courſe to the difference of latitude and departure. With this courſe and the meridional difference of latitude by obſervation, find the difference of longitude.

2. When the dead reckoning is more than once and an half the difference of latitude; or when the courſe is more than five points: Find the courſe and diſtance with the difference of latitude by obſervation, and departure by account; then with the co middle latitude by obſervation, and departure by account, find the difference of longitude.

3. When the difference of latitude and departure by account is nearly equal, or the direct courſe is between three and five points of the meridian: Find the courſe with the difference of latitude and departure by account ſince the laſt obſervation. With this courſe and the difference of latitude by obſervation find another departure. Take half the ſum of theſe departures for the true one. With the true departure and difference of latitude by obſervation find the true courſe; then with the true courſe and meridional difference of latitude find the difference of longitude.

2. *To find the longitude at ſea by a variation-chart.*—Dr. Halley having collected a great number of obſervations on the variation of the needle in many parts of the world, by that means was enabled to draw certain lines on Mercator's chart, ſhowing the variation in all the places over which they paſſed in the year 1700, at which time he firſt publiſhed the chart; whence the longitude of thoſe places might be found by the chart, provided its latitude and variation were given. The rule is, Draw a parallel of latitude on the chart through the latitude found by obſervation; and the point where it cuts the curved line marked with the variation that was obſerved will be the ſhip's place.

Exam. A ſhip finds by obſervation the latitude to be 18° 20′ north; and the variation of the compaſs to be 4° weſt. Required the ſhip's place.—Lay a ruler over 18° 20′ north parallel to the equator; and the point where its edge cuts the curve of 4° weſt variation gives the ſhip's place, which will be found in about 27° 10′ weſt from London.

This method of finding the longitude, however, is attended with two inconveniences. 1. That when the variation lines run eaſt or weſt, or nearly ſo, it cannot be applied; though, as this happens only in certain parts of the world, a variation-chart may be of great uſe for the reſt. Even in thoſe places indeed where the variation curves do run eaſt or weſt, they may be of conſiderable uſe in correcting the latitude when meridian obſervations cannot be had; which frequently happens on the northern coaſts of America; the Weſtern Ocean, and about Newfoundland; for, if the variation can be found exactly, the eaſt and weſt curve anſwering to it will ſhow the latitude. But, 2. The variation itſelf is ſubject to continual change; whence a chart, though ever ſo perfect at firſt, muſt in time become totally uſeleſs; and hence the charts conſtructed by Dr. Halley, though of great utility at their firſt publication, became at length almoſt entirely uſeleſs. A new one was publiſhed in 1746 by Meſſrs. Mountaine and Dodſon, which was ſo well received, that in 1756 they again drew variation lines for that year, and publiſhed a third chart the year following. They alſo preſented to the Royal Society a curious paper concerning the variation of the magnetic needle, with a ſet of tables annexed, containing the reſult of more than 50,000 obſervations, in ſix periodical reviews from the year 1700 to 1756 incluſive, adapted to every five degrees of latitude and longitude in the more frequented oceans; all of which were publiſhed in the Philoſophical Tranſactions for 1757.

3. *To find the longitude by the ſun's declination.*—Having made ſuch obſervations on the ſun as may enable us to find his declination at the place, take the difference between this computed declination and that ſhown at London by the ephemeris; from which take alſo the daily difference of declination at that time; then ſay, As the daily difference of declination is to the above found difference, ſo is 360 degrees to the difference of longitude. In this method, however, a ſmall error in the declination will make a great one in longitude.

4. *To find the longitude by the moon's culminating.*—Seek in the ephemeris for the time of her coming to the meridian on the given day and on the day following, and take their difference; alſo take the difference betwixt the times of culminating on the ſame day as found in the ephemeris, and as obſerved; then ſay, As the daily difference in the ephemeris is to the difference between the ephemeris and obſervation; ſo is 360 degrees to the difference of longitude. In this method alſo a ſmall difference in the culmination will occaſion a great one in the longitude.

5 *By eclipſes of the moon.*—This is done much in the ſame manner as by the eclipſes of Jupiter's ſatellites: For if, in two or more diſtant places where an eclipſe of the moon is viſible, we carefully obſerve the times of the beginning and ending, the number of digits eclipſed, or the time when the ſhadow touches ſome remarkable ſpot, or when it leaves any particular ſpot on the moon, the difference of the times when the obſervations were made will give the difference of longitude. Phenomena of this kind, however, occur too ſeldom to be of much uſe.

6. In the 76th volume of the Philoſophical Tranſactions, Mr. Edward Pigot gives a very particular account of his method of determining the longitude and latitude of York; in which he alſo recommends the method of determining the longitude of places by obſervations of the *moon's tranſit over the meridian*. The inſtruments uſed in his obſervations were a gridiron pendulum clock, a two feet and half reflector, an eighteen inch quadrant made by Mr. Bird, and a tranſit inſtrument made by Mr. Siſſon.

By theſe inſtruments an obſervation was made, on the 10th of September 1783, of the occultation of a ſtar of the ninth magnitude by the moon, during an eclipſe of that planet, at York and Paris. Beſides this, there were obſervations made of the immerſions of ϕ *Aquarii* and δ *Piſcium*; the reſult of all which was, that between Greenwich and York the difference of meridians was 4′ 27″.

In 1783 Mr. Pigot informs us, that he thought of finding the difference of meridians by obſerving the meridian right aſcenſions of the moon's limb. This he thought had been quite original: but he found it afterwards in the Nautical Almanack for 1769, and in 1784 read a pamphlet on the ſame ſubject by the Abbé Toaldo; but ſtill found that the great exactneſs of this method was not ſuſpected; though he is convinced that it muſt ſoon be univerſally adopted in preference to that from the firſt ſatellite of Jupiter.

After giving a number of obſervations on the ſatellites of Jupiter, he concludes, that the exactneſs expected from obſervations, even on the firſt ſatellite, is much over-rated. "Among the various objections (ſays he), there is one I have often experienced, and which proceeds ſolely from the diſpoſition of the eye, that of ſeeing more diſtinctly at one time than another. It may not be improper alſo to mention, that the obſervation I ſhould have relied on as the beſt, that of Aug. 30, 1785, marked *excellent*, is one of thoſe moſt diſtant from the truth."

After giving a number of obſervations on the eclipſe of the moon Sept. 10, 1783, our author concludes, that the eclipſes of the moon's ſpots are in general too much neglected, and that it might be relied upon much more were the following circumſtances attended to: 1. To be particular in ſpecifying the clearneſs of the ſky. 2. To chooſe ſuch ſpots as are well defined, and leave no heſitation as to the part eclipſed. 3. That every obſerver ſhould uſe, as far as poſſible, teleſcopes equally powerful, or at leaſt let the magnifying powers be the ſame. "A principal objection (ſays he) may ſtill be urged, viz. the difficulty of diſtinguiſhing the true ſhadow from the penumbra. Was this obviated, I believe the reſults would be more exact than from Jupiter's firſt ſatellite: Undoubtedly the ſhadow appears better defined if magnified little; but I am much inclined to think, that, with high magnifying powers, there is greater certainty of chooſing the ſame part of the ſhadow, which perhaps is more than a ſufficient compenſation for the loſs of diſtinctneſs."

The following rule for meridian obſervations of the moon's limb is next laid down: "The increaſe of the moon's right aſcenſion in twelve hours (or any given time found by computation), is to 12 hours as the increaſe of the moon's right aſcenſion between two places found by obſervation is to the difference of meridians.

Example.

Nov. 30, 1782.

h.	′	″		
13	12	57.62	Meridian tranſit of moon's ſecond limb	By clock at Greenwich.
13	13	29.08	Ditto of α ♍	
		31.46	Difference of right aſcenſion.	

h.	′	″		
13	14	8.05	Meridian tranſit of moon's ſecond limb	By clock at York.
13	14	30.13	Ditto of α ♍	
		22.08	Difference at York.	The clocks going nearly ſidereal time, no correction is required.
		31.46	Difference at Greenwich.	
		9.38	Increaſe of the moon's apparent right aſcenſion between Greenwich and York, by obſervation.	

141″ in ſeconds of a degree, ditto, ditto, ditto.

The increaſe of the moon's right aſcenſion for 12 hours, by computation, is 23,340 ſeconds; and 12 hours reduced into ſeconds is 43,200. Therefore, according to the rule ſtated above,

23,340″ : 43,200″ : diff. of merid. = 261″.

"Theſe eaſy obſervations and ſhort reduction (ſays Mr. Pigot) are the whole of the buſineſs. Inſtead of computing the moon's right aſcenſion for 12 hours, I have conſtantly taken it from the Nautical Almanacks, which give it ſufficiently exact, provided ſome attention be paid to the increaſe or decreaſe of the moon's motion. Were the following circumſtances attended to, the reſults would be undoubtedly much more exact:

"1. Compare the obſervations with the ſame made in ſeveral other places. 2. Let ſeveral and the ſame ſtars be obſerved at theſe places. 3. Such ſtars as are neareſt in right aſcenſion and declination to the moon are infinitely preferable. 4. It cannot be too ſtrongly urged to get, as near as poſſible, an equal number of obſervations of each limb, to take a mean of each ſet, and then a mean of both means. This will in a great meaſure correct the error of teleſcopes and ſight. 5. The adjuſtment of the teleſcopes to the eye of the obſerver before the obſervation is alſo very neceſſary, as the ſight is ſubject to vary. 6. A principal error proceeds from the obſervation of the moon's limb, which may be conſiderably leſſened, if certain little round ſpots near each limb were alſo obſerved in ſettled obſervatories; in which caſe the libration of the moon will perhaps be a conſideration. 7. When the difference of meridians, or of the latitudes of places, is very conſiderable, the change of the moon's diameter becomes an equation.

"Though ſuch are the requiſites to uſe this method with advantage, only one or two of them have been employed in the obſervations that I have reduced. Two-thirds of theſe obſervations had not even the ſame ſtars obſerved at Greenwich and York; and yet none of the reſults, except a doubtful one, differ 15″ from the mean; therefore I think we may expect a ſtill greater exactneſs, perhaps within 10″ if the above particulars be attended to.

"When the ſame ſtars are not obſerved, it is neceſſary for the obſervers at both places to compute their right aſcenſion from tables, in order to get the apparent right aſcenſion of the moon's limb. Though this is not ſo ſatisfactory as by actual obſervation, ſtill the difference will be trifling, provided the ſtars' right aſcenſions are accurately ſettled. I am alſo of opinion, that the ſame method can be put in practice by travellers with little trouble, and a tranſit inſtrument conſtructed ſo as to fix up with facility in any place. It is not neceſſary, perhaps, that the inſtrument ſhould be perfectly in the meridian for a few ſeconds of time, provided ſtars nearly in the ſame parallel of declination with the moon are obſerved; nay, I am inclined to think, that if the inſtrument deviates even a quarter or half a degree, or more, ſufficient exactneſs can be attained; as a table might be computed, ſhowing the moon's parallax and motion for ſuch deviation; which laſt

may eaſily be found by the well known method of obſerving ſtars whoſe difference of declination is conſiderable.

"As travellers very ſeldom meet with ſituations to obſerve ſtars near the pole, or find a proper object for determining the error of the line of collimation, I ſhall recommend the following method as original.—Having computed the apparent right aſcenſion of four, ſix, or more ſtars, which have nearly the ſame parallel of declination, obſerve half of them with the inſtrument inverted, and the other half when in its right poſition. If the difference of right aſcenſions between each ſet by obſervation agrees with the computation, there is no error; but if they diſagree, half that diſagreement is the error of the line of collimation. The ſame obſervations may alſo ſerve to determine, whether the diſtance of the correſponding wires be equal. In caſe of neceſſity, each limb of the ſun might be obſerved in the ſame manner, though probably with leſs preciſion. By a ſingle trial I made above two years ago, the reſult was much more exact than I expected. Mayor's catalogue of ſtars will prove of great uſe to thoſe that adopt the above method. I am rather ſurpriſed that the immerſions of known ſtars of the ſixth and ſeventh magnitude, behind the dark limb of the moon, are not conſtantly obſerved in fixed obſervatories, as they would frequently be of great uſe."

The annexed rule for finding the ſhip's place, with the miſcellaneous obſervations on different methods, we have been favoured with by Mr. John M'Lean of the Obſervatory, Edinburgh. The rule was examined and approved of by Sir Joſeph Banks, Preſident of the Royal Society.

1. With regard to determining the ſhip's place by the help of the courſe and diſtance failed, the following rule may be applied.—It will be found as expeditious as any of the common methods by the middle latitude or meridional parts; and is in ſome reſpects preferable, as the common tables of ſines and tangents only are requiſite in applying it.—Let *a* and *b* be the diſtances of two places from the ſame pole in degrees, or their complete latitudes; *c* the angle which a meridian makes with the rhumb line paſſing through the places; and L the angle formed by their meridians, or the difference of longitude in minutes: then A and B being the logarithmic tangents of $\frac{1}{2}a$ and $\frac{1}{2}b$, S the ſine of C, and S the ſine of (C+1′), we ſhall have the following equation $L=\frac{A \backsim B}{S'-S}$ *

Alſo from a well known property of the rhumb line, we have the following equation:

S+E=R+D, where S is the logarithmic coſine of C, E the logarithm of the length of the rhumb-line, or diſtance, D the logarithm of the minute's difference of latitude, and R the logarithm of the radius.

By the help of theſe two equations, we ſhall have an eaſy ſolution of the ſeveral caſes to which the middle latitude, or meridional parts, are commonly applied.

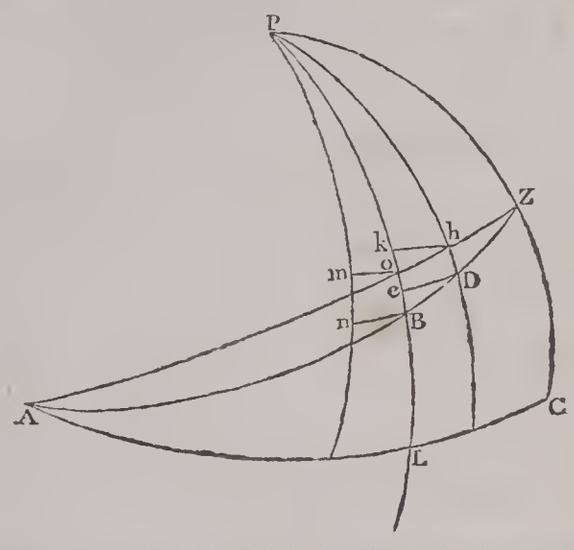
Example. A ſhip from a port, in latitude 56° N. ſails SW. by W. till ſhe arrives at the latitude of 40° N: Required the difference of longitude.

Here $a=34°$, $b=50°$, $c=56°\ 15''$, A = 9.48534, B = 9.56107, S′=9.9199308, S=9.9198464; therefore, $L=\frac{A \backsim B}{S'-S}=\frac{757300}{844}=897$ the minutes difference of longitude. Alſo, S=9.74474, D=2.98227; therefore E=R+D—S=3.23753, to which the natural number is 1728, the miles in the rhumb-line failed over.

2. The common method of finding the difference of longitude made good upon ſeveral courſes and diſtances, by means of the difference of latitude and departure made good upon the ſeveral courſes, is not accurately true.

For example: If a ſhip ſhould ſail due ſouth 600 miles, from a port in 60° north latitude, and then due weſt 600 miles, the difference of longitude found by the common methods of ſolution would be 1053; whereas the true difference of longitude is only 933, leſs than the former by 120 miles, which is more than $\frac{1}{8}$ of the whole. Indeed every conſiderable alteration in the courſe will produce a very ſenſible error in the difference of longitude; though, when the ſeveral rhumb lines failed over are nearly in the ſame direction, the error in longitude will be but ſmall.

The reaſon of this will eaſily appear from the annexed figure, in which the ſhip is ſuppoſed to ſail from Z to A, along the rhumb lines ZB, BA; for, if the meridians PZ, PkoeBL be drawn; and very near the latter other two meridians PhD, Pmn; and likewiſe the parallels of latitude Bn, De, mo, hk; then it is plain that De is greater than hk (for De is to hk as the ſine of DP to the ſine of hP): and ſince this is the caſe every where, the departure correſponding to the diſtance BZ and courſe BZC, will be greater than the departure to the diſtance oZ and courſe oZC. And in the ſame manner we prove that nB is greater than mo; and conſequently, the departure correſponding to the diſtance AB, and courſe ABL, is greater than the departure to the diſtance Ao, and courſe AoL: Wherefore, the ſum of the two departures correſponding to the courſes ABL and BZC, and to the diſtances AB and BZ, is greater than the departure correſponding to the diſtanee AZ and courſe AZC: therefore the courſe anſwering to this ſum as a departure, and CZ as a difference of latitude (AC being the parallel of latitudes paſſing through A), will be greater than the true courſe AZC made good upon the whole. And hence the difference of longitude found by the common rules will be greater than the true difference of longitudes; and the error will be greater or leſs, according as BA deviates more or leſs from the direction of BZ.



3. Of determining the ſhip's longitude by lunar obſervations.

Several rules for this purpoſe have been lately publiſhed, the principal object of which ſeems to have been to abbreviate the computations requiſite for determining the true diſtance of the ſun or a ſtar from the moon's centre. This, however, ſhould have certainly been leſs attended to than the inveſtigation of a ſolution, in which conſiderable errors in the data may produce a ſmall error in the required diſtance. When

* A ∽ B ſignifies the difference between A and B.

either of the luminaries has a ſmall elevation, its altitude will be affected by the variableneſs of the atmoſphere; likewiſe the altitude, as given by the quadrant, will be affected by the inaccuracy of the inſtrument, and the uncertainty neceſſarily attending all obſervations made at ſea. The ſum of theſe errors, when they all tend the ſame way, may be ſuppoſed to amount to at leaſt one minute in altitude; which, in many caſes, according to the common rules for computing the true diſtance, will produce an error of about 30 minutes in the longitude. Thus, in the example given by Monſ. Callet, in the *Tables Portatives*, if we ſuppoſe an error of one minute in the ſun's altitude, or call it 6° 26′ 34″, inſtead of 6° 27′ 34″; we ſhall find the alteration in diſtance according to his rule to be 54″, producing an error of about 27 minutes in the longitude: for the angle at the ſun will be found, in the ſpherical triangle whoſe ſides are the complement of the ſun's altitude, complement of the moon's altitude, and obſerved diſtance, to be about 26°; and as radius is to the coſine of 26°, ſo is 60″ the ſuppoſed error in altitude, to 54″ the alteration in diſtance. Perhaps the only method of determining the diſtance, ſo as not to be affected by the errors of altitude, is that by firſt finding the angles at the ſun and moon, and by the help of them the corrections of diſtance for parallax and refraction. The rule is as follows:

Add together the complement of the moon's apparent altitude, the complement of the ſun's apparent altitude, and the apparent diſtance of centres; from half the ſum of theſe ſubtract the complement of the ſun's altitude, and add together the logarithmic co-ſecant of the complement of the moon's altitude, the logarithmic co-ſecant of the apparent diſtance of centres, the logarithmic ſine of the half ſum, and the logarithmic ſine of the remainder; and half the ſum of theſe four logarithms, after rejecting 20 from the index, is the logarithmic coſine of half the angle at the moon.

As radius is to the coſine of the angle at the moon; ſo is the difference between the moon's parallax and refraction in altitude to a correction of diſtance; which is to be added to the apparent diſtance of centres when the angle at the moon is obtuſe; but to be ſubtracted when that angle is acute, in order to have the diſtance once corrected.

In the above formula, if the word *ſun* be changed for *moon*, and *vice verſa*, wherever theſe terms occur, we ſhall find a ſecond correction of diſtance to be applied to the diſtance, once corrected by ſubtraction when the angle at the ſun is obtuſe, but by addition when that angle is acute, and the remainder or ſum is the true diſtance nearly.

In applying this rule, it will be ſufficient to uſe the complement, altitudes, and apparent diſtances of centres, true to the neareſt minute only, as a ſmall error in the angles at the ſun and moon will very little affect the corrections of diſtances.

If D be the computed diſtance in ſeconds, d the difference between the moon's parallax and refraction in altitude, S the ſine of the angle at the moon, and R the radius; then $\frac{d^2 S^2}{2DR}$ will be a third correction of diſtance to be added to the diſtance twice corrected. But it is plain, from the nature of this correction, that it may be always rejected, except when the diſtance D is very ſmall, and the angle at the moon nearly equal to 90°.

This ſolution is likewiſe of uſe in finding the true diſtance of a ſtar from the moon, by changing the word *ſun* into *ſtar*, and uſing the refraction of the ſtar, inſtead of the difference between the refraction and parallax in altitude of the ſun, in finding the ſecond correction of diſtance.

Ex. Given the obſerved diſtance of a ſtar from the centre of the moon, 50° 8′ 41″; the moon's altitude, 55° 58′ 5″; the ſtar's altitude 19° 18′ 5″; and the moon's horizontal parallax, 1° 0′ 5″: Required the true diſtance.

Coſec.——0.02512——*'s co. alt.——70° 42′
)'s co. alt.——34′ 4——Coſec.——0.25169
Coſec.——0.11479——obſ. diſt.——50 9——Coſec.——0.11479

2)154 55

Sine——9.98950 —— —— 77 27——Sine——9.98950

Rem. 6 45——Sine——9.07018

Sine——9.83688 —— Rem. 43 23 2)19.42616

2)19.96629 ——Coſec.——9.71308——58° 54′ 2

Coſec.——9.98314 —— 15° 54′ 2 117 48 =)'s angle.

31 48 = *'s angle.

Rad. : Coſec. 117° 48′ : :)'s diff. parall. & refract. 1986″ : 923″ = 1ſt correct. of diſtance.
Rad. : Coſec. 31° 48′ : ſtar's refract. 162″ : 138″ = 2d correct. of diſtanee.

Here the firſt correction of diſtance is additive, ſince the angle at the moon is obtuſe; and the ſecond correction is alſo additive, ſince the angle at the ſtar is acute: therefore their ſum 923″ + 138″ = 1061″ = 17′ 41″, being added to 50° 8′ 41″, the apparent diſtanee of the ſtar from the moon's centre, gives 50° 26′ 21″ for the true diſtance of centres nearly;—and 2 × L (d + S) — L (2 L R + L 2 + L D) = L 8″, which, being added to the diſtance twice corrected, gives 50° 26′ 29″ for the true diſtance. By comparing this diſtance with the computed diſtances in the ephemeris, the time at Greenwich correſponding to that of obſerving the diſtance will be known; and the difference of thoſe times being converted into degrees and minutes, at the rate of 15 degrees to the hour, will give the longitude of the place of obſervation, which will be eaſt if the time at the place be greater than that at Greenwich, but weſt if it be leſs.

LONGITUDINAL, in general, denotes ſomething placed lengthwiſe: thus ſome of the fibres in the veſſels of the human body are placed longitudinally, others tranſverſely or aeroſs.

LONGOBARDI. See LANGOBARDI.

LONGOMONTANUS (CHRISTIAN), a learned aſtronomer, born in a village of Denmark in 1562. He was the ſon of

a ploughman; and was obliged to ſuffer during his ſtudies all the hardſhips to which he could be expoſed, dividing his time, like the philoſopher Cleanthes, between the cultivation of the earth and the leſſons he received from the miniſter of the place. At laſt, when he was 15, he ſtole away from his family, and went to Wiburg, where there was a college, in which he ſpent 11 years; and though he was obliged to earn a livelihood, he applied himſelf to ſtudy with ſuch ardour, that among other ſciences he learned the mathematics in great perfection. He afterwards went to Copenhagen; where the profeſſors of that univerſity in a ſhort time conceived ſo high an opinion of him, that they recommended him to the celebrated Tycho Brahe. Longomontanus lived eight years with that famous aſtronomer, and was of great ſervice to him in his obſervations and calculations. At length, being extremely deſirous of obtaining a profeſſor's chair in Denmark, Tycho Brahe conſented, though with ſome difficulty, to deprive himſelf of his ſervice; gave him a diſcharge, filled with the higheſt teſtimonies of his eſteem; and furniſhed him with money for the expence of his long journey. He obtained a profeſſorſhip of mathematics in the univerſity of Copenhagen in 1605; and diſcharged the duty of it worthily till his death, which happened in 1647. He wrote many learned works; amuſed himſelf with endeavouring to ſquare the circle, and pretended that he had made that diſcovery: but Dr. John Pell, an Engliſh mathematician, attacked him warmly on that ſubject, and proved that he was miſtaken.

LONGTOWN, a town of Cumberland, on the Scots borders, near the conflux of the Eſk and Kirkſop, ſeven miles from Carliſle, and 313 miles from London. It has a market on Thurſday, and a charity ſchool for 60 children, with two fairs in the year.

LONGUEVILLE, a town of France, in the department of Lower Seine and late province of Normandy, ſeated on a ſmall river, 23 miles N. of Rouen.

LONGUS, a Greek ſophiſt, author of a book entitled Ποιμενικα, or Paſtorals, and a romance containing the loves of Daphnis and Chloe. Huetius, biſhop of Avranches, ſpeaks very advantageouſly of this work; but he cenſures the obſcene touches with which it is interſperſed. None of the ancient authors mention him, ſo the time when he lived cannot be certainly fixed. There is an Engliſh tranſlation of this author, which is aſcribed to the late J. Craggs, Eſq. ſecretary of ſtate.

LONGWY, a town of France, in the department of Moſelle and late duchy of Lorrain, with a caſtle. It is divided into the Old and New Town, the latter of which is fortified. It was taken by the king of Pruſſia in 1792, but retaken two months after. It is ſeated on an eminence, 15 miles S. W. of Luxemburg, and 167 N. E. of Paris. E. lon. 5. 58. N. lat. 49. 30.

LONICERA, HONEYSUCKLE, in botany: A genus of the monogynia order, belonging to the pentandria claſs of plants. The corolla is monopetalous and irregular; the berry polyſpermous, bilocular, and inferior.

The Species are, 1. The *alpigena*, or upright red-berried honeyſuckle, riſes with a ſhrubby, ſhort, thick, upright ſtem, branching ſtrong and erectly four or five feet high; largiſh, ſpear-ſhaped leaves, in pairs oppoſite; and from the ſides of the branches many red flowers by two's on long footſtalks, each ſucceeded by two red berries joined together at their baſe; it flowers in Auguſt, and the berries ripen in autumn. 2. The *cærulea*, or blue-berried upright honeyſuckle, riſes with a ſhrubby upright ſtem, branching moderately three or four feet high, with many white flowers proceeding from the ſides of the branches; appearing in May, and ſucceeded by blue berries joined together at their baſe. 3. The *nigra*, or black-berried upright honeyſuckle, riſes with a ſhrubby ſtem branching three or four feet high, with white flowers ſucceeded by ſingle and diſtinct black berries. 4. The *tartarica*, or Tartarian honeyſuckle, riſes with a ſhrubby upright ſtem, branching erectly three or four feet high; heart-ſhaped, oppoſite leaves, and whitiſh erect flowers ſucceeded by red berries, ſometimes diſtinct, and ſometimes double. 5. The *diervilla*, or yellow-flowered Arcadian honeyſuckle, riſes with ſhrubby upright ſtalks, branching erect to the height of three or four feet; the branches terminated by cluſters of pale yellow flowers, appearing in May and June, and ſometimes continuing till autumn; but rarely ripening ſeeds here. 6. The *xyloſteum*, or fly honeyſuckle, riſes with a ſtrong ſhrubby ſtem, branching erect to the height of ſeven or eight feet; with erect white flowers proceeding from the ſides of the branches; each ſucceeded by large double red berries, joined together at their baſe. The flowers appear in June, and the berries ripen in September. 7. The *ſymphoricarpos*, or ſhrubby St. Peter's wort, riſes with a ſhrubby, rough ſtem, branching erect four or five feet high, with ſmall greeniſh flowers appearing round the ſtalk in Auguſt. 8. The *periclymenum*, or common climbing honeyſuckle, hath two principal varieties, viz. The Engliſh wild honeyſuckle, or woodbine of our woods and hedges, and the Dutch or German honeyſuckle. The former riſes with ſhrubby, weak, very long ſlender ſtalks, and branches trailing on the ground, or climbing round any ſupport; all terminated by oval imbricated heads, furniſhing ſmalliſh flowers of white or red colours, and appearing from June or July till autumn. The Dutch honeyſuckle riſes with a ſhrubby declinated ſtalk, and long trailing purpliſh branches, terminated by oval imbricated heads, furniſhing large beautiful red flowers of a fragrant odour, appearing in June and July. 9. The *caprifolium*, or Italian honeyſuckle, riſes with ſhrubby declinated ſtalks, ſending out long ſlender trailing branches, terminated by verticillate or whorled bunches of cloſe-ſitting flowers, very fragrant, and white, red, and yellow colours. 10. The *ſempervirens*, or evergreen trumpet-flowered honeyſuckle, riſes with a ſhrubby declinated ſtalk, ſending out long ſlender trailing branches, terminated by naked verticillate ſpikes, of long, unreflexed, deep ſcarlet flowers, very beautiful, but of little fragrance.

The moſt eaſy method of propagating theſe plants is by layers or cuttings, eſpecially the latter: both of theſe readily emit roots, and form plants in one year fit for tranſplantation. Some ſorts are alſo propagated by ſuckers and ſeed.

LONSDALE or *Kirkby* LONSDALE, a town of Weſtmoreland, ſeated on the river Lon, in a pleaſant and rich valley of the ſame name. It is a large well-built town, has a handſome church, and a fine ſtone-bridge over the river. It is well inhabited; and is the beſt town in the county except Kendal. It gives title of Earl to the Lowther family. W. lon. 2. 27. N. lat. 54. 10.

LOO, a town of the United Provinces, in Guelderland, eight miles weſt of Deventer, where the prince of Orange had a fine palace. E. lon. 6. 0. N. lat. 52. 18.

LOOE, EAST and WEST, two mean boroughs in Cornwall, ſeparated by a creek, over which is a narrow ſtone bridge. They ſend together as many members to parliament as London. The market held at Eaſt Looe, is on Saturday. They are 16 miles W. of Plymouth, and 232 W. by S. of London. W. lon. 4. 36. N. lat. 50. 23.

LOOF, the after part of a ſhip's bow; or that part of her ſide forward where the planks begin to be incurvated into an arch as they approach the ſtem.

LOOF, or *Luff*. See LUFF.

LOOK-OUT, in the ſea-language, a watchful attention to ſome important object or event which is expected to ariſe from the preſent ſituation of a ſhip, &c. It is principally uſed in navigation when there is a probability of danger from the real or ſuppoſed proximity of land, rocks, enemies, and, in ſhort,

whatever peril ſhe may encounter through inattention, which might otherwiſe have been avoided by a prudent and neceſſary vigilance. There is always a look-out kept on a ſhip's fore-caſtle at ſea, to watch for any dangerous objects lying near her track, and to which ſhe makes a gradual approach as ſhe advances: the mate of the watch accordingly calls often from the quarter-deck, "Look out afore there!" to the perſons appointed for this ſervice.

LOOKING-GLASSES, are nothing but plain mirrors of glaſs; which, being impervious to the light, reflect the images of things placed before them. See the articles MIRROR and OPTICS. For the caſting, grinding, and poliſhing of looking-glaſſes, ſee the article GLASS. For foliating of looking-glaſſes, ſee the article FOLIATING.

LOOL, in metallurgy, a veſſel made to receive the waſhings of ores of metals. The heavier or more metalline parts of the ores remain in the trough in which they are waſhed; the lighter and more earthy run off with the water, but ſettle in the lool.

LOOM, the weaver's frame; a machine whereby ſeveral diſtinct threads are woven into one piece. Looms are of various ſtructures, accommodated to the various kinds of materials to be woven, and the various manner of weaving them; *viz.* for woollens, ſilks, linens, cottons, cloths of gold; and other works, as tapeſtry, ribbands, ſtockings, &c divers of which will be found under their proper heads. See WEAVING. The weaver's loom-engine, otherwiſe called the Dutch loom-engine, was brought into uſe from Holland to London, in or about the year 1676.

Heir LOOM, in law. See HEIR-*Loom*.

LOOM, at ſea. If a ſhip appears big, when at a diſtance, they ſay ſhe looms, or appears a great ſail: the term is alſo uſed to denote the indiſtinct appearance of any other diſtant objects.

LOOM-*Gale*, at ſea, a gentle eaſy gale of wind, in which a ſhip can carry her top-ſails a-trip.

LOOP, in the iron works, is a part of a ſow or block of caſt iron broken or melted off from the reſt, and prepared for the forge or hammer. The uſual method is, to break off the loop of about three quarters of a hundred weight. This loop they take up with their ſlinging-tongs, and beat it with iron ſledges upon an iron plate near the fire, that ſo it may not fall to pieces, but be in a condition to be carried under the hammer. It is then placed under the hammer, and a little water being drawn to make the hammer move but ſoftly, it is beat very gently; and by this means the droſs and foulneſs are forced off, and after this they draw more and more water by degrees, and beat it more and more till they bring it to a four-ſquare maſs, of about two feet long, which they call a bloom.

LOOPING, in metallurgy, a word uſed by the miners of ſome counties of England, to expreſs the running together of the matter of an ore into a maſs, in the roaſting or firſt burning, intended only to calcine it ſo far as to make it fit for powdering. This accident, which gives the miners ſome trouble, is generally owing to continuing the fire too long in this proceſs.

LOOSA, in botany: A genus of the monogynia order, belonging to the polyandria claſs of plants. The calyx is pentaphyllous, ſuperior; there are five ſub-ovate, cucullated, and large petals; the nectarium conſiſts of five leaves, gathered into a conical figure, each terminated by two filaments; the capſule is turbinated, unilocular, and trivalved at top; the ſeeds are very numerous; and there are three linear and longitudinal ſinuſes.

LOOSE-STRIFE. See LYSIMACHIA.

LOPES LE VEGA. See VEGA.

LOPEZ, or INDIAN, Root, in the materia medica. The plant to which this article belongs is unknown. Neither the woody nor cortical part of the root has any remarkable ſenſible quality. A ſlight bitterneſs is perceptible; and it is recommended, like ſimarouba, in diarrhœas even of the colliquative kind, in half-dram doſes four times a-day. Little of this root has been brought to Europe: but ſome of thoſe who have had an opportunity of employing it, ſpeak in very high terms of the effects obtained from it.

LOPHIUS, FISHING-FROG, *Toad-fiſh*, or *Sea-devil*; a genus of the branchioſtegious order of fiſhes, whoſe head is in ſize equal to all the reſt of the body. There are three ſpecies; the moſt remarkable of which is the piſcatorius, or common fiſhing-frog, an inhabitant of the Britiſh ſeas. This ſingular fiſh was known to the ancients by the name of Βατραχος, and *rana*; and to us by that of the *fiſhing-frog*, for it is of a figure reſembling that animal in a tadpole ſtate. Pliny takes notice of the artifice uſed by it to take its prey: *Eminentia ſub oculis cornicula turbato limo exerit, aſſultantes piſciculos attrahens, donec tam prope accedunt, ut aſſiliat.* "It puts forth the ſlender horns it has beneath its eyes, enticing by that means the little fiſh to play round, till they come within reach, when it ſprings on them." The fiſhing-frog grows to a large ſize, ſome being between four and five feet in length; and Mr. Pennant mentions one taken near Scarborough, whoſe mouth was a yard wide. The fiſhermen on that coaſt have a great regard for this fiſh, from a ſuppoſition that it is a great enemy to the dog-fiſh; and, whenever they take it with their lines, ſet it at liberty.

It is a fiſh of very great deformity: the head is much bigger than the whole body; is round at the circumference, and flat above; the mouth of a prodigious wideneſs. The under jaw is much longer than the upper: the jaws are full of ſlender ſharp teeth: in the roof of the mouth are two or three rows of the ſame: at the root of the tongue, oppoſite each other, are two bones of an elliptical form, thick ſet, with very ſtrong ſharp teeth. The noſtrils do not appear externally, but in the upper part of the mouth are two large orifices that ſerve inſtead of them. On each ſide the upper-jaw are two ſharp ſpines, and others are ſcattered about the upper part of the head. Immediately above the noſe are two long tough filaments, and on the back three others; theſe are what Pliny calls *cornicula*, and ſays it makes uſe of to attract the little fiſh. They ſeem to be like lines flung out for that end. Along the edges of the head and body are a multitude of ſhort fringed ſkins, placed at equal diſtances. The aperture to the gills is placed behind; each of theſe is very wide, ſo that ſome writers have imagined it to be a receptacle for the young in time of danger. The body grows ſlender near the tail, the end of which is quite even. The colour of the upper part of this fiſh is duſky, the lower part white; the ſkin ſmooth.

LORANTHUS, in botany: A genus of the monogynia order, belonging to the hexandria claſs of plants; and in the natural method ranking under the 48th order, *Aggregatæ*. The germen is inferior; there is no calyx; the corolla is ſexfid and revoluted; the ſtamina are at the tops of the petals; the berry is monoſpermous. There is only one ſpecies, a native of America, diſcovered by Father Plumier, and found growing naturally at La Vera Cruz by Dr. Houſton. It riſes with a ſhrubby ſtalk, eight or ten feet high, dividing into ſeveral branches, having at their ends cluſters of ſmall ſcarlet-coloured flowers, ſucceeded by oval berries with a pulpy covering, and a hard ſhell with one cell, incloſing ſeveral compreſſed ſeeds. It is propagated by ſeeds, which ſhould be ſown ſoon after they are ripe; otherwiſe they are very apt to miſcarry, or lie a year in the ground without germinating. The plants require always to be kept in a bark-ſtove.

LORARII, among the Romans, officers whoſe buſineſs it was, with whips and ſcourges, to compel the gladiators to

engage. The *lorarii* alſo puniſhed ſlaves who diſobeyed their maſters.

LORD, a title of honour given to thoſe who are noble either by birth or creation. In this ſenſe, it amounts to much the ſame as *peer of the realm*, or *lord of parliament*. The title is by courteſy alſo given to all the ſons of dukes and marquiſes, and to the eldeſt ſons of earls: and it is alſo a title of honour beſtowed on thoſe who are honourable by their employments; as *lord advocate, lord chamberlain, lord chancellor, &c.* The word is Saxon, but abbreviated from two ſyllables into one: for it was originally *Illaford*, which by dropping the aſpiration became *Laford*, and afterwards by contraction *Lord*. "The etymology of the word (ſays J. Coates) is well worth obſerving; for it was compoſed of *illaf* "a loaf of bread," and *ford* "to give or afford;" ſo that *Illaford*, now *Lord*, implies "a giver of bread," becauſe, in thoſe ages, ſuch great men kept extraordinary houſes, and fed all the poor; for which reaſon they were called *givers of bread*, a thing now much out of date, great men being fond of retaining the title, but few regarding the practice for which it was firſt given. See LADY.

Houſe of LORDS, one of the three eſtates of parliament, and compoſed of the Lords Spiritual and Temporal.

1. The *Spiritual Lords* conſiſt of 2 archbiſhops and 24 biſhops; and at the diſſolution of monaſteries by Henry VIII. conſiſted likewiſe of 26 mitred abbots and two priors: a very conſiderable body, and in thoſe times equal in number to the temporal nobility. All theſe hold, or are ſuppoſed to hold, certain ancient baronies under the king: for William the Conqueror thought proper to change the ſpiritual tenure of frank-almoign or free-alms, under which the biſhops held their lands during the Saxon government, into the feodal or Norman tenure by barony; which ſubjected their eſtates to all civil charges and aſſeſſments, from which they were before exempt; and in right of ſucceſſion to thoſe baronies, which were unalienable from their reſpective dignities, the biſhops and abbots were allowed their ſeat in the houſe of lords. But though theſe lords ſpiritual are in the eye of the law a diſtinct eſtate from the lords temporal, and are ſo diſtinguiſhed in moſt of our acts of parliament; yet in practice they are uſually blended together under the name of *the lords*; they intermix in their votes, and the majority of ſuch intermixture joins both eſtates. And from this want of a ſeparate aſſembly, and ſeparate negative of the prelates, ſome writers have argued very cogently, that the lords ſpiritual and temporal are now in reality only one eſtate: which is unqueſtionably true in every effectual ſenſe, though the ancient diſtinction between them ſtill nominally continues. For if a bill ſhould paſs their houſe, there is no doubt of its validity, though every lord ſpiritual ſhould vote againſt it; of which Selden and Sir Edward Coke give many inſtances: as, on the other hand, doubtleſs it would be equally good, if the lords temporal preſent were inferior to the biſhops in number, and every one of thoſe temporal lords gave his vote to reject the bill; though this Sir Edward Coke ſeems to doubt of.

2. The *Temporal Lords* conſiſt of all the peers of the realm, (the biſhops not being in ſtrictneſs held to be ſuch, but merely lords of parliament), by whatever title of nobility diſtinguiſhed; dukes, marquiſes, earls, viſcounts, or barons. Some of theſe ſit by deſcent, as do all ancient peers; ſome by creation, as do all new-made ones; others, ſince the union with Scotland, by election, which is the caſe of the 16 peers, who repreſent the body of the Scots nobility. Their number is indefinite, and may be increaſed at will by the power of the crown; and once, in the reign of Queen Anne, there was an inſtance of creating no leſs than 12 together; in contemplation of which, in the reign of King George I. a bill paſſed the houſe of lords, and was countenanced by the then miniſtry, for limiting the number of the peerage. This was thought by ſome to promiſe a great acquiſition to the conſtitution, by reſtraining the prerogative from gaining the aſcendant in that auguſt aſſembly by pouring in at pleaſure an unlimited number of new-created lords. But the bill was ill reliſhed, and miſcarried in the houſe of commons, whoſe leading members were then deſirous to keep the avenues to the other houſe as open and eaſy as poſſible.

The diſtinction of ranks and honours is neceſſary in every well-governed ſtate: in order to reward ſuch as are eminent for their ſervices to the public, in a manner the moſt deſirable to individuals, and yet without burthen to the community; exciting thereby an ambitious yet laudable ardour and generous emulation in others. And emulation, or virtuous ambition, is a ſpring of action which however dangerous or invidious in a mere republic or under a deſpotic ſway, will certainly be attended with good effects under a free monarchy; where, without deſtroying its exiſtence, its exceſſes may be continually reſtrained by that ſuperior power from which all honour is derived. Such a ſpirit, when nationally diffuſed, gives life and vigour to the community; it ſets all the wheels of government in motion, which, under a wiſe regulator, may be directed to any beneficial purpoſe; and thereby every individual may be made ſubſervient to the public good, while he principally means to promote his own particular views. A body of nobility is alſo more particularly neceſſary in our mixed and compounded conſtitution in order to ſupport the rights of both the crown and the people, by forming a barrier to withſtand the encroachments of both. It creates and preſerves that gradual ſcale of dignity which proceeds from the peaſant to the prince; riſing like a pyramid from a broad foundation, and diminiſhing to a point as it riſes. It is this aſcending and contracting proportion that adds ſtability to any government; for, when the departure is ſudden from one extreme to another, we may pronounce that ſtate to be precarious. The nobility therefore are the pillars, which are reared from among the people, more immediately to ſupport the throne; and, if that falls, they muſt alſo be buried under its ruins. Accordingly, when in the laſt century the commons had determined to extirpate monarchy, they alſo voted the houſe of lords to be uſeleſs and dangerous. And ſince titles of nobility are thus expedient in the ſtate, it is alſo expedient that their owners ſhould form an independent and ſeparate branch of the legiſlature. If they were confounded with the maſs of the people, and like them had only a vote in electing repreſentatives, their privileges would ſoon be borne down and overwhelmed by the popular torrent, which would effectually level all diſtinctions. It is therefore highly neceſſary that the body of nobles ſhould have a diſtinct aſſembly, diſtinct deliberations and diſtinct powers from the commons. See alſo KING, NOBILITY, PARLIAMENT, COMMONS, *and* COMMONALTY.

As to the peculiar laws and cuſtoms relating to the houſe of lords, one very ancient privilege is that declared by the charter of the foreſt, confirmed in parliament 9 Hen. III.; viz. that every lord ſpiritual or temporal ſummoned to parliament, and paſſing through the king's foreſts, may, both in going and returning, kill one or two of the king's deer without warrant: in view of the foreſter if he be preſent, or on blowing a horn if he be abſent, that he may not ſeem to take the king's veniſon by ſtealth.

In the next place, they have a right to be attended and conſulted, by the judges of the court of king's bench and common pleas, and ſuch of the barons of the exchequer as are of the degree of the coif, or have been made ſerjeants at law; as likewiſe by the king's learned counſel, being ſerjeants,

and by the maſters of the court of chancery; for their advice in point of law, and for the greater dignity of their proceedings. The ſecretaries of ſtate, with the attorney and ſolicitor general, were alſo uſed to attend the houſe of peers, and have to this day (together with the judges, &c.) their regular writs of ſummons iſſued out at the beginning of every parliament, *ad tractandum et conſilium impendendum*, though not *ad conſentiendum*: but, whenever of late years they have been members of the houſe of commons, their attendance here hath fallen into diſuſe.

Another privilege is, that every peer, by licence obtained from the king, may make another lord of parliament his proxy, to vote for him in his abſence: a privilege which a member of the other houſe can by no means have, as he is himſelf but a proxy for a multitude of other people.

Each peer has alſo a right, by leave of the houſe, when a vote paſſes contrary to his ſentiments, to enter his diſſent on the journals of the houſe, with the reaſons for ſuch diſſent; which is uſually ſtyled his proteſt.

All bills likewiſe, that may in their conſequences any way affect the rights of the peerage, are by the cuſtom of parliament to have their firſt riſe and beginning in the houſe of peers, and to ſuffer no changes or amendments in the houſe of commons.

There is alſo one ſtatute peculiarly relative to the houſe of lords, 6 Ann. c. 23. which regulates the election of the 16 repreſentative peers of North Britain, in conſequence of the 22d and 23d articles of the union: and for that purpoſe preſcribes the oaths, &c. to be taken by the electors; directs the mode of balloting; prohibits the peers electing from being attended in an unuſual manner; and expreſsly provides, that no other matter ſhall be treated of in that aſſembly, ſave only the election, on pain of incurring a præmunire. See alſo the articles NOBILITY and PEERS.

LORDOSIS, (of λορδὸς, *bent inwards*), in the medical writings, a name given to a diſeaſed ſtate of the ſpine, in which it is bent inwards, or toward the anterior parts. It is uſed in oppoſition to *gibbous*, or *hump-backed*.

LORETTO, a town of Italy, in the Marca or Marche of Ancona, with a biſhop's ſee. It is ſmall, but fortified; and contains the famous *caſa ſanta*, or holy chapel, ſo much viſited by pilgrims. This chapel, according to the Legend, was originally a ſmall houſe in Nazareth, inhabited by the Virgin Mary, in which ſhe was ſaluted by the Angel, and where ſhe bred our Saviour. After their deaths, it was held in great veneration by all believers in Jeſus, and at length conſecrated into a chapel, and dedicated to the Virgin; upon which occaſion St. Luke made that identical image, which is ſtill preſerved here, and dignified with the name of our Lady of Loretto. This ſanctified edifice was allowed to ſojourn in Galilee as long as that diſtrict was inhabited by Chriſtians; but when infidels got poſſeſſion of the country, a band of angels, to ſave it from pollution, took it in their arms, and conveyed it from Nazareth to a caſtle in Dalmatia. This fact might have been called in queſtion by incredulous people, had it been performed in a ſecret manner; but, that it might be manifeſt to the moſt ſhort-ſighted ſpectator, and evident to all who were not perfectly deaf as well as blind, a blaze of celeſtial light, and a concert of divine muſic, accompanied it during the whole journey: beſides, when the angels, to reſt themſelves, ſet it down in a little wood near the road, all the trees of the foreſt bowed their heads to the ground, and continued in that reſpectful poſture as long as the ſacred chapel remained among them. But, not having been entertained with ſuitable reſpect at the caſtle above mentioned, the ſame indefatigable angels carried it over the ſea, and placed it in a field belonging to a noble lady called *Lauretta*, from whom the chapel takes its name. This field happened unfortunately to be frequented at that time by highwaymen and murderers: a circumſtance with which the angels undoubtedly were not acquainted when they placed it there. After they were better informed, they removed it to the top of a hill belonging to two brothers, where they imagined it would be perfectly ſecure from the dangers of robbery or aſſaſſination; but the two brothers, the proprietors of the ground, being equally enamoured of their new viſitor, became jealous of each other, quarrelled, fought, and fell by mutual wounds. After this fatal cataſtrophe, the angels in waiting finally moved the holy chapel to the eminence where it now ſtands, and has ſtood theſe 400 years, having loſt all reliſh for travelling.

The ſacred chapel ſtands due eaſt and weſt, at the farther end of a large church of the moſt durable ſtone of Iſtria, which has been built around it. This may be conſidered as the external covering, or as a kind of great coat to the *caſa ſanta*, which has a ſmaller coat of more precious material and workmanſhip nearer its body. This internal covering or caſe is of the choiceſt marble, after a plan of San Savino's, and ornamented with baſſo relievos, the workmanſhip of the beſt ſculptors which Italy could furniſh in the reign of Leo X. The ſubjects of thoſe baſſo relievos are, the hiſtory of the bleſſed Virgin, and other parts of the Bible. The whole caſe is about 50 feet long, 30 in breadth, and the ſame in height; but the real houſe itſelf is no more than 32 feet in length, 14 in breadth, and at the ſides about 18 feet in height: the centre of the roof is four or five feet higher. The walls of this little holy chapel are compoſed of pieces of a reddiſh ſubſtance, of an oblong ſquare ſhape, laid one upon another, in the manner of brick. At firſt ſight, on a ſuperficial view, theſe red-coloured oblong ſubſtances appear to be nothing elſe than common Italian bricks; and, which is ſtill more extraordinary, on a ſecond and third view, with all poſſible attention, they ſtill have the ſame appearance. Travellers, however, are aſſured, with great earneſtneſs, that there is not a ſingle particle of brick in their whole compoſition, being entirely of a ſtone, which, though it cannot now be found in Paleſtine, was formerly very common, particularly in the neighbourhood of Nazareth.

The holy houſe is divided within into two unequal portions, by a kind of grate-work of ſilver. The diviſion towards the weſt is about three-fourths of the whole; that to the eaſt is called the *Sanctuary*. In the larger diviſion, which may be conſidered as the main body of the houſe, the walls are left bare, to ſhow the true original fabric of Nazareth ſtone; for they muſt not be ſuppoſed to be bricks. At the lower or weſtern wall there is a window, the ſame through which the angel Gabriel entered at the Annunciation. The architraves of this window are covered with ſilver. There are a great number of golden and ſilver lamps in this chapel: one of the former, a preſent from the republic of Venice, is ſaid to weigh 37 pounds, and ſome of the ſilver lamps weigh from 120 to 130 pounds. At the upper end of the largeſt room is an altar, but ſo low, that from it you may ſee the famous image which ſtands over the chimney in the ſmall room or ſanctuary. Golden and ſilver angels, of conſiderable ſize, kneel around her, ſome offering hearts of gold enriched with diamonds, and one an infant of pure gold. The wall of the ſanctuary is plated with ſilver, and adorned with crucifixes, precious ſtones, and votive gifts of various kinds. The figure of the Virgin herſelf by no means correſponds with the fine furniture of her houſe: ſhe is a little woman, about four feet in height, with the features and complexion of a negro. Of all the ſculptors that ever exiſted, aſſuredly St. Luke, by whom this figure is ſaid to have been made, is the leaſt of a flatterer; and nothing can be a ſtronger proof of the bleſſed Virgin's contempt for external

beauty, than her being ſatisfied with this repreſentation of her. The figure of the infant Jeſus, by St. Luke, is of a piece with that of the Virgin: he holds a large golden globe in one hand, and the other is extended in the act of bleſſing. Both figures have crowns on their heads, enriched with diamonds: theſe were preſents from Ann of Auſtria queen of France. Both arms of the Virgin are incloſed within her robes, and no part but her face is to be ſeen; her dreſs is moſt magnificent, but in a wretched bad taſte: this is not ſurpriſing, for ſhe has no female attendant. She has particular clothes for the different feaſts held in honour of her, and, which is not quite ſo decent, is always dreſſed and undreſſed by the prieſts belonging to the chapel: her robes are ornamented with all kinds of precious ſtones down to the hem of her garment.

There is a ſmall place behind the ſanctuary, in which are ſhown the chimney, and ſome other furniture, which they pretend belonged to the Virgin when ſhe lived at Nazareth; particularly a little earthen porringer, out of which the infant uſed to eat. The pilgrims bring roſaries, little crucifixes, and agnus dei's, which the obliging prieſt ſhakes for half a minute in this diſh; after which it is believed they acquire the virtue of curing various diſeaſes, and prove an excellent preventative of all temptations of Satan. The gown which the image had on when the chapel arrived from Nazareth is of red camblet, and carefully kept in a glaſs ſhrine.

Above 100 maſſes are daily ſaid in this chapel, and in the church in which it ſtands. The jewels and riches to be ſeen at any one time in the holy chapel are of ſmall value in compariſon of thoſe in the treaſury, which is a large room adjoining to the veſtry of the great church. In the preſſes of this room are kept thoſe preſents which royal, noble, and rich bigots of all ranks have, by oppreſſing their ſubjects and injuring their families, ſent to this place. To enumerate every particular would fill volumes. They conſiſt of various utenſils and other things in ſilver and gold; as lamps, candleſticks, goblets, crowns, and crucifixes; lambs, eagles, ſaints, apoſtles, angels, virgins, and infants: then there are cameos, pearls, gems, and precious ſtones, of all kinds and in great numbers. What is valued above all the other jewels is the miraculous pearl, wherein they aſſert that Nature has given a faithful delineation of the Virgin ſitting on a cloud with the infant Jeſus in her arms. There was not room in the preſſes of the treaſury to hold all the ſilver pieces which have been preſented to the Virgin. Several other preſſes in the veſtry are completely full. It is ſaid that thoſe pieces are occaſionally melted down by his holineſs for the uſe of the ſtate; and alſo that the moſt precious of the jewels are picked out and ſold for the ſame purpoſe, falſe ſtones being ſubſtituted in their room.

Pilgrimages to Loretto are not ſo frequent with foreigners, or with Italians of fortune and diſtinction, as formerly; nineteen out of twenty of thoſe who make this journey now are poor people, who depend for their maintenance on the charity they receive on the road. To thoſe who are of ſuch a rank in life as precludes them from availing themſelves of the charitable inſtitutions for the maintenance of pilgrims, ſuch journeys are attended with expence and inconveniency; and fathers and huſbands, in moderate and confined circumſtances, are frequently brought to diſagreeable dilemmas, by the raſh vows of going to Loretto which their wives or daughters are apt to make on any ſuppoſed deliverance from danger. To refuſe, is conſidered by the whole neighbourhood as cruel, and even impious; and to grant, is often highly diſtreſſing, particularly to ſuch huſbands as, from affection or any other motive, do not chooſe that their wives ſhould be long out of their ſight. But the poor, who are maintained during their whole journey, and have nothing more than a bare maintenance to expect from their labour at home, to them a journey to Loretto is a party of pleaſure as well as devotion, and by much the moſt agreeable road they can take to heaven. The greateſt concourſe of pilgrims is at the ſeaſons of Eaſter and Whitſuntide. The rich travel in their carriages: a greater number come on horſeback or on mules; or, what is ſtill more common, on aſſes. Great numbers of females come in this manner, with a male friend walking by them as their guide and protector; but the greateſt number of both ſexes are on foot. The pilgrims on foot, as ſoon as they enter the ſuburbs, begin a hymn in honour of the Virgin, which they continue till they reach the church. The poorer ſort are received into an hoſpital, where they have bed and board for three days.

The only trade of Loretto conſiſts of roſaries, crucifixes, little madonas, agnus dei's, and medals, which are manufactured here, and ſold to pilgrims. There are great numbers of ſhops full of theſe commodities, ſome of them of a high price; but infinitely the greater part are adapted to the purſes of the buyers, and ſold for a mere trifle. The evident poverty of thoſe manufacturers and traders, and of the inhabitants of this town in general, is a ſufficient proof that the reputation of our Lady of Loretto is greatly on the decline.

In the great church which contains the holy chapel are confeſſionals, where the penitents from every country of Europe may be confeſſed in their own language, prieſts being always in waiting for that purpoſe: each of them has a long white rod in his hand, with which he touches the heads of thoſe to whom he thinks it proper to give abſolution. They place themſelves on their knees in groupes around the confeſſional chair; and when the holy father has touched their heads with the expiatory rod, they retire, freed from the burthen of their ſins, and with renewed courage to begin a freſh account.

In the ſpacious area before this church there is an elegant marble fountain, ſupplied with water from an adjoining hill by an aqueduct. Few even of the moſt inconſiderable towns of Italy are without the uſeful ornament of a public fountain. The embelliſhments of ſculpture and architecture are employed with great propriety on ſuch works, which are continually in the people's view; the air is refreſhed and the eye delighted by the ſtreams of water they pour forth; a ſight peculiarly agreeable in a warm climate. In this area there is alſo a ſtatue of Sixtus V. in bronze. Over the portal of the church itſelf is a ſtatue of the Virgin; and above the middle gate is a Latin inſcription, importing, that within is the houſe of the mother of God, in which the Word was made fleſh. The gates of the church are likewiſe of bronze, embelliſhed with baſſo relievos of admirable workmanſhip; the ſubjects taken partly from the Old, and partly from the New Teſtament, and divided into different compartments. As the gates of this church are ſhut at noon, the pilgrims who arrive after that time can get no nearer the *ſanta caſa* than theſe gates, which are by this means ſometimes expoſed to the firſt violence of that holy ardour which was deſigned for the chapel itſelf. All the ſculpture upon the gates which is within reach of the mouths of thoſe zealots, is in ſome degree effaced by their kiſſes.

There are alſo ſeveral paintings to be ſeen here, ſome of which are highly eſteemed, particularly two in the treaſury. The ſubject of one of theſe is the Virgin's Nativity, by Annibal Caracci; and of the other, a Holy Family, by Raphael. There are ſome others of conſiderable merit which ornament the altars of the great church. Theſe altars, or little chapels, of which this fabric contains a great number, are lined with marble and embelliſhed by ſculpture; but nothing within this church intereſts a traveller of ſenſibility ſo much as the iron grates before thoſe chapels, which were made of the fetters and chains of the Chriſtian ſlaves who were freed from bondage by the glorious victory of Lepanto.

The place where the governor reſides ſtands near the church,

and the eccleſiaſtics who are employed in it lodge in the ſame palace, where they receive the pilgrims of high diſtinction. The environs of this town are very agreeable, and in fine weather the high mountains of Croatia may be ſeen from hence. It is ſeated on a mountain, in E. lon. 13. 50. N. lat. 43. 24.

LORICA, was a cuiraſs, brigantine, or coat of mail, in uſe among the Roman ſoldiers. It was generally made of leather, and is ſuppoſed to be derived from *lorum*.—The loricæ were ſet with plates of metal in various forms; ſometimes in hooks or rings like a chain, ſometimes like feathers, and ſometimes like the ſcales of ſerpents or fiſhes, to which plates of gold were often added. There were other lighter cuiraſſes conſiſting only of many folds of linen cloth, or of flax made ſtrong enough to reſiſt weapons. Such ſoldiers as were rated under 1000 drachms, inſtead of the lorica now deſcribed, wore a *pectorale*.—The Roman lorica was made like a ſhirt, and defended the wearer both before and behind, but was ſo contrived that the back part could be occaſionally ſeparated from the front. Some of the loricæ were made of cords of hemp or flax, cloſe ſet together; whence they are called *thoraces*, *bilices*, *trilices*, &c. from the number of the cords fixed one upon another; but theſe were uſed rather in hunting than in the field of battle.

LORICATION, or COATING, in chemiſtry, is the covering a glaſs or earthen veſſel with a coat or cruſt of a matter able to reſiſt the fire, to prevent its breaking in the performing an operation that requires great violence of fire. See CHEMISTRY.

LORIS, in zoology. See LEMUR.

LORIMERS, one of the companies of London, that make bits for bridles, ſpurs, and ſuch-like ſmall iron ware. They are mentioned in ſtatute 1 Rich. II. c. 12.—The word ſeems derived from the Latin word *lorum*, "a thong."

LORME (PHILIBERT DE), one of the moſt celebrated architects in the 16th century, was born at Lyons. Queen Catherine de Medicis gave him the ſuperintendance of buildings; and he had the direction of thoſe of the Louvre, the Thuilleries, the caſtle of St. Anet, St. Germains, and other edifices erected by her orders. He wrote ſeveral books of architecture, which are eſteemed; and died about the year 1577.

LORNE, a diſtrict in the north part of Argyleſhire, be- Loch Etive and Loch Awe.

LORRAIN, a late province of France, bounded on the north by Luxemburg and Treves, on the eaſt by Alſace and Deux-Ponts, on the ſouth by Franche Comté, and on the weſt by Champagne and Bar. It is 100 miles in length and 75 in breadth, and abounds in all ſorts of corn, wine, hemp, flax, and rape-ſeed. There are fine meadows and large foreſts, with mines of iron, ſilver, and copper, and ſalt-pits. The principal rivers are the Maeſe or Meuſe, the Moſelle, the Seille, the Meurthe, and the Sare. In 1733 the French conquered Lorrain; and at the peace in 1735 it was agreed that Staniſlaus, the titular king of Poland, father-in-law to the king of France, ſhould poſſeſs this duchy with that of Bar, and that after his death they ſhould be united to France. It was alſo agreed, that Francis Stephen, duke of Lorrain, and the emperor's ſon-in-law, ſhould have the grand duchy of Tuſcany as an equivalent for Lorrain. After the death of the great duke of Tuſcany, in 1737, king Staniſlaus and the duke of Lorrain took poſſeſſion of their reſpective dominions; and the ceſſion was confirmed and guarantied by a treaty in 1738. This province now forms the three departments of Meurthe, Moſelle, and the Voſges.

LORRAIN (Robert le), an eminent ſculptor, born at Paris in 1666. From his infancy he made ſo rapid a progreſs in the art of deſigning, that at the age of 18 the celebrated Girardon intruſted him with the care of teaching his children and correcting his diſciples. He committed to him, alſo, in conjunction with Nouliſſon, the execution of the famous tomb of Cardinal Richelieu in the Sorbonne, and his own tomb at St. Landres in Paris. On his return from Rome, he finiſhed ſeveral pieces at Marſeilles, which had been left imperfect by the death of Mr. Puget. He was received into the Academy of Sculpture in 1701. His *chef-d'œuvre* is Galatea, a work univerſally admired. Lorrain afterwards made a Bacchus for the gardens at Verſailles, a Faun for thoſe of Marly; and ſeveral bronzes, among which is an Andromeda; all in an excellent taſte. This artiſt ſucceeded chiefly in heads; and more particularly in that of young girls, which he performed with incomparable delicacy and truth.

LORRAIN (Claude). See CLAUDE.

LOTEN (JOHN), a good landſcape painter of the Engliſh ſchool; though a native of Switzerland. His taſte led him to ſolemn and dreary ſcenes, as land ſtorms accompanied with ſhowers of rain, &c. and he ſeldom omitted to introduce oak-trees in his proſpects. His landſcapes are generally large; and he painted with nature, truth, and force. But the effect of his compoſition had been much greater, if he had been leſs cold in his colouring: for the judicious eye is not pleaſed with the darkiſh tint that predominates in it. He died in London about 1681.

LOTHIAN, a name given to three counties of Scotland, viz. Haddington ſhire, Edinburgh-ſhire, and Linlithgow-ſhire; otherwiſe called *Eaſt*, *Mid*, and *Weſt*, Lothians.

1. Eaſt Lothian, or Haddington-ſhire, is bounded on the north-weſt by the Frith of Forth; and on the eaſt by the German ſea; on the ſouth-eaſt by Berwick-ſhire; and on the weſt by the county of Edinburgh. It extends about 25 miles from eaſt to weſt, and, where broadeſt, nearly 15 from north to ſouth. The coaſt, advancing northward into the Frith, forms an irregular curve.—This is one of the moſt fruitful counties in Scotland, producing great quantities of wheat and all ſorts of grain, well watered, and plentifully ſupplied with fiſh, fowl, fuel, and all the neceſſaries of life. It abounds with towns, villages, and farms, interſperſed with a great number of agreeable houſes belonging to perſons of rank and fortune. For cultivation, populouſneſs, and fertility, this ſhire may vie with any tract of land in the iſland of Great Britain. Over and above the farming, which turns out to great account, the people towards the ſea-coaſt employ themſelves in the fiſhery, ſalt-making, and in foreign trade; and ſome of the more inland inhabitants engage in the linen and woollen manufactures. Limeſtone and coal are found in moſt parts of the country, and great numbers of ſheep are fed on the hills of Lammermuir.

2. Edinburgh-ſhire, or Mid-Lothian, is about 35 miles long, but varies in its breadth in different places from five to 16 miles. It is bounded on the eaſt by Haddington-ſhire; on the weſt by the ſhire of Linlithgow; on the ſouth by Tweeddale or Peebles-ſhire; and on the north by part of Weſt-Lothian and the Frith of Forth. The aſpect of the country is in general level and pleaſant, interſperſed with a few hills that help to exhibit agreeable proſpects. It is well watered with rivers, and ſhaded with woods. It produces plenty of coal, limeſtone, a ſoft black marble, and ſome copper ore. The ſoil, of itſelf fertile, is finely cultivated, and yields as plentiful harveſts of excellent wheat as are found in any part of Great Britain. The whole ſhire is interſperſed with noble houſes and plantations belonging to noblemen and gentlemen of fortune. The farmers are maſters of the ſcience of agriculture, and wealthy in conſequence of their ſkill, ſome of them paying 500l. of yearly rent. The country is well inhabited, and preſents us with a good number of towns and populous villages. Along the ſea-coaſt the common people ſubſiſt by fiſhing, and

traffic in coals and ſalt, and ſome few carry on a ſmuggling commerce. Thoſe in the inland are employed in farming, and ſome branches of the weaving manufacture. The ſheriffalty of this ſhire is in the gift of the crown; and Edinburgh is a county in itſelf.

3. The ſhire of Linlithgow, or Weſt Lothian, is bounded on the north by the Frith of Forth; the ſmall river Almond divides it from Edinburgh ſhire on the eaſt; on the ſouth-weſt it joins the county of Lanerk; and on the weſt it is parted from Stirling ſhire by Avon, a ſmall river. Its form, though irregular, approaches to a parallelogram. It meaſures from north-eaſt to ſouth-weſt nearly 20 miles. Its breadth, except on the ſhore of the Frith, does not exceed 12.—The country is pleaſant and fertile, abounding with corn and paſturage. Here is found plenty of coal, limeſtone, and lead ore; nay, in the reign of James VI. it produced a rich mine of ſilver.

LOTION, in pharmacy, a preparation of medicines, by waſhing them in ſome liquid, either made very light, ſo as to take away only the dregs, or ſharp, ſo as to penetrate them, in order to clear them of ſome ſalt, or corroſive ſpirit, as is done to antimony, precipitates, magiſteries, &c. or intended to take away ſome foulneſs or ill quality, or to communicate ſome good one. The term lotion is likewiſe given by ſurgeons to a liquid remedy of any kind, for external application.

LOTOPHAGI (anc. geog.), a people of the Regio Syrtica, (ſo called from their living on the lotus); inhabiting between the two Syrtes, from the Cinyphus to the Triton. The lotus was ſaid to be a food ſo luſcious as to make ſtrangers forget their native country. A ſweet wine was expreſſed from it, which did not keep above ten days; (Pliny). Lotophagi of Homer. See MENINX.

LOTTERY, a kind of public game at hazard, frequent in Britain, France, and Holland, in order to raiſe money for the ſervice of the ſtate; being appointed with us by the authority of parliament, and managed by commiſſioners appointed by the lords of the treaſury for that purpoſe. It conſiſts of ſeveral numbers of blanks and prizes, which are drawn out of wheels, one of which contains the numbers, and the other the correſponding blanks or prizes.

The Romans invented Lotteries to enliven their Saturnalia. This feſtival began by the diſtribution of tickets which gained ſome prize. Auguſtus made lotteries which conſiſted of things of little value; but Nero eſtabliſhed ſome for the people, in which 1000 tickets were diſtributed daily, and ſeveral of thoſe who were favoured by fortune got rich by them. Heliogabalus invented ſome very ſingular: the prizes were either of great value or of none at all; one gained a prize of ſix ſlaves, and another of ſix flies; ſome got valuable vaſes, and others vaſes of common earth. A lottery of this kind exhibited an excellent picture of the inequality with which Fortune diſtributes her favours.

The firſt Engliſh lottery we find mentioned in hiſtory was drawn A. D. 1569. It conſiſted of 40,000 lots, at 10s. each lot: the prizes were plate; and the profits were to go towards repairing the havens of this kingdom. It was drawn at the weſt door of St. Paul's cathedral. The drawing began on the 11th of January 1569, and continued inceſſantly drawing, *day and night*, till the 6th of May following; as Maitland, from Stowe, informs us in his Hiſtory, vol. i. p. 257. There were then only *three* lottery-offices in London. The propoſals for this lottery were publiſhed in the years 1567 and 1568. It was at firſt intended to have been drawn at the houſe of Mr. Dericke, her majeſty's ſervant (*i. e.* her jeweller), but was afterwards drawn as above mentioned.

Dr. Rawlinſon ſhowed the Antiquary Society, 1748, "A propoſal for a very rich lottery, general without any blankes, contayning a great number of good prizes, as well of redy money as of plate and certain ſorts of merchandizes, having been valued and priſed by the commandment of the queene's moſt excellent majeſtie's order, to the entent that ſuch commodities as may chance to ariſe thereof after the charges borne may be converted towards the reparations of the havens and ſtrength of the realme, and towards ſuch other public good workes. The number of lotts ſhall be foure hundred thouſand, and no more; and every lott ſhall be the ſum of tenne ſhillings ſterling, and no more. To be filled by the feaſt of St. Bartholomew. The ſhew of priſes are to be ſeen in Cheapſide, at the ſign of the Queene's Armes, the houſe of Mr. Dericke, goldſmith, ſervant to the queene. Some other orders about it in 1567-8. Printed by Hen. Bynneman."

"In the year 1612, king James, in ſpecial favour for the preſent plantation of Engliſh colonies in Virginia, granted a lottery, to be held at the weſt end of St. Paul's: whereof one Thomas Sharplys, a taylor of London, had the chief prize, which was 4000 crowns in fair plate." Baker's Chronicle.

In the reign of queen Anne, it was thought neceſſary to ſuppreſs lotteries, as nuiſances to the public. Since that time, however, they have been licenſed by an act of parliament, under various regulations. The act paſſed in 1778 reſtrains any perſon from keeping an office for the ſale of tickets, ſhares, or chances, or for buying, ſelling, inſuring, or regiſtering, without a licence; for which licence each office-keeper muſt pay 50l. to continue in force for one year, and the produce to be applied towards defraying the expences of the lottery. And no perſon is allowed to ſell any ſhare or chance leſs than a ſixteenth, on the penalty of 50l. All tickets divided into ſhares or chances are to be depoſited in an office, to be eſtabliſhed in London by the commiſſioners of the treaſury, who are to appoint a perſon to conduct the buſineſs thereof; and all ſhares are to be ſtamped by the ſaid officer, who is to give a receipt for every ticket depoſited with him. The numbers of all tickets ſo depoſited are to be entered in a book, with the names of the owners, and the number of ſhares into which they are divided; and twopence for each ſhare is to be paid to the officer on depoſiting ſuch tickets, who is therewith to pay all expences incident to the office. All tickets depoſited in the office are to remain there three days after the drawing. And any perſon keeping an office, or ſelling ſhares, or who ſhall publiſh any ſcheme for receiving moneys in conſideration of any intereſt to be granted in any ticket in the ſaid lottery, &c. without being in poſſeſſion of ſuch ticket, ſhall forfeit 500l. and ſuffer three months impriſonment. And no buſineſs is to be tranſacted at any of the offices after eight in the evening, except on the evening of the Saturday preceding the drawing. No perſon is to keep any office for the ſale of tickets, &c. in Oxford or Cambridge, on penalty of 20l. Before this regulating ſtatute took place, there were upwards of 400 lottery offices in and about London only; but the whole number afterwards, for all Britain, as appeared by the liſt publiſhed by authority, amounted to no more than 51.

LOTUS, or BIRD'S-FOOT TREFOIL, in botany: a genus of the decandria order, belonging to the diadelphia claſs of plants; and in the natural method ranking under the 32d order, *Papilionaceæ*. The legumen is cylindrical, and very erect; the alæ cloſing upwards longitudinally; the calyx is tubulated. There are many ſpecies, but only five or ſix are uſually cultivated in our gardens. 1. The *tetragonolobus*, or winged pea, hath trailing, ſlender, branchy ſtalks, about a foot long, garniſhed with trifoliate oval leaves; and, from the axillas of the branches, large, papilionaceous red flowers, one on each foot-ſtalk; ſucceeded by tetragonous ſolitary pods, having a membranous wing or lobe, running longitudinally at each corner. It flowers in June and July, and the ſeeds ripen in autumn.

2. The *creticus*, or Crètan ſilvery lotus, hath a ſlender under-ſhrubby ſtalk, riſing by ſupport three or four feet high, ornamented with trifoliate, bright, ſilvery leaves; and branches terminated by ſeveral yellow flowers, ſucceeded by ſubternate pods. 3. The *Jacobæus*, or lotus of St. James's iſland, hath upright herbaceous ſtalks, branching two or three feet high; and, from the upper part of the branches, long ſlender foot-ſtalks, terminated each by three or five yellowiſh purple flowers, appearing moſt part of the ſummer and autumn, and ſucceeded by ſubternate pods filled with plenty of ſeeds. 4. The *hirſutus*, or hairy Italian lotus, hath upright hairy ſtalks branching a yard high, and terminated by heads of whitiſh hoary-cupped flowers appearing in June, which are ſucceeded by oval pods full of ſeed, which ripens in autumn. 5. The *dorcynium*, white Auſtrian lotus, or ſhrub trefoil of Montpelier, has underſhrubby ſmooth ſtalks, branching three or four feet high, and the branches terminated by aphyllous heads of ſmall white flowers appearing in June, ſucceeded by ſhort pods. 6. The *edulis*, ſends forth ſeveral trailing ſtalks about a foot long, furniſhed at their joints with trifoliate, roundiſh, ſmooth leaves, having oval ſtipulæ. The flowers come ſingly from the ſides of the ſtalks, on long peduncles, with three oval floral leaves, the length of the flower: the latter is ſmall, yellow; and is ſucceeded by a thick arched pod, having a deep furrow on its outſide.

The firſt ſpecies is a hardy annual, and is eaſily raiſed from ſeed ſown any time from the month of February to May; the plants requiring no other culture than to be kept free from weeds. It was formerly cultivated as an eſculent; for its young green ſeed-pods may be dreſſed and eaten like peaſe, or in the manner of kidney-beans. The other ſpecies may be propagated either by ſeeds or cuttings, but require to be kept in pots in the green-houſe during the winter ſeaſon.—The ſixth ſpecies is an annual, and a native of ſeveral parts of Italy, where the inhabitants eat the young pods as we do kidney-beans. The green pods of the firſt ſpecies were formerly gathered in this country, and dreſſed in the manner of kidney-beans, and are uſed ſo ſtill in ſome of the northern counties of England; but they are coarſe, and not very agreeable to ſuch as have been accuſtomed to feed upon better fare.

Lotus *of Homer*. See Diospyros.

Egyptian Lotus. See Nymphæa.

Libyan Lotus. See Rhamnus.

LOVAGE, in botany. See Ligusticum.

Love-*Apple*. See Solanum.

LOVENTINUM, or Luentinum, (anc. geog.) a town of the Demeta in Britain, near the mouth of the Tuerobis or Tivy. Suppoſed to have been afterwards ſwallowed up by an earthquake, and to have ſtood where is now the lake called *Lin Savaian* in Brecknockſhire.

LOUGHBOROUGH, a town of Leiceſterſhire, diſtant about 110 miles from London. It is the ſecond town in the county, and was in the Saxons time a royal village. Its market is on Thurſday; and its fairs are on April 25th, May 28th, Auguſt 1ſt, and November 2d. It has a large church, and a free ſchool; beſides a charity ſchool for 80 boys and another for 20 girls. It has been very much reduced by fires; but is ſtill a very agreeable town, with rich meadow-ground, on the Foſſe, which runs here almoſt parallel with the river Soar. The new canal has made the coal-trade here very extenſive.

LOUGHBRICKLAND, a fair and poſt town of Ireland, ſituated in the county of Down, and province of Ulſter, 58 miles from Dublin. The name ſignifies the lake of the *ſpeckled trouts*; and it was ſo called from a lake near it, which abounds with thoſe fiſh. It conſiſts of one broad ſtreet, at the end of which is the pariſh church, ſaid to have been built by Dr. Taylor when biſhop of Dromore, ſoon after the Reſtoration. The linen manufacture is carried on here very extenſively; and the town is a great thoroughfare, the turnpike road from Dublin to Belfaſt paſſing through a red bog near it. The fairs are five in the year.

LOUGH-DERG, anciently *Derg-abhan*, i. e. "the river of the woody moraſs," from a river which iſſues out of this lake. This lough is ſituated in the county of Donegal and province of Ulſter in Ireland, and is famous for having in it the iſland that contains St. Patrick's purgatory, which is a narrow little cell, hewn out of the ſolid rock, in which a man could ſcarce ſtand upright.—There is alſo a lake of this name ſituated between the counties of Galway and Tipperary.

LOUGH-NEACH, a loch or lake of Ireland, ſituated in the counties of Armagh, Down, Derry, and Antrim, and province of Ulſter. It is the largeſt in Europe, thoſe of Ladoga and Onega in Ruſſia, and that of Geneva in Switzerland, excepted; being 20 miles long and 15 broad. The area of this lake is computed to be 100,000 acres. It is remarkable for a healing virtue; and likewiſe for petrifying wood, which is not only found in the water but in the adjacent ſoil at a conſiderable depth. On its ſhores ſeveral beautiful gems have been diſcovered. Its ancient name was *Loch-eachu* or *Loch-Neach*, from *loch*, "a lake," and *neach*, "wonderful, divine, or eminent." Its petrifying powers are not inſtantaneous, as ſeveral of the ancients have ſuppoſed, but require a long ſeries of ages to bring them to perfection, and appear to be occaſioned by a fine mud or ſand, which inſinuates itſelf into the pores of the wood, and which in proceſs of time becomes hard like ſtone. On the borders of this lake is Shane's caſtle, the elegant ſeat of the right honourable John O'Neil. Dr. Smyth ſeems to doubt whether the healing quality in this lake is not to be confined to one ſide of it, called the *fiſhing-bank*; and he informs us, that this virtue was diſcovered in the reign of Charles II. in the inſtance of the ſon of one Mr. Cunningham, who had an *evil* which ran on him in eight or ten places, and notwithſtanding all applications ſeemed incurable: at length he was perfectly healed, after bathing in this lough about eight days. Hence that writer gives us another derivation of the name *Lochneach*, which (he ſays) ſeems to hint at this quality; *Neaſg* or *Neas*, in Iriſh, ſignifying a ſore or ulcer," which might not improbably be corrupted into *Neagh*: Hence he apprehends, this lake was remarked at a much earlier period for its healing property. As to its petrifying power it is mentioned by Nenius, a writer of the 9th century, who ſays, "Eſt alind ſtagnum quod facit ligna dureſcere in lapides. Homines autem findunt ligna, et poſtquam formaverunt, projiciunt in ſtagnum, et manent in eo uſque ad caput anni, et in capite anni lapis invenitur, et vocatur ſtagnum *Luch-Echach*." Lough-Neach gives title of baron to the family of *Skeffington*.

LOUGH-STRANGFORD, a lake of Ireland, ſituated in the county of Down and province of Ulſter. It takes its preſent name from a ſmall port-town called *Strangford*, ſeated on the weſt ſide of the narrow entrance into the ſea. It was formerly known by the name of *Lough-Cone* or *Lough-Coyne*. It is a deep bay or inlet of the ſea, about 17 miles long and four or five broad; it goes weſt as far as Downpatrick, and north as far as Comber and Newtown, and by computation covers 25,775 acres, Iriſh plantation meaſure. It abounds with excellent fiſh, particularly ſmelts; and off the bar there is a periodical herring fiſhery in or about Auguſt. The bar or entrance into this lough is about three miles below Strangford. There is a long rock at the entrance in the middle of the paſſage, dangerous to ſtrangers on account of the current; yet there is a broad paſſage on either ſide, and deep water. The current here is very ſtrong and rapid, running at the rate of ſix or ſeven miles an hour. There are but few veſſels that go higher up than Strangford. A good many veſſels bound up the

channel put in here, if the wind is unfavourable to their paſſage. The iſlands in this lake are numerous; Doctor Boat enumerates them at 260. But from an actual ſurvey, made at the time Dr. Smyth wrote his hiſtory of that county, it appears, there are 52 iſlands ſmall and great, known by particular names, and many others nameleſs; the contents of theſe 54 iſlands added together amount to 914 acres and an half. The great and profitable manufacture carried on in theſe iſlands, and the fiſheries on the coaſts ſurrounding the lake, is the burning of ſea-weed into kelp, which employs a number of hands, and has been computed to produce to the ſeveral proprietors a neat profit of 1000l. *per annum* and upwards. Four of the iſlands here are called *Swan iſlands*, from the number of ſwans that frequent them.

LOUIS, or *Knights of* St. Louis, the name of a military order in France, inſtituted by Louis XIV. in 1693. Their colours were of a flame colour, and paſſed from left to right; the king was their grand maſter. There were in it eight great croſſes, and 24 commanders; the number of knights not limited. At the time of their inſtitution, the king charged his revenue with a fund of 200,000 livres for the penſions of the commanders and knights. This inſtitution was of courſe aboliſhed with the monarchy.

Louis, *Lewis*, *Louis d'or*, or *Lewidore*, a French coin, firſt ſtruck in 1640, under the reign of Louis XIII. and which had once a conſiderable currency. See Money.

LOUISIANA, a country in North-America, bounded on the ſouth by the gulph of Mexico, on the eaſt by the river Miſſiſippi, on the weſt by New Mexico, and on the north by an unknown country. It extends from the 29th to the 40th degree of north latitude, and from about the 80th to the 9th or 97th degree weſt longitude from London. The climate of Louiſiana varies according to the latitudes. The ſouthern parts are not ſo hot as thoſe parts of Africa which lie under the ſame parallel, and the northern parts are colder than the countries of Europe at the ſame diſtance from the pole: the cauſes of which are ſuppoſed to be the thick foreſts which overrun the country, and the great number of rivers; the former preventing the ſun from heating the earth, and the latter ſupplying it with moiſt vapours; beſides the cold winds which come from the north over vaſt tracts of land. They have bad weather; but it never laſts long, for the rain generally falls in ſtorms and ſudden ſhowers; the air is wholeſome, the inhabitants healthy, and they who are temperate live to a great old age. The country is extremely well watered; and almoſt all the rivers that run through it fall into the Miſſiſippi, which diſcharges itſelf into the gulph of Florida.

LOUSE, in zoology. See Pediculus and Lice.

LOUTH, a town of Lincolnſhire in England, 156 miles from London. It is a town corporate; and one of the handſomeſt and gayeſt in the county, there being in it not only frequent aſſemblies, concerts, &c. but even maſquerades. Here are ſeveral handſome houſes. From hence there is a canal to the ſea at Tilney, about eight miles. Beſides a charity ſchool for 40 children, it has a free ſchool founded by Edward VI. with a large church, and a fine ſteeple, which ſome think is as high as Grantham ſpire, which is 288 feet high. Its markets are on Wedneſday and Saturday, and its fairs on May 24th, and Auguſt 16th.

Louth, a county in the eaſtern part of Ireland, which extends in the form of a bow or half-moon, on the ſide of the ocean, being much longer than it is broad. It is bounded on the ſouth and ſouth-weſt by the county of Eaſt Meath, on the north-weſt by Monaghan, on the north by Armagh, and on the north-eaſt by the bay of Carlingford, which parts it from the county of Down: it is watered by ſeveral ſmall rivers which fall into the ſea; and its ſouth frontiers are watered by the river Boyne. Its chief towns are Dundalk and Carlinford; unleſs we include Drogheda, a part whereof is in this county. It is the ſmalleſt county in the kingdom; but very fertile and pleaſant, and abounding with many remains of antiquities, of which Mr. Wright, in his Louthiana, has given a very ample deſcription. It contains 111,180 Iriſh plantation acres, 50 pariſhes, 5 baronies, and 5 boroughs, and returns 10 members to parliament: it is about 22 miles long and 14 broad.

Louth, a town in the above county, having a yearly fair.

LOUVAIN, a city in the Auſtrian Netherlands, in the province of Brabant, pleaſantly ſeated on the river Dyle, in a plentiful and agreeable country. The walls are about eight or nine miles in circumference; but they include ſeveral fields and vineyards. The caſtle ſtands on a high hill, ſurrounded with fine gardens, and has a charming proſpect all over the country: this town contains nine market places, 14 water-mills, 126 ſtreets, 16 ſtone bridges, and ſeveral handſome palaces. The town-houſe is a venerable old building, adorned with ſtatues on the outſide; and the churches are very handſome, particularly the collegiate church of St. Peter: but the principal ornament is the univerſity, founded only in 1426 by John IV. duke of Brabant, with the concurrence of Pope Martin V. It contains about 20 colleges, four of which are called *Pædagogia*. There is in the number alſo an Engliſh college of friars-preachers, which owes its eſtabliſhment to the liberality of Cardinal Philip Howard, brother to the duke of Norfolk, who, before he was raiſed to the purple, had been private chaplain to queen Catherine, conſort to Charles II. The Iriſh have likewiſe a ſeminary, erected in part under the care of Eugenius Matthews, titular archbiſhop of Dublin, anno 1623, which receives its appointments from the Propaganda at Rome. Beſides the above, there are two convents for the Iriſh, one of Recollects and the other of Dominicans, where divinity and the Matheſis are taught. In the laſt century the number of ſcholars exceeded 4000; but in the year 1742 the inhabitants amounted to 12,000, including 2000 ſtudents only.—At the beginning of the 14th century, under John III. it flouriſhed conſiderably in the manufacture of woollen cloth: 400 houſes were then occupied by ſubſtantial clothiers, who gave employment to an incredible number of weavers, ſo great, it is ſaid, that a bell was rung to prevent any injuries which the children in the ſtreet might receive from the crowd and hurry on their returning from work. In 1382, theſe weavers, however, took up arms, and rebelled againſt their ſovereign Prince Wenceſlaus, throwing from the windows of the Town-hall 17 of the aldermen and counſellors, and afterwards proceeded to lay waſte great part of Brabant: but being beſieged and reduced to great extremities, they ſubmiſſively implored his clemency; which was granted after the execution of ſome of the principal ring-leaders of the weavers, the chief inſtigators to this revolt, were baniſhed, the greater part of whom took refuge in England; where they firſt introduced, or at leaſt augmented very much, the woollen manufacture. The town, by this circumſtance, being almoſt depopulated, the univerſity was eſtabliſhed to ſupply in ſome meaſure the loſs of the rebellious clothiers. Since that time the manufacture gradually declined, no cloth of any account being made there at preſent. This impolitic ſtep of the duke Wenceſlaus ſent treaſures to England, through the hands of thoſe exiled people; an important leſſon to governors, that they ſhould deal with great precaution reſpecting ſuch uſeful members of the community. Upon the ruins of theſe looms was formed the cloth manufacture of Limbourg, which is carried on with good advantage to this day. There is yet ſtanding at Louvain part of the old drapers-hall, now converted into four public ſchools, where lectures in divinity, philoſophy, law, and phyſic, are given, and the public acts are

made. Adjoining to the ſchools is the univerſity library, which altogether compoſe a large pile of building. Over the door of the chief entrance we read theſe words, *Sapientia ædificavit ſibi domum*. The principal church is collegiate, dedicated to St. Peter, which had formerly three very large towers with elevated ſpires, one conſiderably higher than the two collaterals; theſe were blown down in the year recorded by this chronogram, *o Mn Ia Ca D Vnt*. From the name of this church the burghers have acquired the nick-name of *Petermen*, whoſe anceſtors having clothed the back by a noble woollen manufacture, the modern Petermen now compoſe an ignoble mixture for the belly, called after them, *Peterman beer*, a ſort of whitiſh muddy ale, which they notwithſtanding ſend in large quantities to all parts of the country, as well as to Holland, by the canals. Louvain was anciently the capital of the province, long before Bruxelles had any claim to that title. E. lon. 4 40. N lat. 51. 12.

LOUYS, or LOUIS, (John), an engraver of conſiderable eminence, who flouriſhed about the middle of the 16th century. According to Baſan, he was a native of Flanders. He learned the art of engraving from Peter Soutman, at the time that Suyderhoef ſtudied under the ſame maſter; and his uſual ſtyle of engraving bears ſome reſemblance to that of his maſter. One of his beſt prints is, Diana, with her nymphs, repoſing after the chaſe; a middling-ſized plate, lengthwiſe, from Rubens.

LOW BELL, in birding, a name given to a bell, by means of which they take birds in the night, in open champaign countries, and among ſtubble, in October. The method is to go out about nine o'clock at night in a ſtill evening, when the air is mild and the ſun does not ſhine. The low-bell ſhould be of a deep and hollow ſound, and of ſuch a ſize that a man may conveniently carry it in one hand. The perſon who carries it is to make it toll all the way he goes, as nearly as may be, in that manner in which the bell on the neck of a ſheep tolls as it goes on and feeds. There muſt alſo be a box made like a large lanthorn, about a foot ſquare, and lined with tin, but with one ſide open. Two or three great lights are to be ſet in this; and the box is to be fixed to the perſon's breaſt, with the open ſide forwards, ſo that the light may be caſt forward to a great diſtance. It will ſpread as it goes out of the box; and will diſtinctly ſhow to the perſon that carries it whatever there is in the large ſpace of ground over which it extends, and conſequently all the birds that rooſt upon the ground. Two perſons muſt follow him who carries the box and bell, one on each ſide, ſo as not to be within the reach of the light to ſhow themſelves. Each of theſe is to have a hand net of about three or four feet ſquare, faſtened to a long ſtick or pole; and on whichever ſide any bird is ſeen at rooſt, the perſon who is neareſt is to lay his net over it, and take it with as little noiſe as poſſible. When the net is over the bird, the perſon who laid it is not to be in a hurry to take the bird, but muſt ſtay till he who carries the light is got beyond it, that the motions may not be diſcovered. The blaze of the light, and the noiſe of the bell, terrify and amaze the birds in ſuch a manner, that they remain ſtill to be taken; but the people who are about the work muſt keep the greateſt quiet and ſtillneſs that may be.

Some people are fond of going on this ſcheme alone. The perſon then fixes the light box to his breaſt, and carries the bell in one hand, and the net in the other; the net in this caſe may be ſomewhat ſmaller, and the handle ſhorter. When more than one are out at a time, it is always proper to carry a gun; as it is no uncommon thing to ſpy a hare when on this expedition.

LOWER (Richard), an eminent Engliſh phyſician in the 17th century, was born in Cornwall, and educated at Weſtminſter-ſchool and Oxford. He entered on the phyſic line; and practiſed under Dr. Thomas Willis, whom he inſtructed in ſome parts of anatomy, eſpecially when the latter was writing his *Cerebri anatome*. He, with Dr. Willis, in 1674, diſcovered the medicinal waters at Aſhop in Northamptonſhire; which, upon their recommendations, became very much frequented. In 1666 he followed Dr. Willis to London, practiſed phyſic under him; and became fellow of the royal ſociety, and of the college of phyſicians. In 1669 he publiſhed his *Tractatus de corde*; and, after the death of Dr. Willis in 1675, he was eſteemed the moſt eminent phyſician in London. Upon the breaking out of the Popiſh plot in 1678, ſays Mr. Wood in his *Athenæ Oxonienſes*, he cloſed with the Whigs, ſuppoſing that party would carry all before them; but, being miſtaken, he loſt his credit and practice He died in 1691.

LOWERING, among diſtillers, a term uſed to expreſs the debaſing the ſtrength of any ſpirituous liquor, by mixing water with it. The ſtandard and marketable price of theſe liquors is fixed in regard to a certain ſtrength in them called *proof*; this is that ſtrength which makes them, when ſhaken in a phial or poured from on high into a glaſs, retain a froth or crown of bubbles for ſome time. In this ſtate, ſpirits conſiſt of about half pure or totally inflammable ſpirit, and half water; and if any foreign or home ſpirits are to be expoſed to ſale, and are found to have that proof wanting, ſcarce any body will buy it till it has been diſtilled again and brought to that ſtrength; and if it is above that ſtrength, the proprietor uſually adds water to it to bring it down to that ſtandard. See the article Proof. There is another kind of lowering among the retailers of ſpirituous liquors to the vulgar, by reducing it under the ſtandard proof. Whoever has the art of doing this without deſtroying the bubble proof, which is eaſily done by means of ſome addition that gives a greater tenacity to the parts of the ſpirits, will deceive all that judge by this proof alone. In this caſe, the beſt way to judge of liquors is by the eye and tongue, and eſpecially by the inſtrument called Hydrometer.

LOWTH (William), D.D. a learned divine, born at London in 1661, was the ſon of an apothecary, and took his degrees at Oxford. His eminent worth and learning recommended him to Dr. Mew biſhop of Winchceſter, who made him his chaplain, gave him two livings in Hampſhire, and conferred on him a prebend in the cathedral of Winchceſter. He acquired an unuſual ſhare of critical learning. Thus ſituated in life, the labours of Mr. Lowth appear to have been ſtrictly confined within the limits of his own province, and applied ſolely to the peculiar duties of his function: yet, in order that he might acquit himſelf the better in theology, he had purſued his ſtudies with a more general and extenſive view. Few were more deeply verſed in critical learning; there being ſcarcely any ancient author, Greek or Latin, profane or eccleſiaſtical, eſpecially the latter, but what he had read with accuracy, conſtantly accompanying his reading with critical and philological remarks. Of his collections in this way he was upon all occaſions very communicative. Hence his notes on *Clemens Alexandrinus*, which are to be met with in Potter's edition of that father. Hence his remarks on *Joſephus*, communicated to Hudſon for his edition, and acknowledged in the preface: as alſo thoſe larger and more numerous annotations on the Eccleſiaſtical Hiſtorians, inſerted in *Reading's* edition of them at Cambridge. The author of *Bibliotheca Biblica* was indebted to him for the ſame kind of aſſiſtance. Chandler, late biſhop of Durham, while engaged in his "Defence of Chriſtianity, from the Prophecies of the Old Teſtament, againſt the Diſcourſe of the Grounds and Reaſons of the Chriſtian Religion," and in his "Vindication of the Defence, in anſwer to The Scheme of Literal Prophecy conſidered," held a conſtant correſpondence with him, and conſulted him upon many difficulties that occurred in the courſe of that work. The moſt

valuable part of his character was that which leaſt appeared in the eyes of the world, the private and retired part, that of the good Chriſtian and the uſeful pariſh prieſt. His piety, his diligence, his hoſpitality and beneficence, rendered his life highly exemplary, and greatly enforced his public exhortations. He married Margaret, daughter of Robert Pitt, Eſq. of Blandford, by whom he had two ſons and three daughters. (See the next article.) He died in 1732, and was buried by his own orders in the church-yard at Buriton. He publiſhed, 1. A vindication of the divine authority and inſpiration of the Old and New Teſtaments; 2. Directions for the profitable reading of the Holy Scripture; 3. Commentaries on the prophets; and other works.

Lowth (Robert), D. D. ſecond ſon of the preceding Dr. William Lowth, and biſhop ſucceſſively of St. David's, Oxford, and London, was born on the 29th of November 1710, probably at Buriton in the county of Hants. He received the rudiments of his education in Wincheſter college, where his ſchool exerciſes were diſtinguiſhed by uncommon elegance; and having reſided the requiſite number of years in that ſeminary, in 1730 he ſucceeded on the foundation at New College, Oxford. He took the degree of M. A. June 8, 1737. Though his abilities muſt have been known to thoſe with whom he was connected, he was not forward to appear before the world as a writer. At Oxford he continued many years improving his talents, with little notice from the great, and with preferment ſo ſmall as to have at preſent eſcaped the diſtinct recollection of ſome of his contemporaries.

He was not, however, ſuffered to languiſh for ever in obſcurity. His genius and his learning forced themſelves upon the notice of the illuſtrious ſociety of which he was a member; and he was placed in a ſtation where he was eminently qualified to ſhine. In 1741 he was elected by the univerſity to the profeſſorſhip of poetry, re-elected in 1743, and whilſt he held that office he read his admirable lectures *De ſacra poeſi Hebræorum*. In 1744 biſhop Hoadley collated him to the rectory of Ovington in the county of Hants; added to it, nine years afterwards, the rectory of Eaſt Weedhay in the ſame county; and in the interim raiſed him to the dignity of archdeacon of Wincheſter. Theſe repeated favours he ſome years afterwards acknowledged in the following manly and reſpectful terms of gratitude: "This addreſs, My Lord, is not more neceſſary on account of the ſubject, than it is in reſpect of the author. Your Lordſhip, unſolicited and unaſked, called him from one of thoſe colleges to a ſtation of the firſt dignity in your dioceſe, and took the earlieſt opportunity of accumulating your favour upon him, and of adding to that dignity a ſuitable ſupport. Theſe obligations he is now the more ready thus publicly to acknowledge, as he is removed out of the reach of further favours of the like kind. And though he hath relinquiſhed the advantages ſo generouſly conferred on him yet he ſhall always eſteem himſelf highly honoured in having once enjoyed the patronage of the great advocate of civil and religious liberty."

On the 8th of July 1754 the univerſity of Oxford conferred upon him the degree of D. D. by diploma; an honour which, as it is never granted but to diſtinguiſhed merit, was probably conferred on Mr. Lowth in conſequence of his prelections on the Hebrew poetry, which had then been lately publiſhed. Having in 1749 travelled with Lord George and Lord Frederick Cavendiſh, he had a claim upon the patronage of the Devonſhire family; and in 1755, the late duke being then lord lieutenant of Ireland, Dr. Lowth went to that kingdom as his grace's firſt chaplain. Soon after this appointment he was offered the biſhopric of Limerick; but preferring a leſs dignified ſtation in his own country, he exchanged it with Dr. Leſlie, prebendary of Durham and rector of Sedgefield, for theſe preferments. In November 1765 he was choſen F. R. S. In June 1766 he was, on the death of Dr. Squire, preferred to the biſhopric of St. David's; which, in the October following, he reſigned for that of Oxford, vacant by the tranſlation of biſhop Hume to Saliſbury. In April 1777 he was tranſlated to the ſee of London, vacant by the death of biſhop Terrick; and in 1783 he declined the offer of the primacy of all England.

Having been long afflicted with the ſtone, and having long borne the ſevereſt ſufferings of pain and ſickneſs with the moſt exemplary fortitude and reſignation, this great and good man died at Fulham, Nov. 3, 1787; and on the 12th his remains were privately interred in a vault at Fulham church, near thoſe of his predeceſſor. He had married in 1752, Mary, the daughter of Lawrence Jackſon of Chriſt-church, Hants, Eſq. by whom he had two ſons and five daughters. His lady and two children only ſurvived him.

His literary character may be eſtimated from the value and the importance of his works; in the account of which we may begin with his *Prelections on the Hebrew Poetry*. The choice of ſo intereſting a ſubject naturally attracted general attention; and the work has been read with equal applauſe abroad and at home. In theſe prelections the author has acquitted himſelf in the moſt maſterly manner, as a poet, a critic, and a divine; and ſuch is the claſſic purity of his Latin ſtyle, that though we have read the work with the cloſeſt attention, and with no other view than to diſcover, if poſſible, an Angliciſm in the compoſition, we never found a ſingle phraſe to which, we believe, a critic of the Auguſtan age could poſſibly have objected. This is an excellence to which neither Milton nor Johnſon has attained; to which indeed no other Engliſh writer of Latin with whom we are acquainted has attained, unleſs perhaps Atterbury muſt be excepted. To the prelections was ſubjoined a ſhort confutation of biſhop Hare's ſyſtem of Hebrew metre; which occaſioned a Latin letter from Dr. Edwards of Clare-hall, Cambridge, to Dr. Lowth, in vindication of the Harian metre. To this the author of the prelections replied in a *larger confutation*, in which biſhop Hare's ſyſtem is completely overthrown, and the fallacy upon which it was built accurately inveſtigated. After much attentive conſideration, biſhop Lowth has pronounced the metre of the Hebrew to be perfectly irrecoverable.

In 1758 he publiſhed *The life of William of Wykeham biſhop of Winchеſter*, with a dedication to Biſhop Hoadley; which involved him in a diſpute concerning a deciſion which that biſhop had lately made reſpecting the wardenſhip of Wincheſter-college. This controverſy was on both ſides carried on with ſuch abilities, that, though relating to a private concern, it may yet be read, if not with pleaſure at leaſt with improvement. The life of Wykeham is drawn from the moſt authentic ſources; and affords much information concerning the manners, and ſome of the public tranſactions of the period in which Wykeham lived, whilſt it diſplays ſome private intelligence reſpecting the two literary ſocieties of which he was the founder. In theſe two ſocieties Dr. Lowth was educated, and he gratefully expreſſes his obligations to them.

In 1762 was firſt publiſhed his *Short Introduction to Engliſh Grammar*, which has ſince gone through many editions. It was originally deſigned only for private and domeſtic uſe: but its judicious remarks being too valuable to be confined to a few, the book was given to the world; and the excellence of its method, which teaches what is right by ſhewing what is wrong, has inſured public approbation and very general uſe. In 1765 Dr. Lowth was engaged with Biſhop Warburton in a controverſy, which made much noiſe at the time, which attracted the notice even of royalty, and of which the memory is ſtill recent. If we do not wiſh to dwell on the particulars

of this controverſy, it is becauſe violent literary contention is an evil, which, though like other war it may ſometimes be unavoidable, is yet always to be regretted; and becauſe the characters of learned, ingenious, and amiable men never appear to leſs advantage than under the form which that ſtate of hoſtility obliges them to aſſume. The two combatants indeed engaged with erudition and ingennity ſuch as is ſeldom brought into conflict; but it appears that, in the opinion of Dr. Johnſon, Warburton had the moſt ſcholaſtic learning, and that Lowth was the moſt correct ſcholar: that, in their conteſt with each other, neither of them had much argument, and that both were extremely abuſive. We have heard, and we hope it is true, that they were afterwards reconciled, and expreſſed mutual regret for the violence of their paſt conduct.

In 1778 Biſhop Lowth publiſhed his laſt great work, *A Tranſlation of Iſaiah*. To his literary and theological abilities the tranſlator joined the moſt critical knowledge of the character and ſpirit of the eaſtern poetry; and, accordingly, the prophecies of Iſaiah (which, though almoſt always ſublime or elegant, are yet ſometimes obſcure) were tranſlated in a manner adequate to the higheſt expectations of the public. Several occaſional diſcourſes, which the Biſhop, by his ſtation, was at different times called upon to deliver, were of courſe publiſhed, and are all worthy of their excellent author; but there is one on the *kingdom of God*, on the extenſion and progreſſive improvement of Chriſt's religion, and on the means of promoting theſe by the advancement of religious knowledge, by freedom of inquiry, by toleration, and mutual charity, which may be diſtinguiſhed above the reſt, as exhibiting a moſt comprehenſive view of the ſucceſſive ſtates of the Chriſtian church, and containing the trueſt principles of Chriſtianity.

Of the Biſhop's poetical pieces, none diſplay greater merit than *Verſes on the Genealogy of Chriſt*, and *the Choice of Hercules*, both written very early in his life. He wrote a ſpirited *Imitation of an Ode of Horace*, applied to the alarming ſituation of this country in 1745; and likewiſe ſome *verſes on the death of Frederick prince of Wales*, with a few ſmaller poems. The following inſcription on the tomb of his daughter beautifully diſplays his paternal affection and claſſic taſte. As it is ſhort, and, in our opinion, has all the merit of the ancient epitaph, the reader will probably be pleaſed with ſuch a ſpecimen of his lordſhip's Latinity.

Cara, vale, ingenio præſtans, pietate, pudore,
Et pluſquam natæ nomine cara, vale.
Cara Maria, vale. At veniet felicius ævum,
Quando iterum tecum, ſim modo dignus, ero.
Cara, redi, læta tum dicam voce, paternas,
Eja, age in amplexus, cara Maria, redi.

Learning and taſte, however, did not conſtitute Biſhop Lowth's higheſt excellence. Eulogium itſelf can ſcarcely aſcend to extravagance when ſpeaking of him either as a private man or as a paſtor of the church of Chriſt. His amiable manners rendered him an ornament to his high ſtation, whilſt they endeared him to all with whom he converſed; and his zeal for the intereſts of true religion made him eager to promote to places of truſt and dignity ſuch clergymen as he knew were beſt qualified to fill them. Of his modeſty, gentleneſs, and pleaſing converſation, we have the teſtimony of one whoſe deciſion will hardly be diſputed.—"It would anſwer no end (ſays Biſhop Warburton) to tell you what I thought of the author of Hebrew Poetry, before I ſaw him. But this I may ſay, I was never more ſurpriſed, when I did ſee him, than to find him of ſuch amiable and gentle manners, of ſo modeſt, ſenſible, and diſengaged a deportment." He united, indeed, in an eminent degree, the qualities of the gentleman with thoſe of the ſcholar: he converſed with elegance, as he wrote with accuracy. As a huſband, a father, or the maſter of a family, he was as nearly faultleſs as the imperfections of humanity will eaſily permit. His temper, when rouſed by what he thought improper conduct, was indeed ſuſceptible of conſiderable warmth; but if he could be highly offended, upon a ſlight conceſſion he could likewiſe forgive. His heart was tender and ſympathetic. He poſſeſſed a mind which felt its own ſtrength, and decided on whatever came before it with promptitude and firmneſs. In thoſe trials where affliction was to be ſuffered or ſubdued, he behaved as a man and a Chriſtian. His piety had no tincture of moroſeneſs; his charity no leaven of oſtentation. To his whole dioceſe he was endeared by his laudable diſcretion and his uſeful zeal. To the world he was a benefit by his exemplary life and his ſplendid abilities. And whilſt virtue and learning are reverenced among men, the memory of Lowth will be reſpected and admired.

LOXIA, in zoology; the name of a genus of birds of the order of paſſeres, the diſtinguiſhing characters of which are theſe: The bill is ſtrong, convex above and below, and very thick at the baſe: the noſtrils are ſmall and round: the tongue is as if cut off at the end: the toes are four, placed three before and one behind; excepting in one ſpecies, which has only two toes before and one behind.

1. The *curviroſtra*, or common croſs-bill, which is about the ſize of a lark, is known by the ſingularity of its bill, both mandibles of which curve oppoſite ways and croſs each other: the general colour of the plumage in the male is of a red-lead inclining to roſe colour, and more or leſs mixed with brown: the wings and tail are brown; the legs black. The female is of a green colour, more or leſs mixed with brown in thoſe parts where the male is red. This ſpecies is a conſtant inhabitant of Sweden, Germany, Poland, Switzerland, Ruſſia, and Siberia, where it breeds; but migrates ſometimes in vaſt flocks into other countries, as is now and then the caſe in reſpect to England; for though in ſome years a few are met with, yet in others it has been known to viſit us by thouſands, fixing on ſuch ſpots as are planted with pines, for the ſake of the ſeeds, which are its natural food: it is obſerved to hold the cone in one claw like the parrot, and to have all the actions of that bird when kept in a cage. It is alſo found in North America and Greenland; and is ſaid to make the neſt in the higheſt parts of the fir-trees, faſtening it to the branch with the reſinous matter which exſudes from the trees.

2. The *coccothrauſtes*, or hawfinch, is in length ſeven inches; breadth, 13: the bill is funnel-ſhaped, ſtrong, thick, and of a dull pale pink colour; the breaſt and whole under ſide are of a dirty fleſh-colour; the neck aſh-coloured; the back and coverts of the wings of a deep brown, thoſe of the tail of a yellowiſh bay: the greater quill-feathers are black, marked with white on their inner webs: the tail is ſhort, ſpotted with white on the inner ſides; and the legs are of a fleſh-colour. This ſpecies is ranked among the Britiſh birds; but only viſits theſe kingdoms occaſionally, and for the moſt part in winter, and is never known to breed here. It is more plenty in France, coming into Burgundy in ſmall flocks, about the beginning of April, and ſoon after making the neſt, which is placed between the bifurcation of the branches of trees, about 12 feet from the ground: it is compoſed of ſmall dry fibres, intermixed with liverwort, and lined with finer materials. The eggs are of a roundiſh ſhape, of a blueiſh green ſpotted with olive brown, with a few irregular black markings interſperſed. It is alſo common in Italy, Germany, Sweden, and the weſt and ſouthern parts of Ruſſia, where the wild fruits grow. It feeds on berries, kernels, &c. and from the great ſtrength of the bill, it cracks the ſtones of the fruit of the haws, cherries, &c. with the greateſt eaſe.

3. The *enucleator*, or pine-groſsbeak, is nine inches in length, and weighs two ounces. The bill is ſtrong, duſky, and forked at the end: the head, back, neck, and breaſt, are of a rich crimſon; the bottoms of the feathers aſh colour; the quill-feathers and tail duſky, their exterior edges of a dirty white: the legs are black. This ſpecies frequents the moſt northern parts of this kingdom, being only met with in Scotland, and eſpecially the Highlands, where it breeds, and inhabits the pine-foreſts, feeding on the ſeeds, like the croſsbill. It is alſo found in all the pine-foreſts of Siberia, Lapland, and the northern parts of Ruſſia: it is common about St. Peterſburgh in autumn, and is caught in great plenty at that time for the uſe of the table; returning north in ſpring. They are likewiſe common to the northern parts of America; appearing at Hudſon's Bay in May, to which place they are ſaid to come from the ſouth, and are obſerved to feed on the buds of willow. The ſouthern ſettlements are inhabited by them throughout the year, but the northern only in the ſummer ſeaſon. Our laſt voyagers met with this bird in Norton Sound; it was alſo found at Aoonalaſhka.

4. The *pyrrhula*, or bullfinch, is ſo generally known as almoſt to ſuperſede deſcription: The head, wings, and tail, are black; the breaſt and belly red; the upper tail coverts and vent white; and the breaſt aſh-colour. The female differs in having the under parts of a reddiſh brown. This ſpecies is common in moſt parts of the continent of Europe, and throughout Ruſſia and Siberia, at which laſt places it is caught for the table. It is pretty common in England; and builds in the buſhes, five or ſix feet from the ground. The neſt is compoſed chiefly of moſs; and the eggs, which are five or ſix in number, are dirty bluciſh white, marked at the large end with dark ſpots. The time of breeding is about the end of May or beginning of June. In the ſummer it moſtly frequents woods and the more retired places. In winter it approaches gardens and orchards, and has been generally ſtigmatiſed for making havock among the buds of trees. From ſome late obſervations, however, it would appear, that the object of theſe birds is not the bud, but "the *worm* in the bud;" and that this ſpecies, in conjunction with various other ſpecies of ſmall birds, are the frequent means of defending the embryo-fruits, and thence promoting their growth to maturity: for the warmth that ſwells the buds, not only hatches nidos (eggs) of unnumbered tribes of inſects, whoſe parent flies, by an unerring inſtinct, laid them there,—but brings forward a numerous race already in a caterpillar ſtate, that now iſſue from their concealments, and make their excurſion along the budding branches, and would probably deſtroy every hope of fruitage, but for thoſe uſeful inſtruments for its preſervation, whoſe young are principally fed by eating caterpillars.—The bullfinch, in its wild ſtate, has only a plain note; but when tamed it becomes remarkably docile, and may be taught any tune after a pipe, or to whiſtle any notes in the juſteſt manner: it ſeldom forgets what it has learned; and will become ſo tame as to come at call, perch on its maſter's ſhoulders, and (at command) go through a difficult muſical leſſon. They may be alſo taught to ſpeak, and ſome thus inſtructed are annually brought to London from Germany.

5. The *cærulea*, or blue groſsbeak, is the ſize of the bullfinch: The bill is ſtout, brown, and the baſe of it ſurrounded with black feathers which reach on each ſide as far as the eye: the whole plumage beſides is of a deep blue, except the quills and tail, which are brown, with a mixture of green, and acroſs the wing coverts a band of red: the legs are duſky. It is an inhabitant of South America; but is ſometimes found in Carolina, where it is a very ſolitary bird, and ſeen only in pairs, but they diſappear in winter. It has only a ſingle note.

6. The *violacea*, or purple groſsbeak, is about the ſize of a ſparrow: the bill is black: the plumage, violet black; except the irides, a ſtreak over the eye, the chin, and the vent, which are red: the legs are duſky grey. This ſpecies inhabits the Bahama Iſlands, Jamaica, and the warmer parts of America.

7. The *cardinalis*, or cardinal groſsbeak, is near eight inches in length. The bill is ſtout, and of a pale red colour: the irides are hazel: the head is greatly creſted, the feathers riſing up to a point when erect: round the bill, and on the throat, the colour is black; the reſt of the bird of a fine red; the quills and tail duller than the reſt, and browniſh within: the legs are the colour of the bill. The female differs from the male, being moſtly of a reddiſh brown. This ſpecies is met with in ſeveral parts of North America; and has attained the name of nightingale from the ſineneſs of its ſong, the note of which reſembles that of the nightingale. In ſpring, and moſt part of the ſummer, it ſits on the tops of the higheſt trees, ſinging early in the morning, and piercing the ear with its loud pipe. Theſe birds are frequently kept in cages, in which they ſing throughout the year, with only ſhort intervals of muteneſs. They are fond of *maize* and *buck-wheat*; and will get together great hoards of theſe, often as much as a buſhel, which they artfully cover with leaves and ſmall twigs, leaving only a ſmall hole for entrance into the magazine. They are alſo fond of *bees*. They come the beginning of April into New York and the Jerſeys, and frequent the Magnolia ſwamps during the ſummer: in autumn they depart towards Carolina. They are pretty tame, frequently hopping along the road before the traveller; but are not gregarious, ſcarce ever more than three or four being met with together. From their being familiar birds, attempts have been made to breed them in cages, but without ſucceſs.

8. The *orix*, or grenadier groſsbeak, is about the ſize of a houſe-ſparrow. The forehead, ſides of the head, and chin, are black; the breaſt and belly the ſame: the wings are brown, with pale edges; and the reſt of the body of a beautiful red colour: the legs are pale. Theſe birds are inhabitants of Saint Helena; they are alſo in plenty at the Cape of Good Hope, where they frequent watery places that abound with reeds, among which they are ſuppoſed to make their neſt. If (as is ſuppoſed) this be the ſame with Kolben's Finch, he ſays that the neſt is of a peculiar contrivance, made with ſmall twigs, interwoven very cloſely and tightly with cotton, and divided into two apartments with but one entrance (the upper for the male, the lower for the female), and is ſo tight as not to be penetrated by any weather. He adds, that the bird is ſcarlet only in ſummer, being in the winter wholly aſh-coloured. Theſe birds, ſeen among the green reeds, are ſaid to have a wonderful effect; for, from the brightneſs of their colours, they appear like ſo many *ſcarlet lilies*.

9. The *Philippina*, or Philippine groſsbeak, is about the ſize of a ſparrow: the top of the head, the hind part of the neck and back, and the ſcapulars, are yellow, the middle of the feathers brown: the lower part of the back is brown, with whitiſh margins: the fore part of the neck and breaſt are yellow; and from thence to the vent yellowiſh white; the wing-coverts brown, edged with white: the quills are brown, with pale rufous or whitiſh edges; and the tail the ſame: the legs are yellowiſh. Theſe birds inhabit the Philippine Iſlands; and are noted for making a moſt curious neſt, in form of a long cylinder, ſwelling out into a globoſe form in the middle. This is compoſed of the fine fibres of leaves, &c. and faſtened by the upper part to the extreme branch of a tree. The entrance is from beneath; and, after aſcending the cylinder as far as the globular cavity, the true

neſt is placed on one ſide of it; where this little architect lays her eggs, and hatches her brood in perfect ſecurity.

A variety of this ſpecies, the *Baglafechat* (Buff. iii. 469), an inhabitant of Abyſſinia, makes a very curious neſt like the former, but a little different in ſhape; and is ſaid to have ſomewhat of a ſpiral form, not unlike that of a nautilus. It ſuſpends it, like the other, on the extreme twig of ſome tree, chiefly one that hangs over ſome ſtill-water; and always turns the opening towards that quarter from whence leaſt rain may be expected.

10. The *Abyſſinica*, or Abyſſinian groſsbeak, is about the ſize of the hawfinch: the bill is black: the irides are red: the top and ſides of the head, throat, and breaſt, are black: the upper parts of the body, belly and thighs, pale yellow, inclining to brown where the two colours divide: the ſcapulars are blackiſh; the wing-coverts brown, bordered with grey; the quills and tail brown, edged with yellow: the legs are of a reddiſh grey. This bird is found in Abyſſinia; and makes a curious neſt of a pyramidal ſhape, which is ſuſpended from the ends of branches like the others. The opening is on one ſide, facing the eaſt: the cavity is ſeparated in the middle by a partition; up which the bird riſes perpendicularly about half-way, when deſcending, the neſt is within the cavity on one ſide. By this means the brood is defended from ſnakes, ſquirrels, monkeys, and other miſchievous animals, beſides being ſecure from rain, which in that country ſometimes laſts for ſix months together.

11. The *penſilis*, or penſile groſsbeak, (the *Toddy-bird* of Fryer), is about the ſize of the houſe-ſparrow: the bill is black: the irides are yellow: the head, throat, and fore part of the neck, the ſame: from the noſtrils ſprings a dull green ſtripe, which paſſes through the eye and beyond it, where it is broader: the hind part of the head and neck, the back, rump, and wing-coverts, are of the ſame colour: the quills are black, edged with green; the belly is deep grey, and the vent of a rufous red: the tail and legs are black. This ſpecies is found at Madagaſcar; and fabricates a neſt of a curious conſtruction, compoſed of ſtraw and reeds interwoven in ſhape of a bag, the opening beneath. It is faſtened above to a twig of ſome tree; moſtly to thoſe growing on the borders of ſtreams. On one ſide of this, within, is the true neſt. The bird does not form a new neſt every year, but faſtens a new one to the end of the laſt; and often, as far as five in number, one hanging from another. Theſe build in ſociety, like rooks; often five or ſix hundred being ſeen on one tree. They have three young at each hatch.

Kæmpfer mentions a bird ſimilar to this, if not the ſame, which makes the neſt, near Siam, on a tree with narrow leaves and ſpreading branches, the ſize of an apple-tree: the neſt in the ſhape of a purſe with a long neck, made of dry graſs and other materials, and ſuſpended at the ends of the branches; the opening always to the north weſt. He counted fifty on one tree only; and deſcribes the bird itſelf as being like a Canary-bird, of a dark yellow, and chirps like a ſparrow.

Fryer, in his "Account of India and Perſia," p. 76, alſo talks of the ingenuity of the *Toddy-bird*, making a neſt "like a ſteeple, with winding meanders," and tying it by a ſlender thread to the bough of a tree. "Hundreds of theſe pendulous neſts may be ſeen on theſe trees."

12. The *chloris*, or greenfinch, is a well-known bird: the general colour is a yellowiſh green, paleſt on the rump and breaſt, and inclining to white on the belly; the quills are edged with yellow, and the four outer tail-feathers are yellow from the middle to the baſe; the bill is pale-brown, and ſtout; and the legs are of a fleſh-colour.—This ſpecies is pretty common in Britain, and flies in troops during the winter. It makes the neſt in ſome low buſh or hedge, compoſed of dry graſs, and lined with hair, wool, &c. laying five or ſix greeniſh eggs, marked at the larger end with red brown; and the male takes his turn in ſitting. This bird ſoon becomes tame; even old ones being familiar almoſt as ſoon as caught: it lives five or ſix years. Like the chaffinch, it is apt to grow blind if expoſed to the ſun. This ſpecies is alſo pretty common every where on the continent of Europe, but not very frequent in Ruſſia; and is not at all found in Siberia, though it has been met with in Kamtſchatka. It is ſufficiently common both in Cumberland and Scotland: yet in the firſt, it is ſcarce ever obſerved in the winter ſeaſon; but the laſt week in March becomes plentiful, and breeds as in other parts of England.

13. The *Bengalenſis*, or Bengal groſsbeak, is a trifle bigger than a houſe-ſparrow: the bill is of a fleſh-colour; the irides are whitiſh; the top of the head is of a golden yellow; the upper parts of the body are brown, with paler edges; the ſides of the head and under parts rufous white; acroſs the breaſt is a brown band, uniting to, and of the ſame colour with, the upper parts of the body; the legs are of a pale yellow, the claws grey. This ſpecies (thus deſcribed by Mr. Latham) ſeems to be the ſame with the Indian groſsbeak deſcribed as follows in the *Aſiatic Reſearches*: "This little bird, called *bayà* in Hindi, *berbera* in Sanſcrit, *bàbüi* in the dialect of Bengal, *cibù* in Perſian, and *tenawwit* in Arabic, from his remarkably pendent neſt, is rather larger than a ſparrow, with yellow-brown plumage, a yellowiſh head and feet, a light-coloured breaſt, and a conic beak very thick in proportion to his body. This bird is exceedingly common in Hindoſtan: he is aſtoniſhingly ſenſible, faithful, and docile, never voluntarily deſerting the place where his young were hatched, but not averſe, like moſt other birds, to the ſociety of mankind, and eaſily taught to perch on the hand of his maſter. In a ſtate of nature he generally builds his neſt on the higheſt tree that he can find, eſpecially on the palmyra, or on the Indian fig-tree, and he prefers that which happens to overhang a well or a rivulet: he makes it of graſs, which he weaves like cloth and ſhapes like a large bottle, ſuſpending it firmly on the branches, but ſo as to rock with the wind, and placing it with its entrance downwards to ſecure it from birds of prey. His neſt uſually conſiſts of two or three chambers; and it is the popular belief that he lights them with fire-flies, which he catches alive at night, and confines with moiſt clay or with cow-dung. That ſuch flies are often found in his neſt, where pieces of cow-dung are alſo ſtuck, is indubitable; but as their light could be of little uſe to him, it ſeems probable that he only feeds on them. He may be taught with eaſe to fetch a piece of paper, or any ſmall thing that his maſter points out to him. It is an atteſted fact, that if a ring be dropped into a deep well, and a ſignal given to him, he will fly down with amazing celerity, catch the ring before it touches the water, and bring it up to his maſter with apparent exultation; and it is confidently aſſerted, that if a houſe or any other place be ſhown to him once or twice, he will carry a note thither immediately on a proper ſignal being made. One inſtance of his docility I can myſelf mention with confidence, having often been an eye-witneſs of it. The young Hindoo women at Benares, and in other places, wear very thin plates of gold, called *ticas*, ſlightly fixed by way of ornament between their eye-brows; and when they paſs through the ſtreets, it is not uncommon for the youthful libertines, who amuſe themſelves with training bayas, to give them a ſignal, which they underſtand, and ſend them to pluck the pieces of gold from the foreheads of their miſtreſſes, which they bring in triumph to the lovers. The bayà feeds naturally on graſshoppers and other inſects; but will ſubſiſt,

when tame, on pulſe macerated in water: his fleſh is warm and drying, of eaſy digeſtion, and recommended in medical books as a ſolvent of ſtone in the bladder or kidneys; but of that virtue there is no ſufficient proof. The female lays many beautiful eggs reſembling large pearls; the white of them, when they are boiled, is tranſparent, and the flavour of them is exquiſitely delicate. When many bayàs are aſſembled on a high tree, they make a lively din; but it is rather chirping than ſinging: their want of muſical talents is however amply ſupplied by their wonderful ſagacity, in which they are not excelled by any feathered inhabitant of the foreſt."

14. The *nigra*, or black groſsbeak, is about the ſize of a Canary bird: the bill is black, ſtout, and deeply notched in the middle of the upper mandible: the plumage is black, except a little white on the fore part of the wing and baſe of the two firſt quills: the legs are black. It inhabits Mexico.

15. The *minuta*, or minute groſsbeak, is about the ſize of a wren: the bill is ſtout, thick, ſhort, and brown: the upper parts of the plumage are grey brown, the under parts and rump ferruginous cheſnut; the fourth, fifth, and ſixth quills are white at the baſe: the legs are brown. It inhabits Surinam and Cayenne. It is ſaid to keep paired to its mate the whole year; and is a lively, and not very tame bird. It moſtly frequents lands which have lain for ſome time uncultivated; and lives both on fruits and ſeeds. It makes a roundiſh neſt, the hollow of which is two inches in diameter, compoſed of a reddiſh herb, and placed on the trees which it frequents. The female lays three or four eggs.

16. The *ſocia*, or ſociable groſsbeak, is about the ſize of a bullfinch: the general colour of the body above is a ruſous brown, the under parts yellowiſh: the beak and muzzle are black; the legs brown; and the tail is ſhort. It inhabits the interior country at the Cape of Good Hope; where it was diſcovered by Mr. Paterſon.—Theſe birds, according to our author, live together in large ſocieties, and their mode of nidification is extremely uncommon. They build in a ſpecies of *Mimoſa* which grows to an uncommon ſize; and which they ſeem to have ſelected for that purpoſe, as well on account of its ample head, and the great ſtrength of its branches, calculated to admit and to ſupport the extenſive buildings which they have to erect, as for the tallneſs and ſmoothneſs of its trunk, which their great enemies, the ſerpent-tribe, are unable to climb. The method in which the neſts themſelves are fabricated, is highly curious. In the one deſcribed by Mr. Paterſon there could be no leſs a number (he ſays) than from 800 to 1000 reſiding under the ſame roof. He calls it a roof, becauſe it perfectly reſembles that of a thatched houſe; and the ridge forms an angle ſo acute and ſo ſmooth, projecting over the entrance of the neſt below, that it is impoſſible for any reptile to approach them. The induſtry of theſe birds "ſeems almoſt equal (ſays our author) to that of the bee: throughout the day they appear to be buſily employed in carrying a fine ſpecies of graſs, which is the principal material they employ for the purpoſe of erecting this extraordinary work, as well as for additions and repairs. Though my ſhort ſtay in the country was not ſufficient to ſatisfy me by ocular proof, that they added to their neſt as they annually increaſed in numbers, ſtill from the many trees which I have ſeen borne down with the weight, and others which I have obſerved with their boughs completely covered over, it would appear that this is really the caſe. When the tree which is the ſupport of this aerial city is obliged to give way to the increaſe of weight, it is obvious that they are no longer protected, and are under the neceſſity of rebuilding in other trees. One of theſe deſerted neſts I had the curioſity to break down, ſo as to inform myſelf of the internal ſtructure of it, and found it equally ingenious with that of the external. There are many entrances, each of which forms a regular ſtreet, with neſts on both ſides, at about two inches diſtance from each other. The graſs with which they build is called the Boſhman's graſs: and I believe the ſeed of it to be their principal food; though, on examining their neſts, I found the wings and legs of different inſects. From every appearance, the neſt which I diſſected had been inhabited for many years; and ſome parts of it were much more complete than others: this therefore I conceive nearly to amount to a proof, that the animals added to it at different times, as they found neceſſary, from the increaſe of the family, or rather of the nation or community."

17. The *tridactyla*, or three-toe'd groſsbeak (the guiſo balito of *Buffon*), has only three toes, two before and one behind. The bill is toothed on the edges: the head, throat, and fore-part of the neck are of a beautiful red, which is prolonged in a narrow band quite to the vent; the upper part of the neck, back, and tail, are black; the wing coverts brown, edged with white; quills brown, with greeniſh edges; and legs a dull red: the wings reach half way on the tail.—This ſpecies inhabits Abyſſinia; where it frequents woods, and is a ſolitary ſpecies. It feeds on kernels of ſeeds, which it breaks with eaſe with its bill. The name in its native place is *guiſo balito dimmo-won jerck*. Buffon's figure is from Mr. Bruce's drawings.

There are 76 other ſpecies of this genus; the whole number, beſides varieties, enumerated in the *Syſt. Nat.* (Gmelin), and in Mr. Latham's *Index Ornith.* being 93. In Plate 10. are given ſpecimens of ſix, *viz.* the Cærulea; the Longicauda; the Socia; the Cardinalis; the Nigra: the Violacea.

LOYOLA (Ignatius). See Ignatius.

LOZENGE, in heraldry, a four-cornered figure, reſembling a pane of glaſs in old caſements. See Heraldry. Though all heralds agree, that ſingle ladies are to place their arms on lozenges, yet they differ with reſpect to the cauſes that gave riſe to it. Plutarch ſays, in the Life of Theſeus, that in Megara, an ancient town of Greece, the tomb-ſtones, under which the bodies of the Amazons lay, were ſhaped after that form; which ſome conjecture to be the cauſe why ladies have their arms on lozenges. *S. Petra Sancta* will have this ſhield to repreſent a *cuſhion*, whereupon women uſed to ſit and ſpin, or do other houſewifery. Sir J. Ferne thinks it is formed from the ſhield called *teſſera*, which the Romans finding unfit for war, did allow to women to place their enſigns upon, with one of its angles always uppermoſt.

Lozenges, among jewellers, are common to brilliant and roſe diamonds. In brilliants, they are formed by the meeting of the ſkill and ſtar facets on the bezil; in the latter, by the meeting of the facets in the horizontal ribs of the crown. See Facets.

Lozenge is alſo a form of medicine, made into ſmall pieces, to be held or chewed in the mouth till they are melted there: the ſame with what are otherwiſe called *trochiſci*, "troches."

LUBEC, a city and port-town of Germany, in the circle of Lower Saxony and duchy of Holſtein, in E. lon. 10. 35. N. lat. 54. 20. It ſtands at the conflux of ſeveral rivers, the largeſt of which is the Trave, 12 miles from the Baltic, where it has a fine harbour, and 40 north-eaſt of Hamburg. By the Steckenitz, another of thoſe rivers, it has a communication with the Elbe, and conſequently with the German ocean. The city lies on the ſide of a hill, with the Trave, increaſed by the Steckenitz on the one ſide, and the Wackenitz on the other; and is ſtrongly fortified with baſtions, moats, walls, and ramparts; the laſt of which are planted with trees, and form an agreeable walk. Lubec being formerly the chief of the Hanſe towns, was very powerful in conſequence

of the vaſt trade it carried on; but a great part of that trade is now transferred to Hamburg: however, it is ſtill ſaid to employ 150 of its own ſhips, and has a great ſhare of the Baltic trade. It is about two miles in length, and more than one in breadth. The houſes are all of ſtone, but old-faſhioned. Several of the ſtreets have on each ſide rows of lime-trees, with canals in the middle, like thoſe of Holland. The public ſtructures conſiſt of the ancient cathedral of the biſhopric of Lubec, and ſeveral other Lutheran churches; a nunnery for 22 ladies, with an abbeſs and prioreſs; a poor-houſe, an alms-houſe, and houſe of correction; an orphan-houſe; an hoſpital dedicated to the Holy-Ghoſt; a houſe in which poor travellers are entertained three days, and then ſent forward with a paſs; but ſuch as happen to be ſick, are provided with all neceſſaries till they recover or die; the city-armoury, a grammar-ſchool of ſeven claſſes, the Calviniſt church, and the Popiſh chapel. The deputies of the Hanſe-towns uſed to meet here formerly in the town-houſe. An alliance ſtill ſubſiſts between Lubec, Hamburg, and Bremen; and theſe cities, under the name of *Hanſe-towns*, negotiate treaties with foreign powers. Here are divers manufactures, and the city's territory is about 60 miles in compaſs. In the diet of the empire Lubec is poſſeſſed of the third ſeat among the Rheniſh imperial cities; and among thoſe of the circle, has the firſt. In the matricula, its aſſeſſment is 480 florins, and to the chamber of Wetzlar it pays 557 rix-dollars and 88 kruitzers. The city is a republic within itſelf, and both makes and executes laws in regard to civil and criminal matters, &c. A father and ſon, or two brothers, cannot be in the regency at the ſame time. The famous league of the Hanſe-towns was begun here in 1164. This city had its charter of privileges from the emperor Frederic II. Formerly it carried on wars, both offenſive and defenſive, for ſeveral years, not only againſt the dukes of Mecklenburg, but againſt the kings of Sweden and Denmark; particularly in 1428, when it fitted out 250 ſhips of force againſt Eric X. king of Denmark. There are about 20 churches in Lubec, with lofty ſteeples or ſpires. The Trave brings ſhips of burden into the very heart of the city; but the largeſt unload at Travemunde, *i. e.* the mouth of the Trave, eight or ten miles diſtant. Formerly it is ſaid to have employed no leſs than 600 ſhips. In the famous cellar here, it is ſaid there is wine 200 years old. The church of St. Mary's, a noble lofty pile, is ſupported by tall pillars, all of one ſtone each, and has a high ſpire covered with gilt lead. The town's garriſon conſiſts of about 700 or 800 men. The revenue of its Lutheran biſhop, though he is a prince of the empire, is ſaid not to exceed 3000 pounds.

LUBEN, a city of Germany, in the marquiſate of Lower Luſatia. It is ſituated on the river Spree, and is the capital of a ſmall circle of the ſame name. It is the ſeat of the diets, and of the chief tribunals and offices; and has ſeveral churches, with a noble land-houſe and hoſpital. E. lon. 14. 25. N. lat. 52. 0.

LUBIENIETSKI (Stanislaus), a Poliſh gentleman, deſcended from a noble family, and born at Cracow in 1623, was educated by his father with great attention. He became a celebrated Socinian miniſter; and took great pains to obtain a toleration from the German princes for his Socinian brethren. His labours, however, were ineffectual; being himſelf perſecuted by the Lutheran miniſters, and baniſhed from place to place; until at length he was baniſhed out of the world, with his two daughters, by poiſon, his wife narrowly eſcaping, in 1675. We have of his writing *A hiſtory of the reformation in Poland*; *A treatiſe on comets*; with other works in Latin.

LUBIN (Eilhard), was profeſſor of poetry in the univerſity of Roſtock in 1595: and ten years after, was promoted to the profeſſorſhip of divinity. He wrote notes on Anacreon, Juvenal, Perſius, &c. and ſeveral other works; but that which made the moſt noiſe is a Treatiſe on the nature and origin of evil, entitled, *Phoſphorus de cauſa prima et natura mali*, printed at Roſtock in 1596; in which we have a curious hypotheſis to account for the origin of moral evil. He ſuppoſed two co-eternal principles; not *matter* and *vacuum*, as Epicurus did; but God, and *Nihilum* or *Nothing*. This being publiſhed againſt by Grawer, was defended by Lubin; but after all, he is deemed better acquainted with polite literature than with divinity. He died in 1621.

LUBLIN, a handſome and conſiderable town of Poland, capital of the palatinate of the ſame name, with a citadel, a biſhop's ſee, an univerſity, and a handſome Jewiſh ſynagogue. Here the judicial courts for all Poland are held. It has three fairs, frequented by merchants from all nations. It is ſeated on the river Byſtrzna. E. lon. 22. 31. N. lat. 51. 26.

LUCA, (anc. geog.), a town of Etruria, on the river Auſer; a colony and a municipium. Now *Lucca*, capital of the republic of that name, near the river Sechia. E. lon. 11. 20. N. lat. 43. 45.

LUCANIA, a country of Italy, and a part of Magna Græcia; bounded on the north by the river Silarus by which it was ſeparated from the Picentini, and by the river Bradanus by which it was parted from the Apuli Peucetii; on the ſouth by the Laus, which ſeparated it from the Bruttii; on the eaſt by the Sinus Tarentinus: and on the weſt by the Tuſcan ſea. *Lucani*, the people, deſcendants of the Samnites. *Lucanus* the epithet, (Horace). *Lucæ boves* denoted elephants; firſt ſeen in Pyrrhus's wars in Lucania, whence the appellation (Pliny).

LUCANUS (Marcus Annæus), a Latin poet, born at Corduba in Spain, about A. C. 39. He was the ſon of Annæus Mela, the youngeſt brother of Seneca; and was conveyed to Rome from the place of his nativity at the age of eight months: a circumſtance, as his more indulgent critics obſerve, which ſufficiently refutes the cenſure of thoſe who conſider his language as provincial. At Rome he was educated under the Stoic Cornutus, ſo warmly celebrated by his diſciple Perſius the ſatiriſt, who was the intimate friend of our poet. In the cloſe of his education, Lucan is ſaid to have paſſed ſome time at Athens. On his return to Rome he roſe to the office of quæſtor before he had attained the legal age. He was afterwards inrolled among the augurs; and married a lady of noble birth, and of a moſt amiable character. Lucan had for ſome time been admitted to familiarity with Nero, when the emperor choſe to contend for poetical honours by the public recital of a poem he had compoſed on Niobe; and ſome verſes of this imperial production are ſuppoſed to be preſerved in the firſt ſatire of Perſius. Lucan had the hardineſs to repeat a poem on Orpheus, in competition with that of Nero; and, what is more remarkable, the judges of the conteſt were juſt and bold enough to decide againſt the emperor. From hence Nero became the perſecutor of his ſucceſsful rival, and forbade him to produce any poetry in public. The well-known conſpiracy of Piſo againſt the tyrant ſoon followed; and Tacitus, with his uſual ſarcaſtic ſeverity, concludes that Lucan engaged in the enterpriſe from the poetical injuries he had received: "a remark (ſays Mr. Hayley, who has endeavoured to refute the imputation) which does little credit to the candour of the hiſtorian; who might have found a much nobler, and, I will add, a more probable motive for his conduct, in the generous ardour of his character, and his paſſionate adoration of freedom. In the ſequel of his narration, Tacitus alleges a charge againſt our poet, which, if it were true, muſt lead us to deteſt him as the moſt

abject of mankind. The hiſtorian aſſerts, that Lucan, when accuſed of the conſpiracy, for ſome time denied the charge; but corrupted at laſt by a promiſe of impunity, and deſirous to atone for the tardineſs of his confeſſion, he accuſed his mother Atilla as his accomplice. This circumſtance is ſo improbable in itſelf, and ſo little conſonant to the general character of Lucan, that ſome writers have treated it with contempt, as a calumny invented by Nero to vilify the object of his envious abhorrence. But the name of Tacitus has given ſuch an air of authority to the ſtory, that it may ſeem to deſerve a more ſerious diſcuſſion, particularly as there are two ſubſequent events related by the ſame hiſtorian, which have a tendency to invalidate the accuſation ſo injurious to our poet. The events I mean are, the fate of Annæus, and the eſcape of Atilla, the two parents of Lucan. The former died in conſequence of an accuſation brought againſt him, after the death of his ſon, by Fabius Romanus, who had been an intimate with Lucan, and forged ſome letters in his name, with the deſign of proving his father concerned in the conſpiracy. Theſe letters were produced to Nero, who ſent them to Annæus, from an eager deſire, ſays Tacitus, to get poſſeſſion of his wealth. From this fact two inferences may be drawn, according to the different lights in which it may be conſidered:—If the accuſation againſt Annæus was juſt, it is clear that Lucan had not betrayed his father, and he appears the leſs likely to have endangered by his confeſſion the life of a parent, to whom he owed a ſtill tenderer regard.—If Annæus was not involved in the conſpiracy, and merely put to death by Nero for the ſake of his treaſure, we may the more readily believe, that the tyrant who murdered the father from avarice, might calumniate the ſon from envy. But the eſcape of Atilla affords us the ſtrongeſt reaſon to conclude that Lucan was perfectly innocent of the abject and unnatural treachery of which Tacitus has ſuppoſed him guilty. Had the poet really named his mother as an accomplice, would the vindictive and ſanguinary Nero have ſpared the life of a woman whoſe family he deteſted, particularly when other females were put to death for their ſhare in the conſpiracy? That Atilla was not in that number, the hiſtorian himſelf informs us in the following remarkable ſentence, "Atilla mater Annæi Lucani, ſine abſolutione, ſine ſupplicio, diſſimulata;" thus tranſlated by Gordon: "The information againſt Atilla, the mother of Lucan, was diſſembled; and, without being cleared, ſhe eſcaped unpuniſhed."

The preceding remarks will, our author hopes, vindicate to every candid mind the honour of Lucan, whoſe firmneſs and intrepidity of character are indeed very forcibly diſplayed in that picture of his death which Tacitus himſelf has given us. He was condemned to have his veins cut, as his uncle Seneca had before him. Lucan, "while his blood iſſued in ſtreams, perceiving his feet and hands to grow cold and ſtiffen, and life to retire by little and little to the extremities, while his heart was ſtill beating with vital warmth, and his faculties nowiſe impaired, recollected ſome lines of his own, which deſcribed a wounded ſoldier expiring in a manner that reſembled this. The lines themſelves he rehearſed; and they were the laſt words he ever uttered." The critics differ concerning the verſes of the Pharſalia which the author quoted in ſo memorable a manner. The two paſſages he is ſuppoſed to have repeated are the following; of which Lipſius contends for the latter.

Sanguis erant lacrymæ: quæcunque foramina nova
Humor, ab his largus manat cruor: ora redundant,
Et patulæ nares: ſudor rubet: omnia plenis
Membra fluunt venis: totum eſt pro vulnere corpus.
Lib. ix. 814.

Now the warm blood at once, from every part,
Ran purple poiſon down, and drain'd the fainting heart.
Blood falls for tears; and o'er his mournful face
The ruddy drops their tainted paſſage trace.
Where'er the liquid juices find a way,
There ſtreams of blood, there crimſon rivers ſtray.
His mouth and guſhing noſtrils pour a flood,
And e'en the pores ooze out the trickling blood;
In the red deluge all the parts lie drown'd,
And the whole body ſeems one bleeding wound.
Rowe.

Scinditur avulſus; nec ſicut vulnere ſanguis
Emicuit lentus; ruptis cadit undique venis,
Diſcurſuſque animæ, diverſa in membra meantis,
Interceptus aquis. Lib. iii. v. 638.

No ſingle wound the gaping rupture ſeems,
Where trickling crimſon wells in ſlender ſtreams;
But, from an op'ning horrible and wide,
A thouſand veſſels pour the burſting tide:
At once the winding channel's courſe was broke,
Where wand'ring life her mazy journey took;
At once the currents all forgot their way,
And loſt their purple in the azure ſea.
Rowe.

Such was the death of Lucan before he had completed his 27th year.—His wife, Polla Argentaria, is ſaid to have tranſcribed and corrected the three firſt books of the Pharſalia after his death. It is much to be regretted (Mr. Hayley obſerves) that we poſſeſs not the poem which he wrote on the merits of this amiable and accompliſhed woman; but her name is immortalized by two ſurviving poets of that age. The veneration which ſhe paid to the memory of her huſband is recorded by Martial; and more poetically deſcribed in that pleaſing and elegant little production of Statius, *Genethliacon Lucani*, a poem ſaid to have been written at the requeſt of Argentaria. The author, after invoking the poetical deities to attend the ceremony, touches with great delicacy and ſpirit on the compoſitions of Lucan's childhood, which are loſt, and the Pharſalia, the production of his early youth: he then pays a ſhort compliment to the beauty and talents of Argentaria; laments the cruel fate which deprived her ſo immaturely of domeſtic happineſs; and concludes with an addreſs to the ſhade of Lucan, which ſeems to furniſh a ſtrong preſumption of Lucan's innocence in regard to one of the accuſations mentioned above. "Had he been really guilty of baſely endangering the life of his mother (ſays Mr. Hayley), it is not probable that his wife would have honoured his memory with ſuch enthuſiaſtic veneration; or that Statius, in verſes deſigned to do him honour, would have alluded to *the mother* of Nero. If his character as a man has been injured by the hiſtorian (continues Mr. Hayley), his poetical reputation has been treated not leſs injuriouſly by the critics. Quintilian, by a frivolous diſtinction, diſputes his title to be claſſed among the poets; and Scaliger ſays, with a brutality of language diſgraceful only to himſelf, that he ſeems rather to *bark* than to *ſing*. But theſe inſults may appear amply compenſated, when we remember, that in the moſt poliſhed nations of modern Europe the moſt elevated and poetic ſpirits have been his warmeſt admirers; that in France he was idolized by Corneille, and in England tranſlated by Rowe.—The ſevereſt cenſures on Lucan have proceeded from thoſe who have unfairly compared his language to that of Virgil: but how unjuſt and abſurd is ſuch a compariſon! It is comparing an uneven block of porphyry, taken rough from the quarry, to the moſt beautiful ſuperficies of poliſhed marble. How differently ſhould we think of Virgil as a poet, if we poſſeſſed only the verſes which

he wrote at that period of life when Lucan compoſed his Pharſalia! In the diſpoſition of his ſubject, in the propriety and elegance of diction, he is undoubtedly far inferior to Virgil: but if we attend to the bold originality of his deſign, and to the vigour of his ſentiments; if we conſider the Pharſalia as the rapid and uncorrected ſketch of a young poet, executed in an age when the ſpirit of his countrymen was broken, and their taſte in literature corrupted; it may juſtly be eſteemed as one of the moſt noble and moſt wonderful productions of the human mind."—Lucan wrote ſeveral poems; but we have none remaining beſide his *Pharſalia*, of which an excellent Engliſh verſion has been given by Mr. Nicholas Rowe.

LUCANUS, the STAG-BEETLE, in zoology; a genus of inſects of the order coleoptera. The antennæ end in a club or knob, which is compreſſed or flattened on one ſide, and divided into ſhort laminæ reſembling the teeth of a comb; the jaws are porrected or advanced before the head, and are dentated. There are 20 ſpecies. See Plate 11. The largeſt as well as the moſt ſingular is the cervus; which is eaſy to be known by two large moveable maxillæ, reſembling in form the horns of a ſtag, which project from its head, and have in a ſpecial manner acquired it the appellation of Stag-Beetle. Thoſe maxillæ, broad and flat, equal to one third of the inſect's length, have in the middle, towards their inner part, a ſmall branch, and at their extremity are forked. Beſides this, they have ſeveral ſmall teeth throughout their whole length. The head that bears theſe maxillæ is very irregular, very broad and ſhort. The thorax is ſomething narrower than the head and body, and margined round. The elytra are very plain, without either ſtreaks or lines. The whole animal is of a deep brown colour. It is commonly found upon the oak, but is ſcarce in the neighbourhood of London; and though the largeſt of coleopterous inſects to be met with in this part of the world, it is much ſmaller than thoſe of the ſame ſpecies that are found in woody countries. This creature is ſtrong and vigorous, and its horns, with which it pinches ſeverely, are carefully to be avoided.—The jaws are ſometimes as red as coral, which gives this inſect a very beautiful appearance; the female is diſtinguiſhed by the ſhortneſs of the jaws, which are not half ſo long as thoſe of the male. Theſe inſects feed on the liquor that oozes from oaks, which they ſuck with their trunk or tongue. The females depoſit their eggs in the trunks of decayed trees, ſuch as the oak and the aſh. The larvæ or grubs lodge under the bark and in the hollow of old trees, which they eat into and reduce into fine powder, and there transform themſelves into chryſalids. They are common in Kent and Suſſex, and are ſometimes met with in other parts of England. The porrected jaws are particularly uſeful to theſe animals, in ſtripping off the bark from trees, and affixing themſelves thereby to the tree, while they ſuck with their trunk the juice that oozes from it.

LUCAR DE BARAMEDA (St.), a handſome and conſiderable town of Spain, with a very good harbour, well defended, in Andaluſia. It was once the greateſt port in Spain, before the galleons unloaded their treaſure at Cadiz. It is ſeated at the mouth of the river Guadalquiver. W. lon. 6. 5. N. lat. 36. 40.

LUCAR *de Guadiana* (St.), a ſtrong town of Spain, in Andaluſia, on the confines of Algarve; ſeated on the river Guadiana, with a little harbour. W. lon. 5. 59. N. lat. 37. 32.

LUCAR *la Major* (St.), a ſmall town of Spain, in Andaluſia, with the title of a duchy. It is ſeated on the river Guadiana, in W. lon. 6. 32. N. lat. 37. 21.

LUCARIA, a feaſt celebrated at Rome on the 18th of July, in memory of the flight of the Romans into a great wood, where they found an aſylum, and ſaved themſelves from deſtruction. This wood in which they found protection, was ſituated between Tiber and the *Via Salaria*. The enemies from whom the Romans fled were the Gauls. On this feſtival, Plutarch tells us, it was cuſtomary to pay the actors, and ſuch as contributed to the public amuſement, with the money ariſing from the felling of wood. This money was called *lucar*. It is obvious, from what has been obſerved, that *lucar* and *lucaria* are derived from *lucus*, a grove.

LUCAS (JACOBS), an eminent artiſt, more generally known by the name of *Lucas van* LEYDEN, or *Hugenſe*, was born at Leyden in 1494. He received his firſt inſtructions in the art of painting from his father Hugues Jacobs; but completed his ſtudies in the ſchool of Cornelius Engelbrecht. He gained much money by his profeſſion; and being of a generous turn of mind, he ſpent it freely, dreſſed well, and lived in a ſuperior ſtyle. It is ſaid that a few years before his death he made a tour into Zealand and Brabant; and during his journey, a painter of Fluſhing, envious of his great abilities, gave him poiſon at an entertainment; which, though very ſlow, was too fatal in its effect, and put an end to his life, after ſix years languiſhing under its cruel influence. Others, denying the ſtory of the poiſon, attribute his death to his inceſſant induſtry. The ſuperiority of this artiſt's genius manifeſted itſelf in his infancy: for his works, even from the age of nine, were ſo excellent, as to excite the admiration of all cotemporary artiſts; and when he was about 15, he painted a St. Hubert, which gained him great applauſe. His tone of colouring (Mr. Pilkington obſerves) is good, his attitudes (making a reaſonable allowance for the ſtiff German taſte) are well choſen, his figures have a conſiderable expreſſion in their faces, and his pictures are very highly finiſhed. He endeavoured to proportion the ſtrength of his colouring to the different degrees of diſtance in which his objects were placed: for in that early time the true principles of perſpective were but little known, and the practice of it was much leſs obſerved. In the town-hall at Leyden, the moſt capital picture of Lucas, the ſubject of which is the Laſt Judgment, is preſerved with great care; the magiſtrates having refuſed very large ſums which have been offered for it.

This artiſt painted not only in oil, but alſo in diſtemper, and upon glaſs. Nor was he leſs eminent for his engraving than for his painting. He carried on a familiar and friendly correſpondence with Albert Durer, who was his cotemporary; and it is ſaid, that as regularly as Albert Durer publiſhed one print, Lucas publiſhed another, without the leaſt jealouſy on either ſide, or wiſh to depreciate each other's merit. And when Albert came into Holland upon his travels, he was received by Lucas in a moſt cordial and affectionate manner. His ſtyle of engraving, however, according to Mr. Strutt, differed conſiderably from that of Albert Durer, "and ſeems evidently to have been founded upon the works of Iſrael van Mechlen. His prints are very neat and clear, but without any powerful effect. The ſtrokes are as fine and delicate upon the objects in the front, as upon thoſe in the diſtances; and this want of variety, joined with the feebleneſs of the maſſes of ſhadow, give his engravings, with all their neatneſs, an unfiniſhed appearance, much unlike the firm ſubſtantial effect which we find in the works of Albert Durer. He was attentive to the minutiæ of his art. Every thing is carefully made out in his prints, and no part of them is neglected. He gave great character and expreſſion to the heads of his figures; but, on examination of his works, we find the ſame heads too often repeated. The hands and feet are rather mannered than correct; and when he attempted to draw the naked figure, he ſucceeded but very indifferently. He affected to make the folds of his draperies long and flowing; but his female figures are frequently ſo exceſſively loaded with girdles, bandages, and other ornamental

trappings, that much of the elegance of the deſign is loſt. He engraved on wood, as well as on copper; but his works on the former are by no means numerous. They are, however, very ſpirited; though not equal, upon the whole, to thoſe of his friend Albert. The prints of this maſter are pretty numerous, but very ſeldom met with complete; eſpecially fine impreſſions of them. For though they are, generally ſpeaking, executed with the graver only, yet, from the delicacy of the execution, they ſoon ſuffer in the printing. Of his engravings the few following may be mentioned as among the principa'. 1. *Mahomet ſleeping, with a prieſt murdered by his ſide, and another figure ſtealing his ſword*, a middling-ſized upright plate, dated 1508, ſaid to be one of his moſt early productions. 2. An *ecce homo*, a large plate, lengthwiſe, dated 1510. 3. *The crucifixion on Mount Calvary*, the ſame. 4. *The wiſe men's offering*, the ſame, dated 1513. 5. *Return of the prodigal ſon*, a middling-ſized plate, lengthwiſe, dated 1518. 6. A large print, lengthwiſe, called *the dance of Magdalen*, dated 1519. 7. His own *portrait*, a ſmall upright plate, dated 1525. 8. *David playing before Saul*, a middling-ſized upright plate, dated . This is a very fine print; the expreſſion of Saul's countenance, in particular, is admirable. 9. A print known by the name of *Uleſpiegle*, which is the ſcarceſt of all the works of this maſter. It was in the collection of the king of France; and ſaid by Marolles, and other maſters, to be unique. But Baſan informs us, that M. Mariette had alſo an impreſſion of this plate; and it has been ſince found in one or two other collections. It repreſents a travelling bag-piper with his family; himſelf playing as he goes along, and carrying two children in a baſket at his back; his wife trudging by his ſide, ſupporting with one hand an infant on her ſhoulder, and with the other leading an aſs loaded with two baſkets, having two children in each; and another child going before, with a little dog, completes the ſingular groupe. This rare print is dated 1520, and is known to have been ſold for 16 louis-d'ors.—It is nearly $7\frac{1}{2}$ inches high by $4\frac{3}{4}$ broad; and has been twice copied. One of the copies is the reverſe way: but the other is the ſame way with the original; and though not ſo well executed, might without a compariſon be miſtaken for it.

Lucas (Richard), D. D. a learned Engliſh divine, was born in 1648, and ſtudied at Oxford: after which he entered into holy orders, and was for ſome time maſter of the free ſchool at Abergavenny. Being eſteemed an excellent preacher, he became vicar of St. Stephen's, Coleman-ſtreet, in London, and lecturer of St. Olave's in Southwark. He was doctor of divinity; and in 1696 was inſtalled prebendary of Weſtminſter. His ſight began to fail him in his youth; and he totally loſt it in his middle age. He was greatly eſteemed for his piety and learning; and publiſhed ſeveral works, particularly, 1. Practical Chriſtianity. 2. An inquiry after happineſs. 3. Several ſermons. 4. A Latin tranſlation of The whole duty of man. He died in 1715.

LUCCA, a ſmall republic of Italy on the coaſt of the Mediterranean, between the territory of Genoa on the weſt, Modena on the north, and Tuſcany on the eaſt. According to Keyſler, it is only about 30 miles in circumference, but is exceedingly fertile and populous. It contains, beſides the city of Lucca, 150 villages. The number of inhabitants is computed at 120,000. The government is lodged in a goſalonier, whoſe power is much the ſame with that of the doges of Venice and Genoa. He is aſſiſted by nine counſellors; but the power of all the ten continues only for two months; during which time they live in the ſtate-palace, and at the public expence. They are choſen out of the great council, which conſiſts of 240 nobles; but even this council is changed by a new election every two years. The revenues of the republic are about 400,000 ſcudi or crowns; out of which they maintain 500 men by way of regular force, and 70 Swiſs as a guard to their acting magiſtrates. The city of Lucca is ſituated in a plain, terminating in moſt delightful eminences, adorned with villas, ſummer-houſes, corn-fields, and plantations of every kind; ſo that nothing either for uſe or pleaſure is here wanting. The city, which is about three Italian miles in circumference, has regular well-lined fortifications; and its ſtreets, though irregular, are wide, well paved, and full of handſome houſes. The number of its inhabitants is computed to be above 40,000; and they carry on large manufactures, eſpecially of ſilk ſtuffs. Lucca has a biſhop, who enjoys ſeveral extraordinary privileges; and its cathedral is Gothic. The city ſtands in E. lon. 11. 27, N. lat. 43. 5.

LUCENTI, Lucentia, or *Lucentum*, a town of the Hither Spain, now Alicant, a ſea-port of Valencia. W. lon. 32. N. lat. 38. 37.

LUCERES, in Roman antiquity, the third in order of the three tribes into which Romulus divided the people, including all foreigners; ſo called from the *lucus* or grove where Romulus opened an aſylum.

LUCERIA, (anc. geog.), a town of Apulia in Italy; which in Strabo's time ſtill exhibited marks of Diomed's ſovereignty in thoſe parts. Ptolemy has *Nuceria*; whether from miſtake, or the cuſtom of his time, uncertain. Now *Nocera de Pagani*, in the kingdom of Naples. E. lon. 15. 0. N. lat. 40. 40.

LUCERIUS, in mythology, a name given to Jupiter, as *Luceria* was given to Juno, as the deities which gave light to the world.

LUCERNE, one of the 13 cantons of Swiſſerland. It holds the third place among the 13; and is the head of the Catholic cantons. Though leſs than Zuric, and conſequently much leſs than Berne, it is, however, far more extenſive than any of the reſt, being 15 or 16 leagues long, and eight broad. The population is eſtimated at 100,000. Even the mountainous part is not barren, but abundant in wood and paſture, furniſhing cattle, hides, cheeſe, and butter, for exportation. All the north part is fertile in grain, fruit, and hay; ſupplying ſufficient for the conſumption of the inhabitants: but as the mountaineers of the little cantons come to their market for corn, the people of Lucerne purchaſe this commodity from other parts of Swiſſerland, but eſpecially from Alſace and Suabia. Their manufactures are very inconſiderable; conſiſting only in a little ſilk and cotton thread.—The government is oligarchical. The councils are choſen from among 00 citizens only. The great council of 64 members is the nominal ſovereign; but in fact the power reſides in the ſenate, or little council of 36, having for their chiefs the two avoyers.—The whole canton profeſſes the Roman Catholic religion. The pope's nuncio, with the title of legate *a latere*, uſually reſides at Lucerne.—They threw off the Auſtrian yoke in 352; and by entering into a perpetual alliance with the three ancient cantons, they gave ſuch weight to the confederacy, as to enable it in 1386 to reſiſt all the efforts of the enemy at the bloody battle of Sempach.

The *town of Lucerne* is ſituated at the extremity of a moſt beautiful lake of the ſame name, where the river Reuſs iſſues from it. The buildings are ancient, and the ſtreets narrow; nor is Lucerne populous in proportion to its extent, the inhabitants being only between 3 and 4000. Since this is the great paſſage to Italy by Mount St. Gothard, and the merchandiſe which paſſes the Alps on mules, and is to be tranſported by the rivers Reuſs, Aar, and Rhine, is all depoſited here, it might have a flouriſhing trade, if arts and manufactures were attended to. The Reuſs ſeparates the town into two unequal parts, which are connected by three bridges; one wide for carriages, and two narrow covered ones for foot paſſengers;

beſides theſe, there is a fourth over an arm of the lake, to paſs to the cathedral. Three of theſe bridges have old bad paintings of the Dance of Death, and the Hiſtory of the Bible, and of Swiſſerland. They make a commodious dry walk for the inhabitants.—Of religious edifices, the principal are the cathedral, or collegiate church of St. Leger; the convent of Cordeliers; the college of the Jeſuits; the convent of Capuchins; and two convents of nuns. Of the ſecular buildings, the hotel de ville is the principal. The arſenal is well furniſhed. The water tower is remarkable only for its poſition and antiquity: it is ſaid to have been a pharos or lighthouſe.—What greatly attracts moſt the notice of ſtrangers is, a plan in relief of part of the cantons of Lucerne, Zug, and Berne, and the whole of Schweitz, Uri, and Underwald, executed by General Pfiffer on a large ſcale. He has completed about 60 ſquare leagues; the plan is 12 feet long, and nine and a half broad: every mountain is accurately meaſured, and every object diſtinctly placed.

The *Lake of Lucerne* exhibits greater variety and more picturesque ſcenery than any other of the Swiſs lakes. It is ſeven leagues long in a right line, and three wide about Kuſſnacht; but the ſhape is very irregular. The whole ſouth ſide is bordered by high mountains; but the north exhibits hills of no great height. The narrow gulph that extends towards the weſt, is bordered on the north and north-weſt by mount Pilat, which is a ſingle mountain riſing boldly more than 6000 feet above the lake; and on the ſouth by mount Burgenberg. Stanz-Stadt, belonging to the canton of Underwald, is on this ſide; and hereabouts the lake is deepeſt. Kuſſnacht is on the point of the other gulph, which extends towards the eaſt, and is wider than the former. All the country to the weſt of theſe gulphs, and part of it to the north of the latter, belongs to the canton of Lucerne; but that which is to the ſouth and north-eaſt is dependent on the canton of Zug. All the mountains on the left ſhore of the lake belong to the canton of Underwald; thoſe on the right, partly to the canton of Uri, partly to that of Schweitz, partly to the little republic of Gerſaw, but principally to the canton of Lucerne.

Lucerne, in botany. See Medicago.—For the culture of this plant, ſee Husbandry.

LUCIA (St.), one of the Caribbee iſlands in the Weſt Indies, about 22 miles long, and 11 broad, the middle of it lying in N. lat. 39. 14. W. lon. 27. 0. It was firſt ſettled by the French in 1650; but was reduced by the Engliſh in 1664, who evacuated it in 1666. The French immediately re-ſettled the iſland, but were again driven away by the Caribbs. As ſoon as the ſavages were gone the former inhabitants returned, but only for a ſhort time; for, being afraid of falling a prey to the firſt privateer that ſhould viſit their coaſts, they removed either to other French ſettlements that were ſtronger, or which they might expect to be better defended. There was then no regular culture or colony at St. Lucia; it was only frequented by the inhabitants of Martinico, who came thither to cut wood and to build canoes, and who had conſiderable docks on the iſland. In 1718 it was again ſettled by the French; but four years after, it was given by the court of London to the duke of Montague, who was ſent to take poſſeſſion of it. This occaſioned ſome diſturbance between the two courts; which was ſettled, however, by an agreement made in 1731, that, till the reſpective claims ſhould be finally adjuſted, the iſland ſhould be evacuated by both nations, but that both ſhould wood and water there. This precarious agreement furniſhed an opportunity for private intereſt to exert itſelf. The Engliſh no longer moleſted the French in their habitations; but employed them as their aſſiſtants in carrying on with richer colonies a ſmuggling trade, which the ſubjects of both governments thought equally advantageous to them. This trade has been more or leſs conſiderable till the treaty of 1763, when the property of St. Lucia was ſecured to the crown of France. After that time the colony flouriſhed conſiderably. In the beginning of the year 1772, the number of white people amounted to 2018 ſouls, men, women, and children; that of the blacks to 663 freemen, and 12,795 ſlaves. The cattle conſiſted of 928 mules or horſes, 2070 head of horned cattle, and 3184 ſheep or goats. There were 38 ſugar plantations, which occupied 978 pieces of land; 53,95,889 coffee-trees; 1,321,600 cocoa plants; and 367 plots of cotton. There were 706 dwelling places. The annual revenue at that time was about 175,000l. which, according to the Abbé Raynal, muſt have increaſed one-eighth yearly for ſome time. It was taken by the Britiſh fleet under admirals Byron and Barrington, in the year 1778; but was reſtored to France at the peace of 1783.

The ſoil of St. Lucia is tolerably good, even at the ſea-ſide; and is much better the farther one advances into the country. The whole of it is capable of cultivation, except ſome high and craggy mountains which bear evident marks of old volcanoes. In one deep valley there are ſtill eight or ten ponds, the water of which boils up in a dreadful manner, and retains ſome of its heat at the diſtance of 6000 toiſes from its reſervoirs. The air in the inland parts, like that of all other uninhabited countries, is foul and unwholeſome; but grows leſs noxious as the woods are cleared and the ground laid open. On ſome parts of the ſea-coaſt, the air is ſtill more unhealthy, on account of ſome ſmall rivers which ſpring from the foot of the mountains, and have not ſufficient ſlope to waſh down the ſands with which the influx of the ocean ſtops up their mouths; by which means they ſpread themſelves into unwholeſome marſhes on the neighbouring grounds.

Lucia (St.), a high and mountainous iſland of Africa, and one of thoſe of Cape Verde, is about nine leagues long, and lies in the latitude of 16° 18′ N. according to the Engliſh geographers; but according to all others, it is a degree farther to the northward. On the eaſt-ſouth-eaſt ſide is a harbour, with a bottom and ſhore of white ſand; but its beſt road is oppoſite to St. Vincent's to the ſouth-weſt, where there are at leaſt 20 fathoms of water. On the weſt ſide there is no water: it abounds with goats, ſea and land fowl, tortoiſes, &c. but whether it hath any inhabitants is not certainly known.

LUCIAN, a celebrated Greek author in the firſt century, was born at Samoſata, of obſcure parents, in the reign of the emperor Trajan. He ſtudied law, and practiſed ſome time as an advocate; but growing weary of the wrangling oratory of the bar, he commenced rhetorician. He lived to the time of Marcus Aurelius, who made him regiſter of Alexandria in Egypt; and, according to Suidas, he was at laſt worried by dogs. Lucian was one of the fineſt wits in all antiquity. His dialogues, and other works, are written in Greek. In theſe he has joined the uſeful to the agreeable, inſtruction to ſatire, and erudition to elegance; and we every where meet with that fine and delicate raillery which characteriſes the Attic taſte.—Thoſe who cenſure him as an impious ſcoffer at religion, have reaſon on their ſide, if religion conſiſted in the theology of the Pagan poets, or in the extravagant opinions of philoſophers; for he perpetually throws ſuch ridicule on the gods and philoſophers, with their vices, as inſpires hatred and contempt for them; but it cannot be ſaid that he writes any where againſt an over-ruling providence.

LUCIANISTS, or Lucanists, a religious ſect, ſo called from Lucianus, or Lucanus, a heretic of the ſecond century, being a diſciple of Marcion, whoſe errors he followed, adding ſome new ones to them. Epiphanius ſays he abandoned Marcion; teaching that people ought not to marry, for fear of enriching the Creator: and yet other authors mention that he held this error in common with Marcion and other Gnoſtics.

He denied the immortality of the ſoul; aſſerting it to be material. There was another ſect of Lucianiſts, who appeared ſome time after the Arians. They taught, that the Father had been a Father always, and that he had the name even before he begot the Son; as having in him the power or faculty of generation: and in this manner they accounted for the eternity of the Son.

LUCID INTERVALS, the fits of lunatics or maniacs, wherein the phrenſy leaves them in poſſeſſion of their reaſon.

LUCIFER, according to the poets, was the ſon of Jupiter and Aurora: in aſtronomy, Lucifer is the bright planet Venus, which either goes before the ſun in the morning, and is our morning ſtar; or in the evening follows the ſun, and then is called *Heſperus* or the evening ſtar.

LUCIFERA, in mythology, a ſurname given to Diana, under which title ſhe was invoked by the Greeks in childbed. She was repreſented as covered with a large veil, interſperſed with ſtars, bearing a creſcent on her head, and holding in her hand a lighted flambeau.

LUCIFERIANS, a religious ſect, who adhered to the ſchiſm of Lucifer, biſhop of Cagliari, in the fourth century, who was baniſhed by the emperor Conſtantius for having defended the Nicene doctrine concerning the three perſons in the godhead.—St. Auguſtine ſeems to intimate, that they believed the ſoul, which they conſidered as of a carnal nature, to be tranſmitted to the children from their fathers. Theodoret ſays, that Lucifer was the author of a new error. The Luciferians increaſed mightily in Gaul, Spain, Egypt, &c. The occaſion of the ſchiſm was, that Lucifer would not allow any acts he had done to be aboliſhed. There were but two Luciferian biſhops, but a great number of prieſts and deacons. The Luciferians bore a peculiar averſion to the Arians.

LUCILIUS (CAIUS), a Roman knight and Latin poet, was born at Sueſſa in Italy, about 140 B. C. He ſerved under Scipio Africanus in the war with the Numantines; and was in great favour with that celebrated general, and with Lælius. He wrote 30 books of ſatires, in which he laſhed ſeveral perſons of quality very ſharply. Some learned men aſcribe the invention of ſatire to him; but M. Dacier has maintained, with great probability, that Lucilius only gave a better turn to that kind of poetry, and wrote it with more wit and humour than his predeceſſors Ennius and Pacuvius had done. His fragments have been carefully collected by Francis Douza at Leyden in 1599, with notes. But they require ſtill to be better illuſtrated by ſome learned critic.

LUCINA, a goddeſs among the Romans, who preſided over women in labour. Some take her to be Diana, others Juno. She is called *Lucina*, becauſe ſhe brought children to the light; from the Latin word *lux*, "light."

LUCIUS, in ichthyology. See ESOX.

LUCONIA. See MANILA.

LUCOPHEREA, in ichthyology. See PERCA.

LUCRETIA, the famous Roman matron, wife of Collatinus, and the cauſe of the revolution in Rome from a monarchy to a republic. This lady being raviſhed by Sextus, the eldeſt ſon of Tarquin king of Rome, ſtabbed herſelf, 509 B. C. The bloody poniard, with her dead body expoſed to the ſenate, was the ſignal of Roman liberty; the expulſion of the Tarquins, and abolition of the regal dignity, was inſtantly reſolved on, and carried into execution.

LUCRETIUS, or TITUS LUCRETIUS CAIUS, one of the moſt celebrated of the Latin poets, was born of an ancient and noble Roman family, and ſtudied at Athens, where he became one of Epicurus's ſect. He acquired great reputation by his learning and eloquence; but in the flower of his age fell into a phrenſy, occaſioned by a philtre given him by his wife, who was diſtractedly fond of him. Lucretius, during the intervals of his madneſs, put Epicurus's doctrines into verſe, and compoſed his ſix books *De rerum natura*, which are ſtill extant. It is ſaid that he killed himſelf in a fit of madneſs, in the 54th year before the Chriſtian æra, when 51 years old. The moſt correct edition of Lucretius is that of Simon de Coline. The cardinal de Polignac has refuted Lucretius's arguments in his excellent Latin poem entitled *Anti-Lucretius*. His poem *De rerum natura* has been tranſlated into Engliſh by Mr. Creech.

LUCRINUS LACUS (anc. geog.), a lake of Campania, between Baiæ and Puteoli, famous for its oyſters (Horace, Martial, Juvenal); *Lucrinenſes* (Cicero), the people dwelling on it. Now a perfect bay ſince the earthquake in 1538.

LUCULLUS (LUCIUS LUCINIUS), a Roman general, celebrated for his eloquence, his victories, and his riches. In his youth he made a figure at the bar; and being afterwards made quæſtor in Aſia, and prætor in Africa, governed thoſe provinces with great moderation and juſtice. Scarce was he known as a military man, when he twice beat the fleet of Amilcar, and gained two great victories over him. His happy genius was greatly improved by ſtudy; for he employed his leiſure in reading the beſt authors on military affairs. Being made conſul with Aurelius Cotta, during the third war with Mithridates king of Pontus, he was ſent againſt this prince; and this expedition was attended with a ſeries of victories, which did him leſs honour than an act of generoſity towards his colleague; who, willing to take advantage of his abſence to ſignalize himſelf by ſome great exploit, haſtened to fight Mithridates; but was defeated and ſhut up in Calcedonia; where he muſt have periſhed, if Lucullus, ſacrificing his reſentment to the pleaſure of ſaving a Roman citizen, had not flown to his aſſiſtance, and diſengaged him. All Pontus then ſubmitted to Lucullus; who being continued in his government of Aſia, entered the territories of Tigranes, the moſt powerful king in Aſia. That prince marched with a formidable army againſt Lucullus: who defeated him with a handful of men, and killed great numbers of his forces; took Tigranocertes, the capital of his kingdom; and was ready to put an end to the war, when the intrigues of a tribune got him depoſed, and Pompey nominated in his room. Lucullus having brought home prodigious riches, now gave himſelf up to exceſſive luxury; and his table was ſerved with a profuſion till that time unknown. He brought from the Eaſt a great number of books, which he formed into a library, and gave admittance to all men of learning, who frequented it in great numbers. Toward the end of his life, he fell into a kind of madneſs; and Lucullus, his brother, was appointed his guardian. He is ſaid to have been the firſt who brought cherries into Europe, having brought the grafts from the kingdom of Pontus.

LUCUS, in general, denotes a wood or grove ſacred to a deity; ſo called *a lucendo*, becauſe a great number of lights were uſually burning in honour of the god (Iſidorus); a practice common with idolaters, as we learn from ſcripture: hence Homer's αγλαον αλσος.

LUD, a Britiſh king mentioned in our old chronicles, and ſaid to have reigned about the year of the world 3878. He is reported to have enlarged and walled about *Troynovant*, or New Troy, where he kept his court, and made it his capital. The name of *London* is hence derived from *Lud's town*; and *Ludgate*, from his being buried near it: but this is only one among many other derivations of the name of London; which are at leaſt equally probable. See LONDON.

LUDI, a term uſed for ſhows and public repreſentations made by the Romans, for the entertainment of the people. See GAMES. For an account of the particular games of Greece and Rome, as the Iſthmian, Nemæan, Olympic, &c. ſee ISTHMIAN, &c.

LUDIUS, a celebrated painter, lived in the reign of Auguſtus Cæſar, and excelled in grand compoſitions. He was the firſt who painted the fronts of houſes in the ſtreets of Rome; which he beautified with great variety of landſcapes, and many other different ſubjects.

LUDLOW (Edmund), ſon of Sir Henry Ludlow, was born at Maidenhead, and educated in Trinity college, Oxford. His father oppoſing the king's intereſt, Mr. Ludlow joined with the ſame party, and was preſent at the battle of Edgehill as a volunteer under the earl of Eſſex. Upon the death of his father he was choſen knight of the ſhire for Wilts, and obtained the command of a regiment of horſe for the defence of that county. He was one of king Charles the firſt's judges: after whoſe death he was ſent by the parliament into Ireland, in quality of lieutenant-general of the horſe; which employment he diſcharged with diligence and ſucceſs till the death of the lord-deputy Ireton, when he acted for ſome time as general, though without that title; Cromwell, who knew him to be ſincerely in the intereſt of the commonwealth, always finding out ſome pretext to hinder the conferring of that character upon him. The laſt ſtroke had been given by Ludlow to the Iriſh rebellion, if the uſurpation of Cromwell had not prevented it. Under his power he never acted; and though Cromwell uſed his utmoſt efforts, he remained inflexible. After Cromwell's death, he endeavoured to reſtore the common-wealth; but Charles II. being recalled, he thought proper to conceal himſelf, and eſcaped into Switzerland, where he ſettled. After the revolution, he came over into England, in order to be employed in Ireland againſt king James; but appearing publicly in London, it gave great offence; and an addreſs was preſented by Sir Edward Seymour to king William III. for a proclamation in order to apprehend Colonel Ludlow, attainted for the murder of king Charles I. Upon this he returned to Switzerland, where he died. During his retirement in Switzerland he wrote his Memoirs.

Ludlow, a town of Shropſhire, ſituated at the conflux of the rivers Teme and Corve, 18 miles from Shrewſbury, and 138 from London. The preſident of the council of the marches, eſtabliſhed by Henry VIII. generally kept his courts in it, by which the town was much benefited, theſe courts not having been aboliſhed till the 1ſt of William and Mary. Its neighbourhood to Wales makes it a great thoroughfare, and engages many of the Welch to ſend their children of both ſexes to it for education. It was incorporated by Edward IV. and among other privileges has that of trying and executing criminals within itſelf. It is one of the neateſt towns in England, with walls and ſeven gates. It is divided into four wards; and is governed by 2 bailiffs, 12 aldermen, 25 common-councilmen, a recorder, a town-clerk, ſteward, chamberlain, coroner, &c. From the caſtle on the top of the hill on which the town ſtands is a moſt delightful proſpect. In an apartment of the outer gatehouſe Samuel Butler is ſaid to have written the firſt part of Hudibras. Of this caſtle, which was beſieged and taken by king Stephen, ſome of the offices are fallen down, and great part of it turned into a bowling-green: but part of the royal apartments and the ſword of ſtate are ſtill left. The walls were at firſt a mile in compaſs, and there was a lawn before it for near two miles, of which much is now incloſed. The battlements are very high and thick, and adorned with towers. It has a neat chapel, where are the coats of arms of abundance of Welch gentry, and over the ſtable-doors are the arms of queen Elizabeth, the earls of Pembroke, &c. This caſtle was a palace of the prince of Wales, in right of his principality. The river Teme has a good bridge over it, ſeveral wears acroſs it, and turns a great many mills. Here is a large parochial church, which was formerly collegiate; in the choir whereof is an inſcription relating to prince Arthur, elder brother to king Henry VIII. who died here, and whoſe bowels were here depoſited, though it is ſaid his heart was taken up ſome time ago in a leaden box. In this choir is a cloſet, commonly called *God's Houſe*, where the prieſts uſed to keep their conſecrated utenſils; and in the market-place is a conduit, with a long ſtone croſs on it, and a niche wherein is the image of St. Laurence, to whom the church was dedicated. On the north ſide of the town there was a rich priory, whereof there are few ruins to be ſeen except thoſe of its church. Here are an alms-houſe for 30 poor people, and two charity-ſchools where 50 boys and 30 girls are both taught and clothed. It has a market on Monday, and three leſſer ones on Wedneſday, Friday, and Saturday. Its fairs are on the Eaſter Tueſday, Whit-Wedneſday, Auguſt 21, Sept. 28, and Dec. 8. Proviſions are very cheap here; and at the annual horſe-races there is the beſt of company. The country round is exceedingly pleaſant, fruitful, and populous, eſpecially that part called the *Corveſdale*, being the vale on the banks of the river Corve. Ludlow ſends two members to parliament.

LUDOLPH (Job), a very learned writer of the 17th century, was born at Erfurt in Thuringia. He travelled much, and was maſter of 25 languages; viſited libraries, ſearched after natural curioſities and antiquities every where, and converſed with learned men of all nations. He publiſhed a Hiſtory of Ethiopia, and other curious books.

Ludolph (Henry William), nephew of Job above-mentioned, was born at Erfurt in 1655. He came over to England as ſecretary to M. Lenthe, envoy from the court of Copenhagen to that of London; and being recommended to Prince George of Denmark, was received as his ſecretary. He enjoyed this office for ſome years, until he was incapacitated by a violent diſorder; when he was diſcharged with a handſome penſion: after he recovered, he travelled into Muſcovy, where he was well received by the czar, and where his knowledge made the Muſcovite prieſts ſuppoſe him to be a conjuror. On his return to London in 1694, he was cut for the ſtone; and as ſoon as his health would permit, in acknowledgement of the civilities he had received in Muſcovy, he wrote a grammar of their language, that the natives might learn their own tongue in a regular method. He then travelled into the Eaſt, to inform himſelf of the ſtate of the Chriſtian church in the Levant; the deplorable condition of which induced him, after his return, with the aid of the biſhop of Worceſter, to print an edition of the New Teſtament in the vulgar Greek, to preſent to the Greek church. In 1709, when ſuch numbers of Palatines came over to England, Mr. Ludolph was appointed by queen Anne one of the commiſſioners to manage the charities raiſed for them; and he died early the following year. His collected works were publiſhed in 1712.

LUDWIGIA, in botany: A genus of the monogynia order, belonging to the tetrandria claſs of plants; and in the natural method ranking under the 17th order, *Calycanthemæ*. The corolla is tetrapetalous; the calyx quadripartite, ſuperior; the capſule tetragonal, quadrilocular, inferior, and polyſpermous.

LUES, among phyſicians, is in general uſed for a diſeaſe of any kind; but in a more particular ſenſe is reſtrained to contagious and peſtilential diſeaſes: thus the *lues venerea*, ſignifies the venereal diſeaſe.

LUFF, the order from the pilot to the ſteerſman to put the helm towards the *lee*-ſide of the ſhip, in order to make the ſhip ſail nearer the direction of the wind. Hence, luff round, or luff a-lee, is the exceſs of this movement, by which it is intended to throw the ſhip's head up in the wind, in order to tack her, &c. A ſhip is accordingly ſaid to ſpring her luff

when ſhe yields to the effort of the helm, by ſailing nearer to the line of the wind than ſhe had done before. See alſo HAULING *the Wind*.

LUFF-*Tackle*, a name given by ſailors to any large tackle that is not deſtined for a particular place, but may be variouſly employed as occaſion requires. It is generally ſomewhat larger than the jigger tackle, although ſmaller than thoſe which ſerve to hoiſt the heavier materials into and out of the veſſel, which latter are the main and fore-tackles, the ſtay and quarter-tackles, &c.

LUG-SAIL, a ſquare ſail, hoiſted occaſionally on the maſt of a boat or ſmall veſſel upon a yard which hangs nearly at right angles with the maſt. Theſe are more particularly uſed in the barca longas, navigated by the Spaniards in the Mediterranean.

LUGDUNUM (anc. geog.), the capital of the Seguſiani in Gallia Celtica, ſituated at the conflux of the Arar and Rhodanus, on an eminence, as the Celtic term *dune* ſignifies; built by Manutius Plancus under Auguſtus, while commanding in that part of Gaul; and whither he led a colony. Now *Lyons*, capital of the Lyonois.

LUGDUNUM *Batavorum* (anc. geog.), a town of the Batavi in Gallia Belgica. Now *Leyden* in Holland.

LUGDUNUM *Convenarum* (anc. geog.), a town of Gaul in Aquitain, at the foot of the Pyrenees. Now *St. Bertrand*, in Gaſcony.

LUGEUS LACUS (anc. geog.), a lake of Japydia, the weſtmoſt diſtrict of Illyricum, to the ſouth of the Save, and near the head of the Arſia. Now commonly called the *Zirichnitz Lake*, from a ſmall adjoining town. It is locked on every ſide with mountains; from which ſcanty currents run down; the leſs in quantity their waters, becauſe drank up by the earth; till at length they are ſwallowed up in rocky furrows, ſo formed as to reſemble artificial. In theſe the water being ſo redundant as to refuſe receiving any more, they regurgitate, and return the water with extraordinary celerity; which thus ſpreading itſelf, forms a lake, in moſt places 18 cubits high. Theſe waters afterwards retire with no leſs celerity than they came on, not only through the furrows, but paſs through the whole of the bottom, as through a ſieve; which when perceived by the inhabitants, they directly ſtop up the larger apertures, and thus take large quantities of fiſh: when the lake is dry, they cut down their harveſt on the ſpot where they ſowed, and ſow again before the inundation comes on: and graſs ſhoots ſo quickly on it, that it may be cut down in three weeks time (Lazius Wernherus).

LUGGERSHALL, a borough of Wiltſhire, 12 miles north of Saliſbury, and 75 north by weſt of London. It is an ancient borough by preſcription, though but a ſmall hamlet, near the foreſt of Chute, in a delightful country; and was the reſidence of ſeveral kings. It had formerly a caſtle. It is governed by a bailiff choſen yearly at the lord of the manor's court-leet. On the neighbouring downs there uſed to be horſe races. It has a fair on the 25th of July, and ſends two members to parliament.

LUKE (St.), the evangeliſt, and the diſciple of the apoſtles, was originally of Antioch in Syria, and by profeſſion a phyſician. He particularly attached himſelf to St. Paul, and was his faithful companion in his travels and labours. He went with him to Troas in Macedonia about the year 51. He wrote his Goſpel in Achaia about the year 53; and, ten years after, the Acts of the Apoſtles, which contains a hiſtory of 30 years. Of all the inſpired writers of the New Teſtament, his works are written in the moſt elegant Greek. It is believed that St. Luke died at Rome, or in Achaia.

Goſpel of St. LUKE, a canonical book of the New Teſtament. Some think that it was properly St. Paul's Goſpel; and that, when the apoſtle ſpeaks of *his* Goſpel, he means what is called *St. Luke*'s. Irenæus ſays, that St. Luke digeſted into writing what St. Paul preached to the Gentiles; and Gregory Nazianzen tells us, that St. Luke wrote with the aſſiſtance of St. Paul.

St. LUKE *the Evangeliſt's Day*, a feſtival in the Chriſtian church, obſerved on the 18th of October.

LULA, a town of Swediſh Lapland; ſeated at the mouth of the river Lula, on the weſt ſide of the gulph of Bothnia, 42 miles ſouth-weſt of Tornea. E. lon. 21. 0. N. lat. 64. 30.

LULA *Lapmark*, a province of Swediſh Lapland; bounded by that of Tornea on the north, by the Bothnic Gulph on the eaſt, by Pithia Lapmark on the ſouth, and Norway on the weſt.

LULLI (JOHN BAPTIST), the moſt celebrated and moſt excellent muſician that has appeared in France ſince the revival of learning, was born at Florence. He was taken to France when very young by a perſon of quality: and he carried the art of playing on the violin to the higheſt perfection. Louis XIV. made him ſuperintendant of muſic. Some time after Perinna having introduced operas into France, and quarrelling with his company, he reſigned his privilege to Lulli. Operas were then carried to the utmoſt perfection by this celebrated muſician, and were attended with continual applauſe. Lulli every year, after this time, gave a piece of his own compoſition, till his death, which happened in 1687.

LULLY (RAYMOND), a famous writer, ſurnamed the *Enlightened Doctor*, was born in the iſland of Majorca in 1225. He applied himſelf with indefatigable labour to the ſtudy of the Arabian philoſophy, to chemiſtry, phyſic, and divinity; and acquired great reputation by his works. He at length went to preach the goſpel in Africa; and was ſtoned to death in Mauritania, at the age of 80. He is honoured as a martyr at Majorca, whither his body was carried. He wrote many treatiſes on all the ſciences, in which he ſhows much ſtudy and ſubtilty, but little judgment or ſolidity. A complete edition of his works has been printed at Mentz.—He ought not to be confounded with Raymond Lully of Terraca, ſurnamed *Neophyta*, who from being a Jew turned Dominican friar. This laſt Lully maintained ſeveral opinions that were condemned by Pope Gregory XI.

LUMBAGO, a fixed rheumatic pain in the ſmall of the back. See MEDICINE.

LUMBARIS, a name given to the arteries and veins which ſpread over the loins.

LUMBRICAL, a name given to four muſcles of the fingers and to as many of the toes.

LUMBRICUS, the WORM, in zoology: a genus of inſects belonging to the order of vermes inteſtina. The body is cylindrical, annulated, with an elevated belt near the middle, and a vent-hole on its ſide. There are two ſpecies of this animal. 1. Lumbricus *terreſtris*, the earth or dew-worm, Mr. Barbut obſerves, differs extremely in colour and external appearance in the different periods of its growth, which has occaſioned people little acquainted with the variations of this kind of animals to make four or five different ſpecies of them. The general colour is a duſky red. They live under ground, never quitting the earth but after heavy rains or at the approach of ſtorms, and in the ſeaſon of their amours. The method to force them out is, either to water the ground with infuſions of bitter plants, or to trample on it. The bare motion on the ſurface of the ſoil drives them up, in fear of being ſurpriſed by their formidable enemy the mole. The winding progreſſion of the worm is facilitated by the inequalities of its body, armed with ſmall, ſtiff, ſharp-pointed briſtles: when it means to inſinuate itſelf into the earth, there oozes from its body a clammy liquor, by means

of which it ſlides down. It never damages the roots of vegetables. Its food is a ſmall portion of earth, which it has the faculty of digeſting. The ſuperfluity is ejected by way of excrement, under a vermicular appearance. Earth-worms are hermaphrodites, and have the parts of generation placed near the neck: their copulation is performed on the ground; nothing being more uſual than to ſee it full of holes, which holes are thought to be made by thoſe kind of worms coming to the ſurface in queſt of females. During their coition they would ſooner ſuffer themſelves to be cruſhed than parted. 2. The *marinus*, marine worm, or lug (ſee plate 10.), is of a pale red colour, and the body is compoſed of a number of annular joints; the ſkin is ſcabrous, and all the rings or joints are covered with little prominences, which render it extremely rough to the touch. It is an inhabitant of the mud about the ſea-ſhores, and ſerves for food to many kinds of fiſh: ſurpriſing large ones are to be met with about the Bognor rocks in Suſſex. The fiſhermen bait their hooks and nets with it. For the effects of theſe animals in the human body, and the method of expelling them, ſee MEDICINE.

LUMELLO, a village in Italy, which gives name to the Lumellin, a ſmall diſtrict in the duchy of Milan, lying along the river Po, and of which Mortaria and Valencia are the principal places. It was ceded to the duke of Savoy in 1707, and confirmed by the treaty of Utrecht in 1713. E. lon. 8. 42. N. lat. 45. 5.

LUMINOUS, an epithet applied to any thing that ſhines or emits light.

LUMINOUS *Emanations*, have been obſerved from human bodies, as alſo from thoſe of brutes. The light ariſing from currying a horſe, or from rubbing a cat's back, are known to moſt. Inſtances of a like kind have been known on combing a woman's head. Bartholin gives us an account, which he entitles *mulier ſplendens*, of a lady in Italy whoſe body would ſhine whenever ſlightly touched with a piece of linen. Theſe effluvia of animal bodies have many properties in common with thoſe produced from glaſs; ſuch as their being lucid, their ſnapping, and their not being excited without ſome degree of friction; and are undoubtedly electrical, as a cat's back has been found ſtrongly electrical when ſtroked. See ELECTRICITY, and LIGHT.

LUMINOUSNESS OF THE SEA. See LIGHT, and SEA.

LUMINOUSNESS *of Putrefcent Subſtances*. See LIGHT.

LUMP-FISH. See CYCLOPTERUS.

LUNA (anc. geog.), a foreſt of Germany, at no great diſtance from the Hercynia; below which were the Boemi: it was therefore in Moravia, near the ſprings of the Marus, now March, which runs into the Danube over againſt Carnutum.

LUNA, or *Lunna*, a town of Gallia Celtica. Now *Clugny* in Burgundy.

LUNA, a town and port of Liguria, at the mouth of the Macra. The town was but ſmall, but the port large and beautiful, according to Strabo. Now extinct, and its ruins called *Luna Diſtrutta*. It was famous for its quarries of white marble, thence called *Lunenſe*; and for its cheeſe, remarkable rather for its ſize than goodneſs, each being a thouſand weight.

LUNA, in aſtronomy, the moon. See ASTRONOMY.

LUNA, in the jargon of the alchemiſts, ſignifies *ſilver*; ſo called from the ſuppoſed influence of the moon thereupon.

LUNA *Cornea*, in chemiſtry, is the combination of marine acid with ſilver. See CHEMISTRY.

LUNACY, a ſpecies of madneſs. See LUNATIC, and MEDICINE.

LUNACY, in law. See IDIOCY, and LUNATIC.

LUNÆ MONS (anc. geog.), a promontory of Luſitania. Now *Rock of Liſbon*. W. lon. 10. N. lat. 38. 50.—Another *Lunæ Mons* of Ethiopia, from which the Nile was ſuppoſed to take its riſe.

LUNÆ *Portus*, a very extenſive port, or more truly a bay, of Liguria, between Portus Veneris and Portus Ericis, 20 miles in compaſs. Now *il Golfo della Spezia*, on the eaſt coaſt of the territory of Genoa.

LUNAR, ſomething relating to the MOON.

LUNAR *Month*. See MONTH.

LUNAR *Year*, conſiſts of 354 days, or 12 ſynodical months. See YEAR.

LUNARE OS, in anatomy, is the ſecond bone in the firſt row of the carpus. It has its name from the Latin, *luna* "the moon," becauſe one of its ſides is in form of a creſcent.

LUNARIA, SATTIN-FLOWER, or *Moonwort*, in botany: A genus of the ſiliculoſa order, belonging to the tetradynamia claſs of plants; and in the natural method ranking under the 39th order, *Siliquoſæ*. The ſilicula is entire, elliptical, compreſſed-plane, and pedicellated, with the valves equal to the partition, parallel and plane; the leaves of the calyx are alternately fritted at the baſe. This plant is famous in ſome parts of the kingdom for its medicinal virtues, though it has not the fortune to be received in the ſhops. The people in the northern countries dry the whole plant in an oven, and give as much as will lie on a ſhilling for a doſe twice a day in hemorrhages of all kinds, particularly in the too abundant flowing of the menſes, and with great ſucceſs. The Welch, among whom it is not uncommon, Dr. Needham informs us, make an ointment of it, which they uſe externally, and pretend it cures dyſenteries.

LUNARIUM (anc. geog.), a promontory of the Hither Spain, between Blanda and Bætulo. Commonly called *el Cabo de Palafugel*, in Catalonia, on the Mediterranean; or *Cabo de Toſa*, on the ſame coaſt, and in Catalonia, 15 miles from the former to the weſt.

LUNATIC, a perſon affected with that ſpecies of madneſs termed *lunacy*. The word is indeed properly applied to one that hath lucid intervals; ſometimes enjoying his ſenſes, and ſometimes not; and that frequently ſuppoſed to depend on the influence of the moon.

LUNATIC, in law. Under the general term of *non compos mentis* (which Sir Edward Coke ſays is the moſt legal name) are comprized not only lunatics, but perſons under phrenſies, or who loſe their intellects by diſeaſe; thoſe that *grow* deaf, dumb, and blind, not being *born* ſo; or ſuch, in ſhort, as are judged by the court of chancery incapable of conducting their own affairs. To theſe alſo, as well as idiots, the king is guardian, but to a very different purpoſe. For the law always imagines, that theſe accidental misfortunes may be removed; and therefore only conſtitutes the crown a truſtee for the unfortunate perſons, to protect their property, and to account to them for all profits received, if they recover, or after their deceaſe to their repreſentatives. And therefore it is declared by the ſtatute 17 Edw. II. c. 10. that the king ſhall provide for the cuſtody and ſuſtentation of lunatics, and preſerve their lands, and the profits of them, for their uſe when they come to their right mind; and the king ſhall take nothing to his own uſe: and if the parties die in ſuch eſtate, the reſidue ſhall be diſtributed for their ſouls by the advice of the ordinary, and of courſe (by the ſubſequent amendments of the law of adminiſtrations) ſhall now go to their executors or adminiſtrators.

On the firſt attack of lunacy, or other occaſional inſanity, when there may be hopes of a ſpeedy reſtitution of reaſon, it is uſual to confine the unhappy objects in private cuſtody under the direction of their neareſt friends and relations: and the legiſlature, to prevent all abuſes incident to ſuch private

cuſtody, hath thought proper to interpoſe its authority, by 14 Geo. III. c. 49. for regulating private mad-houſes. But when the diſorder is grown permanent, and the circumſtances of the party will bear ſuch additional expence, it is thought proper to apply to the royal authority to warrant a laſting confinement.

The method of proving a perſon *non compos* is very ſimilar to that of proving him an idiot. The lord chancellor, to whom, by ſpecial authority from the king, the cuſtody of idiots and lunatics is intruſted, upon petition or information, grants a commiſſion in the nature of the writ *de idiota inquirendo*, to inquire into the party's ſtate of mind; and if he be found *non compos*, he uſually commits the care of his perſon, with a ſuitable allowance for his maintenance, to ſome friend, who is then called his committee. However, to prevent ſiniſter practices, the next heir is ſeldom permitted to be of this committee of the perſon; becauſe it is his intereſt that the party ſhould die. But, it hath been ſaid, there lies not the ſame objection againſt his next of kin, provided he be not his heir; for it is his intereſt to preſerve the lunatic's life, in order to increaſe the perſonal eſtate by ſavings, which he or his family may hereafter be entitled to enjoy. The heir is generally made the manager or committee of the eſtate, it being clearly his intereſt by good management to keep it in condition: accountable, however, to the court of chancery, and to the *non compos* himſelf, if he recovers; or otherwiſe, to his adminiſtrators. See IDIOCY.

LUNATION, the period or ſpace of time between one new moon and another; alſo called *ſynodical month*. See CYCLE and EPACT.

LUNDEN, or LUND, a conſiderable town of Sweden, in Gothland; and capital of the territory of Schonen, with an archbiſhop's ſee and an univerſity. It was ceded to the Swedes by the Danes in 1658. E. lon. 13. 25. N. lat. 55. 40.

LUNDY ISLAND, ſituated 50 miles in the ſea, off the N.W. coaſt of Devonſhire, is 3 miles long and 2 broad, but ſo encompaſſed with inacceſſible rocks, that it has but one entrance to it, ſo narrow that two men can ſcarce go abreaſt. It is reckoned in the hundred of Branton. It had once both a fort and a chapel. The ſouth part of it is indifferent good ſoil; but the north part of it is barren, and has a high pyramidical rock called the Conſtable. Here are horſes, kine, hogs, and goats, with great ſtore of ſheep and rabbits; but the chief commodity is fowl, with which it abounds much, their eggs being very thick on the ground at their ſeaſon of breeding. No venomous creature will live in this iſland. In the reign of King Henry VIII. one William Moriſco, who had conſpired to murder him at Woodſtock, fled to this iſland, which he fortified, turned pirate, and did much damage to this coaſt; but was taken by ſurpriſe at length, with 16 of his accomplices, and put to death.

LUNE, LUNULA, in *Geometry*, a plane in form of a creſcent or half-moon, terminated by the circumference of two circles that interſect each other within.

LUNENBURG, or LUNEBURG *Zell*, a principality of Germany, bounded to the ſouth by that of Calenberg, the diocеſe of Hildeſheim, and the duchy of Brunſwic; to the north, by the duchy of Lauenburg and the Elbe, by the laſt of which it is ſeparated from the territory of the imperial city of Hamburg; to the eaſt, by the duchy of Brunſwic, the Altc Mark, and the duchy of Mecklenburg; and to the weſt, by the duchies of Bremen and Verden, the county of Hoya, and the principality of Calenberg. The ſoil, except along the Elbe, Aller, and Jetz, is either ſand, heath, or moors. In the more fruitful parts of it are produced wheat, rye, barley, oats, peaſe, buck-wheat, flax, hemp, hops, pulſe, oak, beech, firs, pines, birch, and alder, together with black cattle and horſes. The heaths abound with bees and honey, and a ſmall kind of ſheep whoſe wool is long and coarſe. Lunenburg is well furniſhed with ſalt ſprings and limeſtone, and the foreſt of Gorde with veniſon. The rivers Elbe, Ilmenau, and Aller, are navigable; and conſequently very advantageous to the country, independent of the fiſh which they yield. The general diets of this principality are convened by the ſovereign twice a year, and held at Zell. They conſiſt of the deputies of the nobility and the towns of Lunenburg, Uelzen, and Zell, who have the nomination of the members of the high colleges, and other officers, jointly with the ſovereign. There are near 200 Lutheran churches in the country, under two general and 15 ſubordinate ſuperintendants, ſeveral grammar-ſchools, two Calviniſt churches at Zell, and an academy of exerciſes at Lunenburg. The manufactures are chiefly linen cloth, cottons, ribbons, ſtockings, hats, ſtarch, bleached wax, refined ſugar, gold and ſilver wires, all kinds of wooden wares, barges, boats, and ſhips. The exports of theſe to Hamburg, Lubec, and Altena, are conſiderable. The neighbourhood of theſe cities, with the facility of conveying goods and merchandize to them and other places, either by land or water, is very advantageous to this country, and contributes greatly to its ſubſiſtence. On account of this principality, the king of Great Britain has a ſeat and voice both in the college of the princes of the empire and of the circle of Lower Saxony. Its quota in the Matricula is 20 horſes and 120 foot, or 720 florins in lieu of them. The revenues of the principality ariſe chiefly from the demeſnes, tolls on the Elbe, contributions, duties on cattle, beer, wine, brandy, and other commodities, which all together muſt be very conſiderable, ſome bailiwics alone yielding upwards of 20,000 rix-dollars.

LUNENBURG, the capital of the principality of the ſame name, is a pretty large town of Germany, on the river Elmen, or the Ilmenau, which is navigable from the town to the Elbe, at the diſtance of 13 miles. It is 27 miles from Hamburgh, 43 from Zell, 60 from Brunſwic, 76 from Bremen, 68 from Hanover; and ſtands in E lon. 10. 40. N. lat. 53. 28. Its inhabitants are reckoned at between 8000 and 9000. Formerly this town was one of the Hanſe, and an imperial city. Some derive its name from *Lina*, the ancient name of the Ilmenau; others from *Luna*, the moon, an image of which is ſaid to have been worſhipped by the inhabitants in the times of Paganiſm. Here were anciently ſeveral convents, viz. one of Minims, another of Premonſtratenſians, another of Benedictines, and a fourth of Minorites. Out of the revenues of the Benedictine monaſtery was founded an academy for the martial exerciſes, where young gentlemen of the principality of Lunenburg are maintained gratis, and taught French, fencing, riding, and dancing; but foreigners are educated at a certain fixed price. A Latin ſchool was alſo founded, conſiſting of four claſſes, and well endowed out of theſe revenues. The ſuperintendency and management of theſe, and the eſtates appropriated to their maintenance, belongs to the landſchaft director, and the aufreiter, who are both choſen from among the Luneburg nobility. The firſt came in place of the Popiſh abbot, and as ſuch is head of the ſtates of the principality, and preſident of the provincial college. He has the title of *excellency*; and in public inſtruments ſtyles himſelf, *by the grace of God landſchaft director*, and *lord of the manſion of St. Michael in Luneburg*. The chief public edifices are three pariſh-churches, the ducal palace, three hoſpitals, the town-houſe, the ſalt magazine, the anatomical theatre, the academy; the conventual church of St. Michael, in which lie interred the ancient dukes; and in which is the famous table eight feet long, and four wide, plated over with chaſed gold, with a rim embelliſhed with precious ſtones, of an immenſe value, which was taken from the Saracens by the emperor Otho, and preſented to this church; but in 1698, a gang of thieves

ſtripped it of 200 rubies and emeralds, together with a large diamond, and moſt of the gold, ſo that at preſent but a ſmall part of it remains. Here are ſome very rich ſalt-ſprings. Formerly, when there was a greater demand for the ſalt, upwards of 120,000 tons have been annually boiled here, and ſold off: but ſince the commencement of the preſent century, the ſalt trade hath declined greatly. A fifth of the ſalt made here belongs to the king, but is farmed out. It is ſaid to excel all the other ſalt made in Germany. This town is well fortified; and has a garriſon, which is lodged in barracks. In the neighbourhood is a good lime-ſtone quarry; and along the Ilmenau are warehouſes, in which are lodged goods brought from all parts of Germany, to be forwarded by the Ilmenau to Hamburg, or by the Aſche to Lubec, from whence other goods are brought back the ſame way. The town itſelf drives a conſiderable traffic in wax, honey, wool, flax, linen, ſalt, lime, and beer.

LUNENSE MARMOR, in the natural hiſtory of the ancients, the name of that ſpecies of white marble now known among us by the name of the *Carraru-marble*, and diſtinguiſhed from the ſtatuary kind by its greater hardneſs and leſs ſplendour. It was ever greatly eſteemed in building and ornamental works, and is ſo ſtill. It is of a very cloſe and fine texture, of a very pure white, and much more tranſparent than any other of the white marbles. It has always been found in great quantities in Italy, and is ſo to this day. See LUNA.

LUNETTE, in fortification, an enveloped counter-guard, or elevation of earth, made beyond the ſecond ditch, oppoſite to the places of arms; differing from the ravelins only in their ſituation. *Lunettes* are uſually made in ditches full of water, and ſerve to the ſame purpoſe as fauſſebrays, to diſpute the paſſage of the ditch. See FORTIFICATION.

LUNETTE, in the manege, is a half horſe-ſhoe, or ſuch a ſhoe as wants the ſpunge, *i. e.* that part of the branch which runs towards the quarters of the foot.

LUNETTE is alſo the name of two ſmall pieces of felt, made round and hollow, to clap upon the eyes of a vicious horſe that is apt to bite, and ſtrike with his fore feet, or that will not ſuffer his rider to mount him.

LUNGS, in anatomy, a part of the human body, ſerving for reſpiration. See ANATOMY. In the *Journal de Médicine* for June 1789 is a deſcription of an *Inſtrument for inflating the* LUNGS, invented by M. Gorcy phyſician to the military hoſpital at Neufbriſack, which appears to be extremely well adapted to the purpoſe, whilſt it may be uſed with the greateſt eaſe and facility. This inſtrument, which the inventor ſtyles *apodopic*, that is, "reſtorer of reſpiration," conſiſts of a double pair of bellows, BCLM, fig. 1. plate 9. the two different parts of which have no communication with each other. In the lower ſide B M, is an aperture A for a valve conſtructed on the principles of thoſe of Mr. Nairne's air-pump. It conſiſts of a rim of copper, cloſed at one end by a plate of the ſame metal, in which plate are ſeven ſmall holes placed at equal diſtances. This plate is covered with a piece of ſilk coated with elaſtic gum, in which are ſix tranſverſe inciſions of two or three lines in length. Each inciſion is ſo made as to be ſituated between two of the holes, and at an equal diſtance from each. See D, fig. 2. The ſilk muſt be made very ſecure, by a thread paſſing ſeveral times round the rim. It is obvious, that a ſtream of air applied to that ſide of the plate which is oppoſite the ſilk, will paſs through the holes, and, lifting up the ſilk, eſcape through the inciſions. On the contrary, a ſtream of air applied to the other ſide will preſs the ſilk upon the plate, and thus cloſe the holes, ſo that it will be impoſſible for it to paſs through them. This valve opens internally, ſo as to admit the air from without. At B is another valve, on the ſame conſtruction, but opening in a contrary direction, thus permitting the air to eſcape out of the lower part into the tube E F, but preventing its entrance. At C is another valve, opening internally to admit the air from the tube E F; and at D there is a fourth, opening externally, to diſcharge the air from the upper part.

The flexible tube E F, ſcrewed on at the end C B, being introduced into one of the noſtrils, whilſt the mouth and the other noſtril are cloſed by an aſſiſtant, if we ſeparate the two handles L M, which were cloſe together at the introduction of the tube, it is evident, that the air in the lungs will ruſh into the upper part through the valve C, whilſt the external air will fill the lower part through the valve A: the two handles being again brought into contact, the atmoſpheric air will be forced into the lungs through the valve B, and at the ſame time the air in the upper part will be diſcharged at the valve D. Thus by the alternate play of the double bellows, the lungs will be alternately filled and emptied as in reſpiration. In uſing the inſtrument, care ſhould be taken not to be too violent; as the more perfectly the natural motion of reſpiration is imitated the better.

To prevent any ſubſtances from without injuring the valves A, D, fig. 1, the rim is made with a ſcrew, B, fig. 3. in order to receive a cap A A, fig. 3. full of ſmall holes. This ſcrew has alſo another uſe. If dephlogiſticated air be preferred, a bladder filled with it, fig. 4. may, by means of the ſcrew A, be faſtened to the valve A, fig. 1; and, to prevent waſte, as this air may ſerve ſeveral times, a flexible tube may be ſcrewed on the valve D, fig. 1. communicating with the bladder by means of the opening *d*, fig. 4: thus it may be employed as often as the operator thinks proper.

There is a handle K to the partition in the middle, in order that, if it be at any time neceſſary to uſe either of the diviſions alone, the other may be confined from acting. *c*, *b*, fig. 5. repreſent the two valves to be applied at the end of the inſtrument C B, fig. 1.; and fig. 6. is a ſection of the end C B, ſhewing the valves in their proper places.

It is proper to add, that the capacity of the inſtrument ſhould be proportioned to the quantity of air received into the lungs in inſpiration, which Dr. Goodwyn has aſcertained to be twelve cubical inches or ſomewhat more. Each diviſion of the inſtrument, therefore, ſhould be capable of containing that quantity.

LUNG *Wort*, in botany. See PULMONARIA.

LUNISOLAR YEAR, in chronology, the ſpace of 532 common years; found by multiplying the cycle of the ſun by that of the moon.

LUNULA. See LUNE.

LUPERCALIA, feaſts inſtituted in ancient Rome, in honour of the god Pan.—The word comes from *Lupercal*, the name of a place under the Palatine mountain, where the ſacrifices were performed. The Lupercalia were celebrated on the 15th of the calends of March, that is, on the 15th of February, or, as Ovid obſerves, on the third day after the ides. They are ſuppoſed to have been eſtabliſhed by Evander. On the morning of this feaſt, the Luperci, or prieſts of Pan, ran naked through the ſtreets of Rome, ſtriking the married women they met on the hands and belly with a thong or ſtrap of goat's leather, which was held an omen promiſing them fecundity and happy deliveries. See LUPERCI. This feaſt was aboliſhed in the time of Auguſtus; but afterwards reſtored, and continued to the time of the emperor Anaſtaſius.—Baronius ſays it was aboliſhed by the pope in 496.

LUPERCI, a name given to the prieſts of the god Pan. See LUPERCALIA. The *luperci* were the moſt ancient order of prieſts in Rome; they were divided into two colleges or companies, the one called *Fabii* and the other *Quintilii*. To theſe Cæſar added a third, which he called *Julii*.

LUPINUS, LUPINE, in botany: A genus of the decandria order, belonging to the diadelphia claſs of plants; and in

the natural method ranking under the 32d order, *Papilionaceæ*. The calyx is bilabiated: there are five oblong and five roundiſh antheræ; the legumen is coriaceous. There are ſeven ſpecies, ſix of them hardy herbaceous flowery annuals, and one perennial, riſing with upright ſtalks from one to three or four feet high, ornamented with digitate or fingered leaves, and terminated by long whorled ſpikes of papilionaceous flowers, white, blue, yellow, and roſe-coloured. They are all eaſily raiſed from ſeed; and ſucceed in any open borders, where they make a fine variety.

The ſeeds of the white lupine, which have a leguminous taſte accompanied with a diſagreeable bitter one, are ſaid to be anthelmintic, both internally taken and applied externally. Caſpar Hoffman cautions againſt their external uſe, and tells us (from one of the Arabian writers) that they have ſometimes occaſioned death. Simon Pauli alſo ſays, that he ſaw a boy of eight or ten years of age, after taking a dram of theſe ſeeds in powder, ſeized with exquiſite pains in the abdomen, a difficulty of reſpiration, and almoſt total loſs of voice; and that he was relieved from theſe complaints by a clyſter of milk and ſugar, which brought away a vaſt quantity of worms. But Mr. Geoffroy obſerves, very juſtly, that either theſe ſymptoms were owing to the worms, and not to the medicine; or that theſe ſeeds, if they have any noxious quality, loſe it with their bitterneſs in boiling; ſince they were commonly uſed among the Greeks as food, and recommended by Galen as very wholeſome.

LUPULUS, in botany. See HUMULUS.

LUPUS, in zoology. See CANIS.

LUPUS-*Marinus*. See ANARRHICHAS.

LUPUS, in aſtronomy. See ASTRONOMY.

LURCHER, a kind of hunting-dog much like a mongrel gre-hound, with pricked ears, a ſhagged coat, and generally of a yelloviſh white colour: they are very ſwift runners, ſo that if they get between the burrows and the coneys they ſeldom miſs; and this is their common practice in hunting: yet they uſe other ſubtilties, as the tumbler does, ſome of them bringing in their game, and thoſe are the beſt. It is alſo obſervable, that a lurcher will run down a hare at ſtretch

LURE, in falconry, a device of leather, in the ſhape of two wings ſtuck with feathers, and baited with a piece of fleſh, to call back a hawk when at conſiderable diſtance.

LURGAN, a poſt and fair town in the county of Armagh and province of Ulſter in Ireland, 7 miles from Dublin. It is a flouriſhing town, agreeably ſituated in the midſt of a much improved country; and the inhabitants are extenſively engaged in the linen manufacture. It ſtands on a gentle eminence, about two miles from Lough Neagh, of which it commands a moſt beautiful and extenſive proſpect. The fairs are three in the year. N. lat. 54. 3. W. lon. 6. 31.

LURGAN-GREEN, a poſt and fair town of Ireland, in the county of Louth and province of Leinſter, 35 miles from Dublin; a mile beyond which is a handſome ſeat of the earl of Charlemont. It has three fairs in the year.

LURIDÆ, the name of the 28th order in Linnæus's Fragments of a natural method. See BOTANY.

LUSATIA, a marquiſate of Germany, in Upper Saxony; bounded to the eaſt by Sileſia, to the weſt by Miſnia, to the ſouth by Bohemia, and to the north by the marquiſate of Brandenburgh. Till towards the middle of the 15th century, the Upper Luſatia was called the *Mark*, i. e. *the marquiſate or the land of Budiſzin and Gorlitz*: and the Lower only *Luſatia*, which, it is ſaid, in the Sclavonic, ſignifies "a woody or marſhy country." The air of the Upper Luſatia, which is hilly or mountainous, is better than that of the Lower, a great part of which is mooriſh and boggy. Both abound in wood, eſpecially the Lower, and turf for fuel. The heathy and mountainous tracts are generally barren; but the lower champaign and marſh lands are tolerably fertile, producing paſture, wheat, rye, oats, barley, buck-wheat, peaſe, lentils, beans, and millet; together with flax, hops, tobacco, ſome white and red wine, and what is called *manna*. Of ſeveral of theſe articles, however, conſiderable quantities are imported. In this country are found alſo quarries of ſtone, medicinal ſprings, baſtard diamonds, agates, and jaſpers, earths and clays for tobacco-pipes and all ſorts of earthen ware, alum, good iron, ſtone, vitriolic and copper water; nor is it deſtitute of cattle, fiſh, and veniſon. The rivers Spree, the Schwarze, or Black Elſter, and the Pulznitz, have their ſources in the Luſatias, which are alſo watered by the Neiſſe and Queis. The ancient inhabitants of this country were the Saxons, who were ſucceeded by the Vandals, and theſe by the Sober-Wends a Sclavonian people. The preſent inhabitants, the deſcendants of the Wends, have an odd dreſs; and the language is ſo inarticulate and guttural, that it hath been ſaid, it might be pronounced without lips, teeth, or tongue: but the towns are almoſt wholly peopled by Germans.

In the Upper Luſatia are ſix towns which appear at the land diets, 16 ſmaller country towns, and four market towns. In the Lower are four diet-towns, 13 country towns, and two market ones. Both marquiſates were formerly ſubject either to the kings of Bohemia, the archdukes of Auſtria, or electors of Brandenburgh; but, in 1635, both were abſolutely ceded to the elector of Saxony, in lieu of the 72 tons of gold which he expended in aſſiſting the emperor Ferdinand II. againſt the Bohemians.

Chriſtianity was firſt planted in Luſatia in the ſeventh century; but it was ſeveral centuries after that before Popery was fully eſtabliſhed. In the 11th century many cloiſters were erected in the country; but at the Reformation ſuch numbers embraced Lutheraniſm, that it became the predominant religion, and ſtill continues; though there are ſtill ſeveral Roman Catholic foundations, churches, market towns, and villages. The enthuſiaſtic ſect of Hernhuters poſſeſſes a great influence and eſteem here. There are conſiderable manufactures of woollen and linen ſtuffs in the Luſatias, eſpecially the Upper. At Budiſſen, and in the adjacent country, prodigious quantities of ſtockings, ſpatterdaſhes, caps, and gloves are made. The linen manufactures alſo flouriſh here, chiefly in the Upper Luſatia, where all ſorts of linen are made, printed and dyed. Excluſive of theſe, there are conſiderable manufactures of hats, leather, paper, gunpowder, iron, glaſs, bleached wax, &c. Though the demand and exportation of theſe commodities, particularly linens and woollens, is not ſo great as formerly, yet it is ſtill conſiderable, and more than overbalances their importations in wool, yarn, ſilk, wines, ſpices, corn, freſh and baked fruits, garden ſtuff, and hops. Diſputes of many years ſtanding have ſubſiſted between the country-artificers and linen-manufacturers on the one ſide, and the diet-towns on the other; the latter unjuſtly ſeeking to exclude the former from any ſhare in the linen trade. The natives of this country are ſaid to have quick natural parts, but to be ſordidly penurious. We are told they obſerve the Saxon laws much better than they did the Bohemian. Learning hath been much eſteemed and encouraged in both marquiſates ſince the reformation. The ſchools in the ſix diet-towns of Upper Luſatia, particularly at Gorlitz, Budiſſen, and Zittau, greatly diſtinguiſh themſelves, having handſome ſtipends. In Lower Luſatia alſo are ſome good ſchools, with ſtipends for the maintenance of ſtudents. Printing is ſaid to be much followed, and brought to great perfection in this country.

In Upper Luſatia, the ſtates conſiſt, 1ſt, of thoſe called *ſtate-lords*; 2dly, of the prelates; 3dly, of the gentry and commonalty, under which are comprehended the counts, barons,

nobles, and burgeſſes, poſſeſſors of fees and fief-eſtates: and, 4thly, of the repreſentatives of the ſix principal towns. Without the conſent of theſe ſtates no taxes can be impoſed, nor any thing of importance, that regards the public, tranſacted. The diets are ordinary or extraordinary. The ordinary meet once in three years, and the extraordinary when ſummoned by the ſovereign upon particular emergencies. As to eccleſiaſtical matters, the dean of Budiſſen and his conſiſtory exerciſe all manner of epiſcopal juriſdiction; and, among the Proteſtants, the juriſdiction belongs either to the ſuperior, the upper-office, or the patrons. The revenues ariſing to the ſuperior or ſovereign, from Upper Luſatia, conſiſt partly of the ſubſidies granted by the ſtates, among which, at preſent, are reckoned capitation and eſtate-money; and partly of the beer-tax, exciſe, tolls, &c.—Upper Luſatia is divided into two great circles, viz. thoſe of Budiſſen and Gorlitz, which are again divided into leſſer circles.

The land-ſtates of Lower Luſatia conſiſt, like thoſe of the Upper, of prelates, lords, and knights, and the repreſentatives of the ſtate towns, which are Luckau, Gubben-Lubbin, and Kalau. Two land diets are yearly held at Lubben, called *voluntary diets*; but when the ſuperior cauſes the ſtates to be ſummoned together at his diſcretion, and propoſitions to be laid before them, by commiſſaries deputed for that purpoſe, ſuch convention is called a *great land-diet*. The marquiſate is divided into five circles, each of which holds a circle-aſſembly in its circle town. The chief officers appointed either by the ſuperior or the ſtates, are, the preſident of the upper-office, the land-captain, and the land-judge. The principal tribunals are, the land-court, and the upper-office, to which lie appeals from the inferior judicatories. There are alſo officers for the ſeveral circles. Spiritual matters belong here to a conſiſtory, erected in 1668. The ordinary taxes are paid into the cheſt of the circle; and from thence conſigned to the general cheſt, of which the upper tax receiver is ſuperintendant. By him an annual account of the receipts is made out, which is examined and paſſed by the deputies of the ſtates.

LUSITANIA (anc. geog.), one of the diviſions of Spain, extending to the north of the Tagus, quite to the ſea of Cantabria, at leaſt to the Promontorium Celticum. But Auguſtus, by a new regulation, made the Anas its boundary to the ſouth, the Durius to the north; and thus conſtituting only a part of the modern Portugal. *Luſitani* the people, (Diodorus, Stephanus)

LUSTRAL, an epithet given by the ancients to the water uſed in their ceremonies to ſprinkle and purify the people. From them the Romaniſts have borrowed the holy water uſed in their churches.

Lustral *Day*, *(Dies Luſtricus)*, that whereon the luſtrations were performed for a child, and its name given; which was uſually the ninth day from the birth of a boy, and the eighth from that of a girl. Though others performed the ceremony on the laſt day of that week wherein the child was born, and others on the fifth day from its birth. Over this feaſt-day the goddeſs Nundina was ſuppoſed to preſide; the midwives, nurſes, and domeſtics, handed the child backwards and forwards, around a fire burning on the altars of the gods, after which they ſprinkled it with water; hence this feaſt had the name of *amphidromia*. The old women mixed ſaliva and duſt with the water. The whole ended with a ſumptuous entertainment. The parents received gifts from their friends on this occaſion. If the child was a male, their door was decked with an olive garland; if a female, with wool, denoting the work about which women were to be employed.

LUSTRATION, in antiquity, ſacrifices or ceremonies by which the ancients purified their cities, fields, armies, or people, defiled by any crime or impurity. Some of theſe luſtrations were public, others private. There were three ſpecies or manners of performing luſtration, *viz.* by fire and ſulphur, by water, and by air; which laſt was done by fanning and agitating the air round the thing to be purified. Some of theſe luſtrations were neceſſary, *i. e.* could not be diſpenſed with; as luſtrations of houſes in time of a plague, or upon the death of any perſon: others again were done out of choice, and at pleaſure. The public luſtrations at Rome were celebrated every fifth year; in which they led a victim thrice round the place to be purified, and in the mean time burnt a great quantity of perfumes. Their country luſtrations, which they called *ambarvalia*, were celebrated before they began to reap their corn: in thoſe of the armies, which they called *armiluſtria*, ſome choſen ſoldiers, crowned with laurel, led the victims, which were a cow, a ſheep, and a bull, thrice round the army ranged in battle-array in the field of Mars, to which deity the victims were afterwards ſacrificed, after pouring out many imprecations upon the enemies of the Romans. The luſtrations of their flocks were performed in this manner: the ſhepherd ſprinkled them with pure water, and thrice ſurrounded his ſheepfold with a compoſition of ſavin, laurel, and brimſtone ſet on fire; and afterwards ſacrificed to the goddeſs Pales an offering of milk boiled, wine, a cake, and millet. As for private houſes, they were luſtrated with water, a fumigation of laurel, juniper, olive-tree, ſavin, and ſuch-like; and the victim commonly was a pig. Luſtrations made for particular perſons were commonly called *expiations*, and the victims *piacula*. There was alſo a kind of luſtration uſed for infants, by which they were purified, girls the third, and boys the ninth, day after their birth; which ceremony was performed with pure water and ſpittle. In their luſtratory ſacrifices, the Athenians ſacrificed two men, one for the men of their city, and the other for the women. Divers of theſe expiations were auſtere: ſome faſted, others abſtained from all ſenſual pleaſures; and ſome, as the prieſts of Cybele, caſtrated themſelves. The poſtures of the penitents were different according to the different ſacrifices. The prieſts changed their habits according to the ceremony to be performed; white, purple, and black, were the moſt uſual colours. They caſt into the river, or at leaſt out of the city, the animals or other things that had ſerved for a luſtration or ſacrifice of atonement; and thought themſelves threatened with ſome great misfortune when by chance they trod upon them. Part of theſe ceremonies were aboliſhed by the emperor Conſtantine, and his ſucceſſors: the reſt ſubſiſted till the Gothic kings were maſters of Rome; under whom they expired, excepting what the popes thought proper to adopt and bring into the church. For the luſtration, or rather expiation, of the ancient Jews, ſee Expiation.

LUSTRE, the gloſs or brightneſs appearing on any thing, particularly on manufactures of ſilk, wool, or ſtuff. It is likewiſe uſed to denote the compoſition or manner of giving that gloſs. The luſtre of ſilks is given them by waſhing in ſoap, then clear water, and dipping them in alum water cold. To give ſtuffs a beautiful luſtre: For every eight pounds of ſtuff allow a quarter of a pound of linſeed; boil it half an hour, and then ſtrain it through a cloth, and let it ſtand till it is turned almoſt to a jelly: afterwards put an ounce and a half of gum to diſſolve 24 hours; then mix the liquor, and put the cloth into this mixture; take it out, dry it in the ſhade, and preſs it. If once doing is not ſufficient, repeat the operation. Curriers give a luſtre to black leather firſt with juice of barberries, then with gum-arabic, ale, vinegar, and Flanders glue, boiled together. For coloured leather, they uſe the white of an egg beaten in water. Moroccoes have their luſtre from the juice of barberries, and lemon or orange. For hats, the luſtre is fre-

quently given with common water; ſometimes a little black dye is added: the ſame luſtre ſerves for furs, except that for very black furs they ſometimes prepare a luſtre of galls, copperas, Roman alum, ox's marrow, and other ingredients.

LUSTRE, an appellation given to a branched candleſtick, when made of glaſs. See BRANCH and JESSE.

LUSTRINGS. A company was incorporated for making, dreſſing, and luſtrating alamodes and luſtrings in England, who were to have the ſole benefit thereof, by ſtat. 4 and 5 William and Mary. And no foreign ſilks known by the name of *luſtrings* or alamodes are to be imported but at the port of London, &c Stat. 9 and 10 W. III. c. 43. See SILK.

LUSTRUM, in Roman antiquity, a general muſter and review of all the citizens and their goods, which was performed by the cenſors every fifth year, who afterwards made a ſolemn luſtration. See the article LUSTRATION. This cuſtom was firſt inſtituted by Servius Tullius, about 180 years after the foundation of Rome. In courſe of time the luſtra were not celebrated ſo often; for we find the fifth luſtrum celebrated at Rome only in the 574th year of that city.

LUTE, or LUTING, among chemiſts, a mixed, tenacious, ductile ſubſtance, which grows ſolid by drying, and, being applied to the juncture of veſſels, ſtops them up ſo as to prevent the air from getting either in or out. See CHEMISTRY.

LUTE, is alſo a muſical inſtrument with ſtrings —The lute conſiſts of four parts, *viz.* the table, the body or belly, which has nine or ten ſides; the neck, which has nine or ten ſtops or diviſions, marked with ſtrings; and the head or croſs, where the ſcrews for raiſing and lowering the ſtrings to a proper pitch of tone are fixed. In the middle of the table there is a roſe or paſſage for the ſound; there is alſo a bridge that the ſtrings are faſtened to, and a piece of ivory between the head and the neck to which the other extremities of the ſtrings are fitted. In playing, the ſtrings are ſtruck with the right hand, and with the left the ſtops are preſſed. The lutes of Bologna are eſteemed the beſt on account of the wood, which is ſaid to have an uncommon diſpoſition for producing a ſweet ſound.

LUTETIA PARISIORUM, (anc. geog.) a town of the Pariſii, in Gallia Celtica, ſituated in an iſland in the Sequana or Seine. It received its name, as ſome ſuppoſe, from the quantity of clay, *lutum*, which is in its neighbourhood.—J. Cæſar fortified and embelliſhed it; from which circumſtance ſome authors call it *Julii Civitas*. Julian the apoſtate reſided there for ſome time. It is now PARIS, the capital of France; ſo called from its name *Par is* in the lower age.

LUTHER (MARTIN), the celebrated author of the Reformation, was a native of Iſleben in Saxony, and born in 1483. Though his parents were poor, he received a learned education; during the progreſs of which, he gave many indications of uncommon vigour and acuteneſs of genius. As his mind was naturally ſuſceptible of ſerious impreſſions, and tinctured with ſomewhat of that religious melancholy which delights in the ſolitude and devotion of a monaſtic life, he retired into a convent of Auguſtinian friars; where he acquired great reputation, not only for piety, but for love of knowledge and unwearied application to ſtudy. The cauſe of his retirement is ſaid to have been, that he was once ſtruck by lightning, and his companion killed by his ſide by the ſame flaſh. He had been taught the ſcholaſtic philoſophy which was in vogue in thoſe days, and made conſiderable progreſs in it: but happening to find a copy of the bible which lay neglected in the library of his monaſtery, he applied himſelf to the ſtudy of it with ſuch eagerneſs and aſſiduity, as quite aſtoniſhed the monks; and increaſed his reputation for ſanctity ſo much, that he was choſen profeſſor firſt of philoſophy, and afterwards of theology, at Wittemberg on the Elbe, where Frederic elector of Saxony had founded an univerſity.

While Luther continued to enjoy the higheſt reputation for ſanctity and learning, Tetzel, a Dominican friar, came to Wittemberg in order to publiſh indulgences. Luther beheld his ſucceſs with great concern; and having firſt inveighed againſt indulgences from the pulpit, he afterwards publiſhed 95 theſes, containing his ſentiments on that ſubject. Theſe he propoſed, not as points fully eſtabliſhed, but as ſubjects of inquiry and diſputation. He appointed a day on which the learned were invited to impugn them either in perſon or by writing; and to the whole he ſubjoined ſolemn proteſtations of his high reſpect for the apoſtolic ſee, and of his implicit ſubmiſſion to its authority. No opponent appeared at the time prefixed; the theſes ſpread over Germany with aſtoniſhing rapidity, and were read with the greateſt eagerneſs.

Though Luther met with no oppoſition for ſome little time after he began to publiſh his new doctrines, it was not long before many zealous champions aroſe to defend thoſe opinions with which the wealth and power of the clergy were ſo ſtrictly connected. Their cauſe, however, was by no means promoted by theſe endeavours; the people began to call in queſtion even the authority of the canon law and of the pope himſelf.—The court of Rome at firſt deſpiſed theſe new doctrines and diſputes; but at laſt the attention of the pope being raiſed by the great ſucceſs of the reformer, and the complaints of his adverſaries, Luther was ſummoned, in the month of July 1518, to appear at Rome, within 60 days, before the auditor of the chamber. One of Luther's adverſaries, named Prierias, who had written againſt him, was appointed to examine his doctrines, and to decide concerning them. The pope wrote at the ſame time to the elector of Saxony, beſeeching him not to protect a man whoſe heretical and profane tenets were ſo ſhocking to pious ears; and enjoined the provincial of the Auguſtinians to check by his authority the raſhneſs of an arrogant monk, which brought diſgrace upon their order, and gave offence and diſturbance to the whole church.

From theſe letters, and the appointment of his open enemy Prierias to be his judge, Luther eaſily ſaw what ſentence he might expect at Rome; and therefore diſcovered the utmoſt ſolicitude to have his cauſe tried in Germany, and before a leſs ſuſpected tribunal. He wrote a ſubmiſſive letter to the pope, in which he promiſed an unreſerved obedience to his will, for as yet he entertained no doubt of the divine original of the pope's authority; and by the interceſſion of the other profeſſors, Cajetan the pope's legate in Germany was appointed to hear and determine the cauſe. Luther appeared before him without heſitation: but Cajetan thought it below his dignity to diſpute the point with a perſon ſo much his inferior in rank; and therefore required him, by virtue of the apoſtolic powers with which he was clothed, to retract the errors which he had uttered with regard to indulgences and the nature of faith, and to abſtain for the future from the publication of new and dangerous opinions; and at the laſt forbad him to appear in his preſence, unleſs he propoſed to comply with what had been required of him.

This haughty and violent manner of proceeding, together with ſome other circumſtances, gave Luther's friends ſuch ſtrong reaſons to ſuſpect that even the imperial ſafe conduct would not be able to protect him from the legate's power and reſentment, that they prevailed on him ſecretly to withdraw from Augſburg, where he had attended the legate, and to return to his own country. But before his departure, according to a form of which there had been ſome examples, he prepared a ſolemn appeal from the pope, ill-informed at that time concerning his cauſe, to the pope, when he ſhould receive more full intimation with reſpect to it.—Cajetan, enraged at Luther's abrupt retreat, and at the publication of his appeal, wrote to the elector of Saxony, complaining of both; and requiring him, as he regarded the peace of the church, or the authority of its head,

either to ſend that ſeditious monk a priſoner to Rome, or to baniſh him out of his territories. Frederic had hitherto, from political motives, protected Luther, as thinking he might be of uſe in checking the enormous power of the ſee of Rome; and though all Germany reſounded with his fame, the elector had never yet admitted him into his preſence. But upon this demand made by the cardinal, it became neceſſary to throw off ſomewhat of his former reſerve. He had been at great expence and beſtowed much attention on founding a new univerſity, an object of conſiderable importance to every German prince; and foreſeeing how fatal a blow the removal of Luther would be to its reputation, he not only declined complying with either of the pope's requeſts, but openly diſcovered great concern for Luther's ſafety.

The ſituation of our reformer, in the mean time, became daily more and more alarming. He knew very well what were the motives which induced the elector to afford him protection, and that he could by no means depend on a continuance of his friendſhip. If he ſhould be obliged to quit Saxony he had no other aſylum, and muſt ſtand expoſed to whatever puniſhment the rage or bigotry of his enemies could inflict; and ſo ready were his adverſaries to condemn him, that he had been declared a heretic at Rome before the expiration of the 60 days allowed him in the citation for making his appearance. Notwithſtanding all this, however, he diſcovered no ſymptoms of timidity or remiſſneſs; but continued to vindicate his own conduct and opinions, and to inveigh againſt thoſe of his adverſaries with more vehemence than ever. Being convinced, therefore, that the pope would ſoon proceed to the moſt violent meaſures againſt him, he appealed to a general council, which he affirmed to be the repreſentative of the Catholic church, and ſuperior in power to the pope, who being a fallible man, might err, as St. Peter, the moſt perfect of his predeceſſors, had done.

The court of Rome were equally aſſiduous in the mean time to cruſh the author of theſe new doctrines which gave them ſo much uneaſineſs. A bull was iſſued by the pope, of a date prior to Luther's appeal, in which he magnified the virtues of indulgences, and ſubjected to the heavieſt eccleſiaſtical cenſures all who preſumed to teach a contrary doctrine. Such a clear deciſion of the ſovereign pontiff againſt him might have been very fatal to Luther's cauſe, had not the death of the emperor Maximilian, which happened on January 17, 1519 contributed to give matters a different turn. Both the principles and intereſt of Maximilian had prompted him to ſupport the authority of the ſee of Rome: but, in conſequence of his death, the vicariate of that part of Germany which is governed by the Saxon laws devolved to the elector of Saxony; and, under the ſhelter of his friendly adminiſtration, Luther himſelf enjoyed tranquillity, and his opinions took ſuch root in different places, that they could never afterwards be eradicated. At the ſame time, as the election of an emperor was a point more intereſting to the pope (Leo X.) than a theological controverſy which he did not underſtand, and of which he could not foreſee the conſequences, he was ſo extremely ſolicitous not to irritate a prince of ſuch conſiderable influence in the electoral college as Frederic, that he diſcovered a great unwillingneſs to pronounce the ſentence of excommunication againſt Luther, which his adverſaries continually demanded with the moſt clamorous importunity.

From the reaſon juſt now given, and Leo's natural averſion to ſevere meaſures, a ſuſpenſion of proceeding againſt Luther took place for 18 months, though perpetual negotiations were carried on during this interval in order to bring the matter to an amicable iſſue. The manner in which theſe were conducted having given our reformer many opportunities of obſerving the corruption of the court of Rome, its obſtinacy in adhering to eſtabliſhed errors, and its indifference about truth, however clearly propoſed or ſtrongly proved, he began, in 1520, to utter ſome doubts with regard to the divine original of the papal authority, which he publicly diſputed with Eccius, one of his moſt learned and formidable antagoniſts. The diſpute was indeciſive, both parties claiming the victory; but it muſt have been very mortifying to the partiſans of the Romiſh church to hear ſuch an eſſential point of their doctrine publicly attacked.

The Papal authority being once ſuſpected, Luther proceeded to puſh on his inquiries and attacks from one doctrine to another, till at laſt he began to ſhake the firmeſt foundations on which the wealth and power of the church were eſtabliſhed. Leo then began to perceive that there were no hopes of reclaiming ſuch an incorrigible heretic; and therefore prepared to denounce the ſentence of excommunication againſt him. The college of cardinals was often aſſembled, in order to prepare the ſentence with due deliberation; and the ableſt canoniſts were conſulted how it might be expreſſed with unexceptionable formality. At laſt it was iſſued on the 15th of June 1520. Forty-one propoſitions, extracted out of Luther's works, were therein condemned as heretical, ſcandalous, and offenſive to pious ears; all perſons were forbidden to read his writings, upon pain of excommunication; ſuch as had any of them in their cuſtody were commanded to commit them to the flames; he himſelf, if he did not, within 60 days, publicly recant his errors, and burn his books, was pronounced an obſtinate heretic, excommunicated, and delivered to Satan for the deſtruction of the fleſh; and all ſecular princes were required, under pain of incurring the ſame cenſure, to ſeize his perſon, that he might be puniſhed as his crimes deſerved.

Luther was not in the leaſt diſconcerted by this ſentence, which he had for ſome time expected. He renewed his appeal to his general council; declared the pope to be that antichriſt, or man of ſin, whoſe appearance is foretold in the New Teſtament; declaimed againſt his tyranny with greater vehemence than ever; and at laſt, by way of retaliation, having aſſembled all the profeſſors and ſtudents in the univerſity of Wittemberg, with great pomp, and in the preſence of a vaſt multitude of ſpectators, he caſt the volumes of the canon law, together with the bull of excommunication, into the flames. The manner in which this action was juſtified, gave ſtill more offence than the action itſelf. Having collected from the canon law ſome of the moſt extravagant propoſitions with regard to the plenitude and omnipotence of the pope's power, as well as the ſubordination of all ſecular juriſdiction to his authority, he publiſhed theſe with a commentary, pointing out the impiety of ſuch tenets, and their evident tendency to ſubvert all civil government.

On the acceſſion of Charles V. to the empire, Luther found himſelf in a very dangerous ſituation. Charles, in order to ſecure the pope's friendſhip, had determined to treat him with great ſeverity. His eagerneſs to gain this point rendered him not averſe to gratify the papal legates in Germany, who inſiſted, that, without any delay or formal deliberation, the diet then ſitting at Worms ought to condemn a man whom the pope had already excommunicated as an incorrigible heretic. Such an abrupt manner of proceeding, however, being deemed unprecedented and unjuſt by the members of the diet, they made a point of Luther's appearing in perſon, and declaring whether he adhered or not to thoſe opinions which had drawn upon him the cenſures of the church. Not only the emperor, but all the princes through whoſe territories he had to paſs, granted him a ſafe-conduct; and Charles wrote to him at the ſame time, requiring his immediate attendance on the diet, and renewing his promiſes of protection from any injury or violence. Luther did not heſitate one moment about yielding obedience, and ſet out for Worms, attended by the herald who had brought the emperor's letter and ſafe-conduct. While on his

journey, many of his friends, whom the fate of Huſs, under ſimilar circumſtances, and notwithſtanding the ſame ſecurity of an imperial ſafe-conduct, filled with ſolicitude, adviſed and entreated him not to ruſh wantonly into the midſt of danger. But Luther, ſuperior to ſuch terrors, ſilenced them with this reply, "I am lawfully called (ſaid he) to appear in that city; and thither will I go in the name of the Lord, though as many devils as there are tiles on the houſes were there combined againſt me."

The reception which he met with at Worms was ſuch as might have been reckoned a full reward of all his labours, if vanity and the love of applauſe had been the principles by which he was influenced. Greater crowds aſſembled to behold him than had appeared at the emperor's public entry; his apartments were daily filled with princes and perſonages of the higheſt rank; and he was treated with an homage more ſincere, as well as more flattering, than any which pre-eminence in birth or condition can command. At his appearance before the diet, he behaved with great decency, and with equal firmneſs. He readily acknowledged an exceſs of acrimony and vehemence in his controverſial writings; but refuſed to retract his opinions unleſs he were convinced of their falſehood, or to conſent to their being tried by any other rule than the word of God. When neither threats nor entreaties could prevail on him to depart from this reſolution, ſome of the eccleſiaſtics propoſed to imitate the example of the council of Conſtance, and, by puniſhing the author of this peſtilent hereſy, who was now in their power, to deliver the church at once from ſuch an evil. But the members of the diet refuſing to expoſe the German integrity to freſh reproach by a ſecond violation of public faith, and Charles being no leſs unwilling to bring a ſtain upon the beginning of his adminiſtration by ſuch an ignominious action, Luther was permitted to depart in ſafety. A few days after he left the city, a ſevere edict was publiſhed in the emperor's name, and by authority of the diet, depriving him, as an obſtinate and excommunicated criminal, of all the privileges which he enjoyed as a ſubject of the empire, forbidding any prince to harbour or protect him, and requiring all to ſeize his perſon as ſoon as the term ſpecified in his protection ſhould be expired.

But this rigorous decree had no conſiderable effect; the execution of it being prevented partly by the multiplicity of occupations which the commotions in Spain, together with the wars in Italy and the Low Countries, created to the emperor; and partly by a prudent precaution employed by the elector of Saxony, Luther's faithful patron. As Luther, on his return from Worms, was paſſing near Altenſtrain in Thuringia, a number of horſemen in maſks ruſhed ſuddenly out of a wood, where the elector had appointed them to lie in wait for him, and, ſurrounding his company, carried him, after diſmiſſing all his attendants, to Wortburg, a ſtrong caſtle not far diſtant. There the elector ordered him to be ſupplied with every thing neceſſary or agreeable; but the place of his retreat was careſully concealed, until the fury of the preſent ſtorm againſt him began to abate, upon a change in the political ſyſtem of Europe. In this ſolitude, where he remained nine months, and which he frequently called his *Patmos*, after the name of that iſland to which the apoſtle John was baniſhed, he exerted his uſual vigour and induſtry in defence of his doctrines, or in confutation of his adverſaries, publiſhing ſeveral treatiſes, which revived the ſpirit of his followers, aſtoniſhed to a great degree and diſheartened at the ſudden diſappearance of their leader.

Luther, weary at length of his retirement, appeared publicly again at Wittemberg upon the 6th of March 1522. He appeared indeed without the elector's leave; but immediately wrote him a letter, to prevent his taking it ill. The edict of Charles V. ſevere as it was, had given little or no check to Luther's doctrine: for the emperor was no ſooner gone into Flanders, than his edict was neglected and deſpiſed, and the doctrine ſeemed to ſpread even faſter than before. Caroloſtadius, in Luther's abſence, had puſhed things on faſter than his leader; and had attempted to aboliſh the uſe of maſs, to remove images out of the churches, to ſet aſide auricular confeſſion, invocation of ſaints, the abſtaining from meats; had allowed the monks to leave their monaſteries, to neglect their vows, and to marry; in ſhort, had quite changed the doctrine and diſcipline of the church at Wittemberg: all which, though not againſt Luther's ſentiments, was yet blamed by him, as being raſhly and unſeaſonably done. Lutheraniſm was ſtill confined to Germany: it was not got to France; and Henry VIII. of England made the moſt rigorous acts to hinder it from invading his realm. Nay, he did ſomething more: to ſhow his zeal for religion and the holy ſee, and perhaps his ſkill in theological learning, he wrote a treatiſe *Of the ſeven ſacraments*, againſt Luther's book *Of the captivity of Babylon*; which he preſented to Leo X. in October 1521. The pope received it very favourably; and was ſo well pleaſed with the king of England, that he complimented him with the title of *Defender of the faith*. Luther, however, paid no regard to his kingſhip; but anſwered him with great ſharpneſs, treating both his perſon and performance in the moſt contemptuous manner. Henry complained of Luther's rude uſage of him to the princes of Saxony; and Fiſher, biſhop of Rocheſter, replied to his anſwer in behalf of Henry's treatiſe: but neither the king's complaint, nor the biſhop's reply, was attended with any viſible effects.

Luther, though he had put a ſtop to the violent proceedings of Caroloſtadius, now made open war with the pope and biſhops; and, that he might make the people deſpiſe their authority as much as poſſible, he wrote one book againſt the pope's bull, and another againſt the order falſely called the *order of biſhops*. The ſame year, 1522, he wrote a letter, dated July the 2 th, to the aſſembly of the ſtates of Bohemia; in which he aſſured them, that he was labouring to eſtabliſh their doctrine in Germany, and exhorted them not to return to the communion of the church of Rome; and he publiſhed alſo, this year, a tranſlation of the New Teſtament in the German tongue, which was afterwards corrected by himſelf and Melanchthon. This tranſlation having been printed ſeveral times, and being in every body's hands, Ferdinand archduke of Auſtria, the emperor's brother, made a very ſevere edict to hinder the farther publication of it; and forbade all the ſubjects of his imperial majeſty to have any copies of it, or of Luther's other books. Some other princes followed his example; and Luther was ſo angry at it, that he wrote a treatiſe *Of the ſecular power*, in which he accuſes them of tyranny and impiety. The diet of the empire was held at Nurenburg, at the end of the year; to which Hadrian VI. ſent his brief, dated November the 25th: for Leo X. died upon the 2d of December 1521, and Hadrian had been elected pope upon the 9th of January following. In his brief, among other things, he obſerves to the diet, how he had heard, with grief, that Martin Luther, after the ſentence of Leo X. which was ordered to be executed by the edict of Worms, continued to teach the ſame errors, and daily to publiſh books full of hereſies: that it appeared ſtrange to him, that ſo large and ſo religious a nation ſhould be ſeduced by a wretched apoſtate friar: that nothing, however, could be more pernicious to Chriſtendom: and that therefore he exhorts them to uſe their utmoſt endeavours to make Luther, and the authors of theſe tumults, return to their duty; or, if they refuſe and continue obſtinate, to proceed againſt them according to the laws of the empire, and the ſeverity of the laſt edict.

The reſolution of this diet was publiſhed in the form of an edict, upon the 6th of March 1523; but it had no effect in checking the Lutherans, who ſtill went on in the ſame triumphant manner. This year Luther wrote a great many pieces: among the reſt, one upon the dignity and office of the ſupreme magiſtrate; which Frederick elector of Saxony is ſaid to have been highly pleaſed with. He ſent, about the ſame time, a writing in the German language to the Waldenſes, or Pickards, in Bohemia and Moravia, who had applied to him "about worſhipping the body of Chriſt in the euchariſt." He wrote alſo another book, which he dedicated to the ſenate and people of Prague, "about the inſtitution of miniſters of the church." He drew up a form of ſaying maſs. He wrote a piece entitled *An example of popiſh doctrine and divinity*; which Dupin calls *a ſatire againſt nuns and thoſe who profeſs a monaſtic life*. He wrote alſo againſt the vows of virginity, in his preface to his commentary on 1 Cor. viii. And his exhortations here were, it ſeems, followed with effects: for ſoon after, nine nuns, among whom was Catharine de Bore, eloped from the nunnery at Nimptſchen, and were brought, by the aſſiſtance of Leonard Coppen, a burgeſs of Torgau, to Wittemberg. Whatever offence this proceeding might give to the Papiſts, it was highly extolled by Luther; who, in a book written in the German language, compares the deliverance of theſe nuns from the ſlavery of a monaſtic life, to that of the ſouls which Jeſus Chriſt has delivered by his death. This year Luther had occaſion to canonize two of his followers, who, as Melchior Adam relates, were burnt at Bruſſels in the beginning of July, and were the firſt who ſuffered martyrdom for his doctrine. He wrote alſo a conſolatory epiſtle to three noble ladies at Miſnia, who were baniſhed from the duke of Saxony's court at Friburg for reading his books.

In the beginning of the year 1524, Clement VII. ſent a legate into Germany to the diet which was to be held at Nurenburg. Hadrian VI. died in October 1523, and was ſucceeded by Clement upon the 19th of November. A little before his death he canonized Benno, who was biſhop of Meiſſen in the time of Gregory VII. and one of the moſt zealous defenders of the holy ſee. Luther, imagining that this was done directly to oppoſe him, drew up a piece with this title, *Againſt the New Idol and Old Devil ſet up at Meiſſen*; in which he treats the memory of Gregory with great freedom, and does not ſpare even Hadrian. Clement VII's legate repreſented to the diet of Nurenburg the neceſſity of enforcing the execution of the edict of Worms, which had been ſtrangely neglected by the princes of the empire: but, notwithſtanding the legate's ſolicitations, which were very preſſing, the decrees of that diet were thought ſo ineffectual, that they were condemned at Rome, and rejected by the emperor. It was in this year that the diſpute between Luther and Eraſmus, about free-will, began. Eraſmus had been much courted by the Papiſts to write againſt Luther; but he was all along of opinion, that writing would not be found an effectual way to end the differences and eſtabliſh the peace of the church. However, tired out at length with the importunities of the Pope and the Catholic princes, and deſirous at the ſame time to clear himſelf from the ſuſpicion of favouring a cauſe which he would not ſeem to favour, he reſolved to write againſt Luther, though, as he tells Melancthon, it was with ſome reluctance, and choſe free-will for the ſubject. His book was entitled, *A Diatriba, or Conference about Free-will*; and was written with much moderation, and without perſonal reflections. He tells Luther in the preface, "That he ought not to take his diſſenting from him in opinion ill, becauſe he had allowed himſelf the liberty of differing from the judgment of popes, councils, univerſities, and doctors of the church." Luther was ſome time before he anſwered Eraſmus's book; but at laſt publiſhed a treatiſe *De Servo Arbitrio*, or *Of the Servitude of Man's Will*; and though Melancthon had promiſed Eraſmus that Luther ſhould anſwer him with civility and moderation, yet Luther had ſo little regard to Melancthon's promiſe, that he never wrote any thing ſharper. He accuſed Eraſmus of being careleſs about religion, and little ſolicitous what became of it, provided the world continued in peace: and that his notions were rather Philoſophical than Chriſtian. Eraſmus immediately replied to Luther, in a piece called *Hyperaſpiſtes*; in the firſt part of which he anſwers his arguments, and in the ſecond his perſonal reflections.

In October 1524 Luther flung off the monaſtic habit; which, though not premeditated and deſigned, was yet a very proper preparative to a ſtep he took the year after; we mean, his marriage with Catharine de Bore. Catharine de Bore was a gentleman's daughter, who had been a nun, and was taken, as we have obſerved, out of the nunnery of Nimptſchen, in the year 1523. Luther had a deſign, as Melchior Adam relates, to marry her to Glacius, a miniſter of Ortamunden: but ſhe did not like Glacius; and ſo Luther married her himſelf upon the 13th of June 1525. This conduct of his was blamed not only by the Catholics, but, as Melancthon ſays, by thoſe of his own party. He was even for ſome time aſhamed of it himſelf; and owns, that his marriage had made him ſo deſpicable, that he hoped his humiliation would rejoice the angels, and vex the devils. Melancthon found him ſo afflicted with what he had done, that he wrote ſome letters of conſolation to him It was not ſo much the marriage, as the circumſtances of the time, and the precipitation with which it was done, that occaſioned the cenſures paſſed upon Luther. He married all of a ſudden, and at a time when Germany was groaning under the miſeries of a war, which was ſaid at leaſt to be owing to Lutheraniſm. Then, again, it was thought an indecent thing in a man of 42 years of age, who was then, as he pretended, reſtoring the goſpel and reforming mankind, to involve himſelf in marriage with a woman of 26, either through incontinence, or any account whatever. But Luther, as ſoon as he had recovered himſelf a little from this abaſhment, aſſumed his former air of intrepidity, and boldly ſupported what he had done with reaſons. "I took a wife (ſays he) in obedience to my father's commands, and haſtened the conſummation in order to prevent impediments, and ſtop the tongues of ſlanderers." It appears from his own confeſſion, that this reformer was very fond of Mrs. de Bore, and uſed to call her *his Catharine*; which made profane people think and ſay wicked things of him: "And therefore (ſays he) I married of a ſudden, not only that I might not be obliged to hear the clamours which I knew would be raiſed againſt me, but to ſtop the mouths of thoſe who reproached me with Catharine de Bore." Luther alſo gives us to underſtand, that he did it partly as concurring with his grand ſcheme of oppoſing the Catholics.

Luther, notwithſtanding, was not himſelf altogether ſatisfied with theſe reaſons. He did not think the ſtep he had taken could be ſufficiently juſtified upon the principles of human prudence; and therefore we find him, in other places, endeavouring to account for it from a ſupernatural impulſe. But whether there was any thing divine in it or not, Luther found himſelf extremely happy in his new ſtate, and eſpecially after his wife had brought him a ſon. "My rib Kate (ſays he in the joy of his heart) deſires her compliments to you, and thanks you for the favour of your kind letter. She is very well, through God's mercy. She is obedient and complying with me in all things; and more agreeable, I thank God, than I could have expected; ſo that I would not change my poverty for the wealth of Crœſus." He was heard to ſay (Seckendorf tells us), that he would not exchange his wife for the kingdom of France, nor for the riches of the Venetians; and that for

three reaſons: firſt, Becauſe ſhe had been given him by God, at the time when he implored the aſſiſtance of the Holy Ghoſt in finding a good wife: ſecondly, Becauſe, though ſhe was not without faults, yet ſhe had fewer than other women: and, thirdly, Becauſe ſhe religiouſly obſerved the conjugal fidelity ſhe owed him. There went at firſt a report, that Catharine de Bore was brought-to-bed ſoon after her marriage with Luther; but Eraſmus, who had wrote that news to his friends, acknowledged the falſity of it a little after.

His marriage, however, did not retard his activity and diligence in the work of reformation. He reviſed the Augſburg confeſſion of faith, and apology for the Proteſtants, when the Proteſtant religion was firſt eſtabliſhed on a firm baſis. See PROTESTANTS and REFORMATION.

After this, Luther had little elſe to do than to ſit down and contemplate the mighty work he had finiſhed: for that a ſingle monk ſhould be able to give the church ſo rude a ſhock, that there needed but ſuch another entirely to overthrow it, may very well ſeem a mighty work. He did indeed little elſe: for the remainder of his life was ſpent in exhorting princes, ſtates, and univerſities, to confirm the reformation which had been brought about through him; and publiſhing from time to time ſuch writings as might encourage, direct, and aid them in doing it. The emperor threatened temporal puniſhment with armies, and the pope eternal with bulls and anathemas; but Luther cared for none of their threats. His friend and coadjutor Melancthon was not ſo indifferent; for Melancthon had a great deal of ſoftneſs, moderation, and diffidence, in his make, which made him very uneaſy, and even ſorrowful, in the preſent diſorders. Hence we find many of Luther's letters written on purpoſe to ſupport and comfort him under theſe ſeveral diſtreſſes and anxieties.

In the year 1533 Luther wrote a conſolatory epiſtle to the citizens of Oſchatz, who had ſuffered ſome hardſhips for adhering to the Augſburg confeſſion of faith; in which, among other things, he ſays, "The devil is the hoſt, and the world is his inn; ſo that wherever you come, you ſhall be ſure to find this ugly hoſt." He had alſo about this time a terrible controverſy with George duke of Saxony, who had ſuch an averſion to Luther's doctrine, that he obliged his ſubjects to take an oath that they would never embrace it. However, 60 or 70 citizens of Leipſic were found to have deviated a little from the Catholic way in ſome point or other, and they were known previouſly to have conſulted Luther about it; upon which George complained to the elector John, that Luther had not only abuſed his perſon, but alſo preached up rebellion among his ſubjects. The elector ordered Luther to be acquainted with this; and to be told at the ſame time, that if he did not clear himſelf of the charge, he could not poſſibly eſcape puniſhment. But Luther eaſily refuted the accuſation, by proving, that he had been ſo far from ſtirring up his ſubjects againſt him, on the ſcore of religion, that, on the contrary, he had exhorted them rather to undergo the greateſt hardſhips, and even ſuffer themſelves to be baniſhed.

In the year 1534, the Bible tranſlated by him into German was firſt printed, as the old privilege, dated at Bibliopolis, under the elector's hand, ſhows; and it was publiſhed the year after. He alſo publiſhed this year a book againſt maſſes and the conſecration of prieſts, in which he relates a conference he had with the devil upon thoſe points; for it is remarkable in Luther's whole hiſtory, that he never had any conflicts of any kind within, but the devil was always his antagoniſt. In February 1537, an aſſembly was held at Smalkald about matters of religion, to which Luther and Melancthon were called. At this meeting Luther was ſeized with ſo grievous an illneſs, that there were no hopes of his recovery. He was afflicted with the ſtone, and had a ſtoppage of urine for 11 days. In this terrible condition he would needs undertake to travel, notwithſtanding all that his friends could ſay or do to prevent him: his reſolution, however, was attended with a good effect; for the night after his departure he began to be better. As he was carried along, he made his will, in which he bequeathed his Deteſtation of Popery to his friends and brethren; agreeably to what he often uſed to ſay: *Peſtis eram vivus, moriens ero mors tua, Papa*; that is, "I was the plague of Popery in my life, and ſhall continue to be ſo in my death."

This year the Pope and the court of Rome, finding it impoſſible to deal with the Proteſtants by force, began to have recourſe to ſtratagem. They affected therefore to think, that though Luther had indeed carried things on with a high hand and to a violent extreme, yet what he had pleaded in defence of theſe meaſures was not entirely without foundation. They talked with a ſeeming ſhow of moderation; and Pius III. who ſucceeded Clement VII. propoſed a reformation firſt among themſelves, and even went ſo far as to fix a place for a council to meet at for that purpoſe. But Luther treated this farce as it deſerved to be treated; unmaſked and detected it immediately; and, to ridicule it the more ſtrongly, cauſed a picture to be drawn, in which was repreſented the pope ſeated on high upon a throne, ſome cardinals about him with foxes' tails on, and ſeeming to evacuate upwards and downwards (*ſurſum deorſum repurgare*, as Melchior Adam expreſſes it). This was fixed over againſt the title-page, to let the readers ſee at once the ſcope and deſign of the book; which was, to expoſe that cunning and artifice with which thoſe ſubtle politicians affected to cleanſe and purify themſelves from their errors and ſuperſtitions. Luther publiſhed about the ſame time A Confutation of the pretended Grant of Conſtantine to Sylveſter Biſhop of Rome; and alſo ſome letters of John Huſs, written from his priſon at Conſtance to the Bohemians.

In this manner was Luther employed till his death, which happened in the year 1546. That year, accompanied by Melancthon, he paid a viſit to his own country, which he had not ſeen for many years, and returned again in ſafety. But ſoon after he was called thither again by the earls of Mansfeldt, to compoſe ſome differences which had ariſen about their boundaries. Luther had not been uſed to ſuch matters; but becauſe he was born at Iſleben, a town in the territory of Mansfeldt, he was willing to do his country what ſervice he could, even in this way. Preaching his laſt ſermon therefore at Wittemberg, upon the 17th of January, he ſet off on the 23d; and at Hall in Saxony lodged with Juſtus Jonas, with whom he ſtaid three days, becauſe the waters were out. Upon the 28th, he paſſed over the river with his three ſons and Dr. Jonas; and being in ſome danger, he ſaid to the Doctor, "Do not you think it would rejoice the devil exceedingly, if I and you, and my three ſons, ſhould be drowned?" When he entered the territories of the earls of Mansfeldt, he was received by 100 horſemen or more, and conducted in a very honourable manner; but was at the ſame time ſo very ill, that it was feared he would die. He ſaid, that theſe fits of ſickneſs often came upon him when he had any great buſineſs to undertake: of this, however, he did not recover; but died upon the 18th of February, in the 63d year of his age. A little before he expired, he admoniſhed thoſe that were about him to pray to God for the propagation of the Goſpel; "becauſe (ſaid he) the Council of Trent, which had ſat once or twice, and the Pope, would deviſe ſtrange things againſt it." Soon after, his body was put into a leaden coffin, and carried with funeral pomp to the church at Iſleben, when Dr. Jonas preached a ſermon upon the occaſion. The earls of Mansfeldt deſired that his body ſhould be interred in their territories: but the elector of Saxony inſiſted upon his being brought back to Wittemberg; which was accordingly done: and there he was buried

with the greateſt pomp that perhaps ever happened to any private man. Princes, earls, nobles, and ſtudents without number, attended the proceſſion; and Melancthon made his funeral oration.

A thouſand lies were invented by the Papiſts about Luther's death. Some ſaid that he died ſuddenly; others, that he killed himſelf; others, that the devil ſtrangled him; others, that his corpſe ſtunk ſo abominably, that they were forced to leave it in the way as it was carried to be interred. Nay, lies were invented about his death, even while he was yet alive. Luther, however, to give the moſt effectual refutation of this account of his death, put forth an advertiſement of his being alive; and, to be even with the Papiſts for the malice they had ſhown in this lie, wrote a book at the ſame time to prove that "the papacy was founded by the devil."

Luther's works were collected after his death, and printed at Wittemberg in 7 vols. folio. Catharine de Bore ſurvived her huſband a few years; and continued the firſt year of her widowhood at Wittemberg, though Luther had adviſed her to ſeek another place of reſidence. She went from thence in the year 1547, when the town was ſurrendered to the emperor Charles V. Before her departure, ſhe had received a preſent of 50 crowns from Chriſtian III. king of Denmark; and the elector of Saxony and the counts of Mansfeldt gave her good tokens of their liberality. With theſe additions, to what Luther had left her, ſhe had wherewithal to maintain herſelf and her family handſomely. She returned to Wittemberg, when the town was reſtored to the elector; where ſhe lived in a very devout and pious manner, till the plague obliged her to leave it again in the year 1552. She ſold what ſhe had at Wittemberg; and retired to Torgau, with a reſolution to end her life there. An unfortunate miſchance befel her in her journey thither, which proved fatal to her. The horſes growing unruly, and attempting to run away, ſhe leaped out of the vehicle ſhe was conveyed in; and, by leaping, got a fall, of which ſhe died about a quarter of a year after, at Torgau, upon the 20th of December 1552. She was buried there in the great church, where her tomb and epitaph are ſtill to be ſeen; and the univerſity of Wittemberg, which was then at Torgau becauſe the plague raged at Wittemberg, made a public programma concerning the funeral pomp.

LUTHERANISM, the ſentiments of Martin Luther with regard to religion. See LUTHER. Lutheraniſm has undergone ſome alterations ſince the time of its founder.—Luther rejected the epiſtle of St. James, as inconſiſtent with the doctrine of St. Paul, in relation to juſtification; he alſo ſet aſide the Apocalypſe: both which are now received as canonical in the Lutheran church.

Luther reduced the number of ſacraments to two, *viz.* baptiſm, and the euchariſt: but he believed the impanation, or conſubſtantiation, that is, that the matter of the bread and wine remain with the body and blood of Chriſt; and it is in this article that the main difference between the Lutheran and Engliſh churches conſiſts.

Luther maintained the maſs to be no ſacrifice; exploded the adoration of the hoſt, auricular confeſſion, meritorious works, indulgences, purgatory, the worſhip of images, &c. which had been introduced in the corrupt times of the Romiſh church. He alſo oppoſed the doctrine of free-will, maintained predeſtination, and aſſerted our juſtification to be ſolely by the imputation of the merits and ſatisfaction of Chriſt. He alſo oppoſed the faſtings in the Romiſh church, monaſtical vows, the celibate of the clergy, &c.

LUTHERANS, the Chriſtians who follow the opinions of Martin Luther, one of the principal reformers of the church in the 16th century. See LUTHER. The Lutherans, of all Proteſtants, are thoſe who differ leaſt from the Romiſh church; as they affirm, that the body and blood of Chriſt are materially preſent in the ſacrament of the Lord's ſupper, though in an incomprehenſible manner; and likewiſe repreſent ſome religious rites and inſtitutions, as the uſe of images in churches, the diſtinguiſhing veſtments of the clergy, the private confeſſion of ſins, the uſe of wafers in the adminiſtration of the Lord's ſupper, the form of exorciſm in the celebration of baptiſm, and other ceremonies of the like nature, as tolerable, and ſome of them as uſeful. The Lutherans maintain, with regard to the divine decrees, that they reſpect the ſalvation or miſery of men, in conſequence of a previous knowledge of their ſentiments and characters, and not as free and unconditional, and as founded on the mere will of God. Towards the cloſe of the laſt century, the Lutherans began to entertain a greater liberality of ſentiment than they had before adopted; though in many places they perſevered longer in ſevere and deſpotic principles than other Proteſtant churches. Their public teachers now enjoy an unbounded liberty of diſſenting from the deciſions of thoſe ſymbols or creeds which were once deemed almoſt infallible rules of faith and practice, and of declaring their diſſent in the manner they judge the moſt expedient. Moſheim attributes this change in their ſentiments to the maxim which they generally adopted, that Chriſtians were accountable to God alone for their religious opinions; and that no individual could be juſtly puniſhed by the magiſtrate for his erroneous opinions, while he conducted himſelf like a virtuous and obedient ſubject, and made no attempts to diſturb the peace and order of civil ſociety.

LUTHERN, in architecture, a kind of window over the cornice, in the roof of a building; ſtanding perpendicularly over the naked of a wall, and ſerving to illuminate the upper ſtory. Lutherns are of various forms; as ſquare, ſemicircular, round, called *bull's eyes*, *flat arches*, &c.

LUTRA, in zoology. See MUSTELA.

LUTTI (BENEDITTO), an eminent painter, born at Florence in 1666. He was the diſciple of Antonio Dominico Gabiani, and his merit was judged equal to that of his maſter: he painted few beſide eaſel pieces; and his works were much valued and ſought for in England, France, and Germany. The emperor knighted him; and the elector of Mentz, together with his patent of knighthood, ſent him a croſs ſet with diamonds. Lutti was never ſatisfied in finiſhing his pictures; yet, though he often retouched them, they never appeared laboured. He died in 1724.

LUTZEN, a town of Upper Saxony in Germany; famous for a battle fought here in 1632, when Guſtavus Adolphus king of Sweden was killed. It is ſituated on the river Elſter, in E. lon. 12. 37. N. lat. 51. 20.

LUXATION, is when any bone is moved out of its place or articulation, ſo as to impede or deſtroy its proper office or motion. See SURGERY.

LUXEMBURG, a city of the Auſtrian Netherlands, and capital of a duchy of the ſame name. It is ſeated partly on a hill, and partly on a plain; but is very ſtrong both by art and nature. It is but indifferently built, though there are ſome good ſtone houſes in it. There is nothing very remarkable among the ſtructures but the Jeſuits' church; which is a handſome edifice, after the modern taſte. It was taken by Louis XIV. in 1684; who ſo augmented the fortifications, that it is now one of the ſtrongeſt towns in Europe. It was ceded to Spain by the treaty of Ryſwick; but the French took it again in 1701, and gave it up to the houſe of Auſtria by the treaty of Utrecht. It is 25 miles ſouth-weſt of Treves, and 100 weſt of Mentz. E. lon. 6. 10. N. lat. 49. 52.

LUXEMBURG (the duchy of), is one of the 17 provinces of the Netherlands. It is bounded on the eaſt by the archbiſhoprick of Treves; on the ſouth by Lorrain; on the weſt, partly

by Champagne, and partly by the biſhoprick of Liege, which likewiſe, with part of Limburg, bound it on the north. It lies in the foreſt of Ardenne, which is one of the moſt famous in Europe. In ſome places it is covered with mountains and woods, and in general it is fertile in corn and wine; and here are a great number of iron-mines. The principal rivers are, the Moſelle, the Sour, the Ourte, and the Semoy. It belongs partly to the houſe of Auſtria, and partly to the French; and Thionville is the capital of the French part.

LUXEMBURG (François Henry de Montmorenci), duke of, and marſhal of France, a renowned general in the ſervice of Louis XIV. was born in 1628. He was with the prince of Conde at the battle of Rocroy in 1643, and in 1668 diſtinguiſhed himſelf at the conqueſt of Franche Compté. In 1672 he commanded in chief the French army in Holland; when he defeated the enemy near Woerden and Bodegrave, and was univerſally admired for the fine retreat he made in 1673. He became marſhal of France in 1675; gained the battle of Fleurus in 1690, that of Steenkirk in 1692, and that of Nerwind in 1693. He died at Verſailles in 1695.

LUXURIANS FLOS, "a luxuriant or double flower;" a flower, ſome of whoſe parts are increaſed in number, to the diminution or entire excluſion of others. The parts that are augmented or multiplied in luxuriant flowers, are the flower-cup and petals, which Linnæus conſiders as the teguments or covers of the flower; the parts that are diminiſhed, or entirely excluded, are the ſtamina or chives, which the ſame author denominates the male organs of generation.

Luxuriance in flowers is capable of the three following varieties: 1. A flower is ſaid to be MULTIPLIED *(flos multiplicatus)*, when the increaſe of the petals is not ſuch as to exclude all the ſtamina: in this ſenſe, flowers are properly ſaid to be double, triple, or quadruple, according to the number of multiplications of the petals. 2. A flower is ſaid to be FULL, *(flos plenus)*, when, by the multiplication of the petals, all the ſtamina are excluded. Such are moſt of the double flowers that engage the attention of floriſts. 3. A flower is ſaid to be PROLIFIC *(flos prolifer)*, which produces flowers, and ſometimes leaves, from its centre. For a particular deſcription of each of theſe kinds of luxuriance in flowers, ſee the articles MULTIPLICATUS *Flos*, PLENUS *Flos*, and PROLIFER *Flos*.

Many natural orders of plants do not in any circumſtances produce luxuriant flowers. Of this kind are the maſqued-flowers of Tournefort, excepting calve's ſnout; the rough-leaved, umbelliferous, ſtarry plants, and ſuch as flower at the joints, of Ray: ſome umbelliferous flowers, however, are *prolific*. The pea-bloom, or butterfly-ſhaped flowers, are rarely rendered double; ſome inſtances, however, of luxuriance are obſerved in a ſpecies of ladies-finger, coronilla, and broom.

All luxuriant flowers are vegetable monſters. Such as are perfectly full, by which we mean the greateſt degree of luxuriance, cannot be propagated by ſeeds; becauſe theſe, for want of impregnation, can never ripen. Full flowers therefore are very properly denominated by Linnæus *eunuchs*. This higheſt degree of luxuriance is very common in carnation, lychnis, anemone, ſtock, Indian creſs, roſe, marſh marigold, ranunculus, violet, pœony, and narciſſus. Flowers which do not exclude all the ſtamina, perfect their ſeeds. Of this kind are poppy, fennel-flower, campanula, and ſome others. Some flowers, as thoſe of the water-lily, fig-marigold, and cactus, have many rows or ſeries of petals, without the number of ſtamina being in the leaſt diminiſhed. Such flowers are by no means to be reckoned luxuriant, in the ſlighteſt degree. Luxuriance in flowers is generally owing to exceſs of nouriſhment.

LUXURY; voluptuouſneſs, or an extravagant indulgence in diet, dreſs, and equipage. Luxury, among the Romans, prevailed to ſuch a degree, that ſeveral laws were made to ſuppreſs, or at leaſt limit it. The extravagance of the table began about the time of the battle of Actium, and continued in great exceſs till the reign of Galba. Peacocks, cranes of Malta, nightingales, veniſon, wild and tame fowl, were conſidered as delicacies. A profuſion of proviſions was the reigning taſte. Whole wild boars were often ſerved up, and ſometimes they were filled with various ſmall animals, and birds of different kinds: this diſh they called the *Trojan horſe*, in alluſion to the wooden horſe filled with ſoldiers. Fowls and game of all ſorts were ſerved up in whole pyramids, piled up in diſhes as broad as moderate tables. Lucullus had a particular name for each apartment; and in whatever room he ordered his ſervants to prepare the entertainment, they knew by the direction the expence to which they were to go. When he ſupped in the Apollo, the expence was fixed at 50,000 *drachmæ*, that is 1250l. M. Antony provided eight boars for 12 gueſts. Vitellius had a large ſilver platter, ſaid to have coſt a million of *ſeſterces*, called *Minerva's buckler*. In this he blended together the livers of gilt-heads, the brains of pheaſants and peacocks, the tongues of phenicopters, and the milts of lampreys. Caligula ſerved up to his gueſts pearls of great value diſſolved in vinegar; the ſame was done alſo by Clodius the ſon of Æſop the tragedian. Apicius laid aſide 90,000,000 of *ſeſterces*, beſides a mighty revenue, for no other purpoſe but to be ſacrificed to luxury: finding himſelf involved in debt, he looked over his accounts, and though he had the ſum of 10,000,000 of *ſeſterces* ſtill left, he poiſoned himſelf for fear of being ſtarved to death.

The Roman laws to reſtrain luxury were *Lex Orchia*, *Fannia*, *Didia*, *Licinia*, *Cornelia*, and many others; but all theſe were too little; for, as riches increaſed amongſt them, ſo did ſenſuality.

What were the ideas of luxury entertained in England about two centuries ago, may be gathered from the following paſſage of Holingſhed; who, in a diſcourſe prefixed to his hiſtory, ſpeaking of the increaſe of luxury, ſays, "Neither do I ſpeak this in reproach of any man, God is my judge; but to ſhow, that I do rejoice rather to ſee how God has bleſſed us with his good gifts, and to behold how that in a time wherein all things are grown to the moſt exceſſive prices, we yet do find means to obtain and achieve ſuch furniture as heretofore was impoſſible. There are old men yet dwelling in the village where I remain, which have noted three things to be marvelouſly altered in England within their ſound remembrance. One is the multitude of chimneys lately erected; whereas in their young days there were not above two or three, if ſo many, in moſt uplandiſh towns of the realm (the religious houſes, and manor places of their lords, always excepted, and peradventure ſome great perſonages), but each made his fire againſt a reredoſs [ſkreen] in the hall where he dreſſed his meat and dined.—The ſecond is the great amendment of lodging; for, ſaid they, our fathers and we ourſelves have lain full oft upon ſtraw pallets covered only with a ſheet, under coverlits made of a dogſwaine or horharriots (to uſe their own terms), and a good log under their head inſtead of a bolſter.—If it were ſo that the father or goodman of the houſe had a mattreſs, or flock bed and ſheets, a ſack of chaff to reſt his head upon, he thought himſelf to be as well lodged as the lord of the town. So well were they contented, that pillows (ſaid they) were thought meet only for women in childbed: as for ſervants, if they had any ſheet above them, it was well; for ſeldom had they any under their bodies to keep them from pricking ſtraws, that ran oft through the canvas and their hardened hides.—The third thing they tell of, is the exchange of treene [wooden] platters into pewter, and wooden ſpoons into ſilver or tin; for ſo common were all ſorts of treene veſſels in old times, that a man ſhould hardly find four pieces pewter (of which one was peradventure a ſalt) in a good farmer's houſe. Again, in times paſt, men were contented to

dwell in houſes builded of ſallow, willow, &c. ſo that the uſe of oak was in a manner dedicated wholly unto churches, religious houſes, princes palaces, navigation, &c. But now willow, &c. are rejected, and nothing but oak any where regarded; and yet ſee the change, for when our houſes were builded of willow, then had we oaken men; but now that our houſes are come to be made of oak, our men are not only become willow, but a great many altogether of ſtraw, which is a ſore alteration. In theſe, the courage of the owner was a ſufficient defence to keep the houſe in ſafety; but now the aſſurance of the timber muſt defend the men from robbing. Now have we many chimneys, and yet our tenderlins complain of rheums, catarrhs, and poſes; then had we none but reredoſes, and our heads did never ach. For as the ſmoke in thoſe days were ſuppoſed to be a ſufficient hardening for the timber of the houſe; ſo it was reputed a far better medicine to keep the goodman and his family from the quacks or poſe; wherewith, as then, very few were acquainted. Again, our pewterers in time paſt employed the uſe of pewter only upon diſhes and pots, and a few other trifles for ſervice; whereas now they are grown into ſuch exquiſite cunning, that they can in a manner imitate by infuſion any form or faſhion, of cup, diſh, ſalt, bowl, or goblet, which is made by the goldſmiths craft, though they be ever ſo curious and very artificially forged. In ſome places beyond the ſea, a garniſh of good flat Engliſh pewter (I ſay flat, becauſe diſhes and platters in my time began to be made deep, and like baſons, and are indeed more convenient both for ſauce and keeping the meat warm) is eſteemed ſo precious as the like number of veſſels that are made of fine ſilver."

Particular inſtances of luxury in *eating*, however, might be adduced from an earlier period, ſurpaſſing even the extravagance of the Romans. Thus, in the 10th year of the reign of Edward IV. 1470, George Nevill, brother to the earl of Warwick, at his inſtalment into the archiepiſcopal ſee of York, entertained moſt of the nobility and principal clergy, when his bill of fare was 300 quarters of wheat, 350 tuns of ale, 104 tuns of wine, a pipe of ſpiced wine, 80 fat oxen, ſix wild bulls, 1004 wethers, 300 hogs, 300 calves, 3000 geeſe, 3000 capons, 300 pigs, 100 peacocks, 200 cranes, 200 kids, 2000 chickens, 4000 pigeons, 4000 rabbits, 204 bitterns, 4000 ducks, 200 pheaſants, 500 partridges, 2000 woodcocks, 400 plovers, 100 curlews, 100 quails, 1000 egrets, 200 rees, 400 bucks, does, and roebucks, 1506 hot veniſon paſties, 4000 cold ditto, 1000 diſhes of jelly parted, 4000 diſhes of jelly plain, 4000 cold cuſtards, 2000 hot cuſtards, 300 pikes, 300 breams, eight ſeals, four porpuſſes, 400 tarts. At this feaſt the earl of Warwick was ſteward, the earl of Bedford treaſurer, and lord Haſtings comptroller, with many more noble officers; 1000 ſervitors, 62 cooks, 515 menial apparitors in the kitchen.—But ſuch was the fortune of the man, that after his extreme prodigality he died in the moſt abject but unpitied poverty, *victus jacuit in ſumma inopia*.

And as to *dreſs*, luxury in that article ſeems to have attained a great height long before Holingſhed's time: For in the reign of Edward III. we find no fewer than ſeven ſumptuary laws paſſed in one ſeſſion of parliament to reſtrain it. It was enacted, that men ſervants of lords, as alſo of tradeſmen and artiſans, ſhall be content with one meal of fiſh or fleſh every day; and the other meals, daily, ſhall be of milk, cheeſe, butter, and the like. Neither ſhall they uſe any ornaments of gold, ſilk, or embroidery; nor their wives and daughters any veils above the price of twelvepence. Artiſans and yeomen ſhall not wear cloth above 40s. the whole piece (the fineſt then being about 6l. per piece), nor the ornaments before named. Nor the women any veils of ſilk, but only thoſe of thread made in England. Gentlemen under the degree of knights, not having 100l. yearly in land, ſhall not wear any cloth above 4½ marks the whole piece. Neither ſhall they or their females uſe cloth of gold, ſilver, or embroidery, &c. But eſquires having 200l. *per annum* or upwards of rent, may wear cloths of five marks the whole piece of cloth; and they and their females may alſo wear ſtuff of ſilk, ſilver, ribbons, girdles, or furs. Merchants, citizens, burghers, and artificers of tradeſmen, as well of London as elſewhere, who have goods and chattles of the clear value of 500l. and their females, may wear as is allowed to gentlemen and eſquires of 100l. *per annum*. And merchants, citizens, and burgeſſes, worth above 1000l. in goods and chattles, may (and their females) wear the ſame as gentlemen of 200l. *per annum*. Knights of 200 marks yearly may wear cloth of ſix marks the cloth, but no higher; but no cloth of gold, nor furred with ermine: but all knights and ladies having above 400 marks yearly, up to 1000l. *per annum*, may wear as they pleaſe, ermine excepted; and they may wear ornaments of pearl and precious ſtones for their heads only. Clerks having degrees in cathedrals, colleges, &c. may wear as knights and eſquires of the ſame income. Plowmen, carters, ſhepherds, and ſuch like, not having 40s. value in goods or chattles, ſhall wear no ſort of cloth but blanket and ruſſet lawn of 12d. and ſhall wear girdles and belts: and they ſhall only eat and drink ſuitable to their ſtations. And whoſoever uſes other apparel than is preſcribed by the above laws ſhall forfeit the ſame.

Concerning the general utility of luxury to a ſtate, there is much controverſy among the political writers. Baron Monteſquieu lays it down, that luxury is neceſſary in monarchies, as in France; but ruinous to democracies, as in Holland. With regard therefore to Britain, whoſe government is compounded of both ſpecies, it is held to be a dubious queſtion, how far private luxury is a public evil; and, as ſuch, cogniſable by public laws. And indeed our legiſlators have ſeveral times changed their ſentiments as to this point; for formerly there were a number of penal laws exiſting to reſtrain exceſs in apparel, chiefly made in the reigns of Edward III. IV. and Henry VIII. a ſpecimen of which we have inſerted above. But all of them it appeared expedient to repeal at an after period. In fact, although luxury will of neceſſity increaſe according to the influx of wealth, it may not be for the benefit of commerce to impoſe, as in the above cited laws, an abſolute prohibition of every degree of it: yet, for the good of the public, it may be neceſſary that ſuch as go beyond proper bounds in eating, drinking, and wearing what by no means is ſuitable to their ſtation, ſhould be taxed accordingly, could it be done without including thoſe who have a better title to ſuch indulgence. This is certainly, however, a point which ſhould be maturely weighed before executed; and, in mercantile countries at leaſt, ſuch reſtraints may be found prejudicial, moſt likely impracticable, eſpecially where true liberty is eſtabliſhed. Sir William Temple obſerves, ſpeaking of the trade and riches, and at the ſame time of the *frugality* of the Hollanders, "That ſome of our maxims are not ſo *certain* as *current* in politics: as that encouragement of exceſs and luxury, if employed in the conſumption of *native* commodities, is of advantage to trade. It may be ſo to that which impoveriſhes, but not to that which enriches a country. It is indeed leſs prejudicial, if it lies in *native* than in *foreign* wares; but the humour of *luxury* and expence cannot ſtop at certain bounds; what begins in *native* will proceed in *foreign* commodities; and though the example ariſe among idle perſons, yet the imitation will run into all degrees, even of thoſe men by whoſe induſtry the nation ſubſiſts. And beſides, the more of *our own* we ſpend, the leſs we ſhall have to ſend abroad; and ſo it will come to paſs, that while we drive a vaſt trade, yet, by buying much more than we *ſell*, we ſhall come to be poor at laſt."

LYBIA, or LIBYA, a name anciently given to all that part of Africa lying between the border of Egypt and the river Tri-

ton; and comprehending *Cyrenaica*, *Marmarica*, and the Regio *Syrtica*. See thoſe articles.

LYCÆUM, Λυκειον, in antiquity, the name of a celebrated ſchool or Academy at Athens, where Ariſtotle explained his philoſophy. The place was compoſed of porticoes, and trees planted in the quincunx form, where the philoſophers diſputed walking. Hence *philoſophy of the Lycæum* is uſed to ſignify the philoſophy of Ariſtotle, or the Peripatetic philoſophy. Suidas obſerves, that the Lycæum took its name from its having been originally a temple of Apollo Lycæus; or rather a portico or gallery built by Lycæus ſon of Apollo: but others mention it to have been built by Piſiſtratus or Pericles.

LYCÆUS (anc. geog.), a mountain of Arcadia, ſacred to Jupiter; whence *Jupiter Lycæus* (Pliny). Sacred alſo to Pan (Virgil): and hence *Lycæa*, the rites performed to Pan on this mountain; which Evander carrying with him to Latium, were called *Lupercalia* (Virgil).

LYCAON (fab. hiſt.), the firſt king of Arcadia, ſon of Pelaſgus and Meliboea. He built a town called Lycoſura, on the top of mount Lycæus, in honour of Jupiter. He had many wives, by whom he had a daughter called Calliſto, and 50 ſons. He was ſucceeded on the throne by Nyctimus, the eldeſt of his ſons. He lived about 1820 years before the Chriſtian æra.—Another king of Arcadia celebrated for his cruelties. He was changed into a wolf by Jupiter, becauſe he offered human victims on the altar of the god Pan. Some attribute this metamorphoſis to another cauſe. The ſins of mankind, as they relate, were become ſo enormous, that Jupiter viſited the earth to puniſh wickedneſs and impiety. He came to Arcadia, where he was announced as a god, and the people began to pay proper adoration to his divinity. Lycaon, however, who uſed to ſacrifice all ſtrangers to his wanton cruelty, laughed at the pious prayers of his ſubjects; and to try the divinity of the god, he ſerved up human fleſh on his table. This impiety ſo irritated Jupiter, that he immediately deſtroyed the houſe of Lycaon, and changed him into a wolf.

LYCAONIA (anc. geog.), a ſmall country of the Hither Aſia, contained between Pamphylia to the ſouth, Cappadocia to the north, Piſidia and Phrygia to the weſt, and Armenia Minor to the eaſt. *Lycaones*, the people. This country, though ſituated very near mount Taurus, and part of it on it, yet the Romans reckoned it into Aſia intra Taurum. *Arcadia*, anciently called *Lycaonia*, (Stephanus.)—Alſo an iſland in the Tiber, joined to Rome by a bridge, and to the land by another, namely, the Ceſtius and Fabricius.

LYCHNIS, CAMPION, in botany, including alſo the *Bachelor's-button*, *Catch-fly*, &c.: a genus of the pentagynia order, belonging to the pentandria claſs of plants; and in the natural method ranking under the 22d order, *Caryophyllæ*. The calyx is monophyllous, oblong, and ſmooth; there are five unguiculated petals, with the ſegments of the limbs almoſt bifid; the capſule quinquelocular.

The Species are, 1. The *Chalcedonica*, or Chalcedonian ſcarlet lychnis, hath a fibrated perennial root; upright, ſtraight, hairy, annual ſtalks, riſing three or four feet high, garniſhed with long, ſpear pointed, cloſe ſitting leaves, by pairs oppoſite; and the ſtalk crowned by a large, compact, flat bunch of beautiful ſcarlet or flame-coloured flowers, appearing in June and July. Of this there are varieties, with ſingle ſcarlet flowers, with large double ſcarlet flowers of exceeding beauty and elegance, with pale-red flowers, and with white flowers. Of theſe varieties, the double ſcarlet lychnis is ſuperior to all for ſize and elegance: the flowers being large, very double, and collected into a very large bunch, exhibit a charming appearance: the ſingle ſcarlet kind is alſo very pretty; and the others effect an agreeable variety with the ſcarlet kinds. 2. The *dioecia*, or dioecious lychnis, commonly called *bachelor's-button*, hath fibrated perennial roots; upright ſtalks, branching very diffuſe and irregular, two or three feet high, having oval, acute-pointed, rough leaves, by pairs oppoſite; and all the branches terminated by cluſters of dioecious flowers of different colours and properties in the varieties; flowering in April and May. The varieties are, the common ſingle red-flowered bachelor's button, double red, double white, and ſingle white-flowered. The double varieties are exceedingly ornamental in their bloom; the flowers large, very double, and continue long in blow: the ſingle red ſort grows wild by ditch ſides and other moiſt places in many parts of England; from which the doubles were accidentally obtained by culture in gardens. The flowers are often dioecious, *i. e.* male and female on diſtinct plants. 3. The *viſcaria*, or viſcous German lychnis, commonly called *catch-fly*, hath fibry perennial roots; crowned by a tuft of long graſſy leaves cloſe to the ground; many erect, ſtraight, ſingle ſtalks, riſing a foot and a half or two feet high, exuding from their upper part a viſcous or clammy matter; garniſhed with long narrow leaves, by pairs oppoſite; and terminated by many reddiſh purple flowers, in cluſters one above another, forming a ſort of long looſe ſpike; all the flowers with entire petals; flowering in May. Of this alſo there are varieties with ſingle red flowers, with double red flowers, and with white flowers. The double variety is conſiderably the moſt eligible for general culture, and is propagated in plenty by parting the roots. All the varieties of this ſpecies emitting a glutinous liquid matter from their ſtalks, flies happening to light thereon ſometimes ſtick and entangle themſelves, whence the plant obtains the name Catch-fly. 4. The *flos-cuculi*, cuckoo-flower lychnis, commonly called *ragged-robin*, hath fibry perennial roots; upright, branchleſs, channelled ſtalks, riſing near two feet high; garniſhed with long, narrow, ſpear-ſhaped leaves, in pairs oppoſite; and terminated by branchy foot-ſtalks, ſuſtaining many purple deeply quadrifid flowers; appearing in May. The flowers having each petal deeply quadrifid in a torn or ragged like manner, the plant obtained the cant name of Ragged-robin. There are varieties with ſingle flowers and double flowers. The double ſort is a large, very multiple, fair flower: it is an improved variety of the ſingle, which grows wild in moſt of our moiſt meadows, and is rarely cultivated; but the double, being very ornamental, merits culture in every garden. All the four ſpecies and reſpective varieties are very hardy; all fibrous-rooted, the roots perennial; but are annual in ſtalks, which riſe in ſpring, flower in ſummer, ſucceeded in the ſingles by plenty of ſeed in autumn, by which all the ſingle varieties may be raiſed in abundance, but the doubles only by dividing the roots, and ſome by cuttings of the flower-ſtalks.

LYCIA, a country of Aſia Minor, bounded by the Mediterranean on the ſouth, Caria on the weſt, Pamphylia on the eaſt, and Phrygia on the north. It was anciently called *Milyas*, and *Tremile*, from the Milyæ, or Solymi, a people of Crete, who came to ſettle there. The country received the name of *Lycia* from Lycus the ſon of Pandion, who eſtabliſhed himſelf there. The inhabitants have been greatly commended by all the ancients for their ſobriety and juſtice. They were conquered by Crœſus king of Lydia, and afterwards by Cyrus. Though they were ſubject to the power of Perſia, yet they were governed by their own kings, and only paid a yearly tribute to the Perſian monarch. They became part of the Macedonian empire when Alexander came into the eaſt, and afterwards were ceded to the houſe of the Seleucidæ. The country was reduced into a Roman province by the emperor Claudius.

LYCIUM, in botany: A genus of the monogynia order, belonging to the pentandria claſs of plants; and in the natural method ranking under the 28th order, *Luridæ*. The coroll-

is tubular, having its throat cloſed up with the beard of the filaments; the berry is bilocular. There are eight ſpecies, natives of various countries.

LYCODONTES, in natural hiſtory, the petrified teeth of the lupus-piſcis, or wolf-fiſh, frequently found foſſile. They are of different ſhapes; but the moſt common kind riſe into a ſemiorbicular form, and are hollow within, ſomewhat reſembling an acorn-cup; this hollow is found ſometimes empty, and ſometimes filled with the ſtratum in which it is immerſed. Many of them have an outer circle, of a different colour from the reſt.

LYCOMEDES (fab. hiſt.), a king of Scyros an iſland in the Ægean ſea. He was ſon of Apollo and Parthenope. He was ſecretly entruſted with the care of young Achilles, whom his mother Thetis had diſguiſed in woman's clothes, to remove him from the Trojan war, where ſhe knew he muſt unavoidably periſh. Lycomedes has rendered himſelf famous for his treachery to Theſeus, who had implored his protection when driven from his throne of Athens by the uſurper Mneſtheus. Lycomedes, as it is reported, either envious of the fame of his illuſtrious gueſts, or bribed by the emiſſaries of Mneſtheus, led Theſeus to an elevated place, on pretence to ſhow him the extent of his dominions, and perfidiouſly threw him down a precipice, where he was killed.

LYCOPERDON, in botany: A genus of the natural order of fungi, belonging to the cryptogamia claſs of plants. The fungus is roundiſh, and full of farinaceous ſeeds. There are 10 ſpecies, of which the following are the moſt remarkable: 1. The *tuber*, truffles, or ſubterraneous puff-balls, is a native of woods both in Scotland and England. It is a ſubterraneous fungus, growing generally in cluſters three or four inches under ground, without any viſible root. The figure of it is nearly ſpherical, the ſize that of a potatoe; the exterior coat at firſt white, afterwards black, and ſtudded with pyramidical or polyhedrous tubercles; the internal ſubſtance ſolid and callous, of a dirty white or pale brown colour, grained like a nutmeg with ſerpentine lines; in which, according to Micheli, are imbedded minute oval capſules, containing each from two to four round warted ſeeds. The truffles of Great Britain ſeldom exceed three or four ounces in weight; but in Italy, and ſome other parts of the continent, they are ſaid to have been found of the enormous ſize of eight and even fourteen pounds. They are received at our tables, either freſh and roaſted like potatoes, or dried and ſliced into ragouts. They have a volatile and ſomewhat urinous ſmell, and are reputed to be aphrodiſiacal. Dogs are with much pains taught to hunt for them by the ſcent, and to ſcratch up the ground under which they lie. 2. The *boviſta*, or common puff-ball, is frequent in meadows and paſtures in the autumn. It varies exceedingly in ſize, figure, ſuperficies, and colour. In general, it conſiſts of a ſack or bag, having a root at its baſe, and the bag compoſed of three membranes, an epidermis, a tough white ſkin, and an interior coat which adheres cloſely to the central pith. The pith in the young plants is of a yellowiſh colour, at firſt firm and ſolid, but ſoon changes into a cellular ſpongy ſubſtance, full of a dark dull-green powder, which diſcharges itſelf through an aperture at the top of the fungus, which aperture is formed of lacerated ſegments, in ſome varieties reflexed. The powder is believed to be the ſeeds, which through a microſcope appear of a ſpherical form, and to be annexed to elaſtic hairs. See *Haller's Hiſt. Helvet. n.* 2172.

Among the numerous varieties of this fungus, the glabrum is moſt remarkable. It is a ſmooth ſeſſile kind, of a nearly ſpherical form, puckered or contracted at the root. This ſometimes grows to an enormous ſize. It has been found in England as big as a man's head; and at Carraria, near Padua in Italy, ſpecimens have been gathered, weighing 25 pounds, and meaſuring two yards in circumference: but its more ordinary ſize is that of a walnut or an apple.

The varieties of this ſpecies have no limits, being frequently found to run into one another; the ſcaly, warty, and echinated coats turning ſmooth as the plants grow old, and the neck of the fungus having no determinate length. The natural colour of the puff-ball is either white, grey, or aſh-coloured: but is ſometimes found yelloviſh, tawny, and browniſh. The internal ſpongy part of it, bound on to wounds, is eſteemed good to ſtop bleedings. Preſſed and dried in an oven, the puff-ball becomes a kind of tinder, the ſmoke of which is ſaid to intoxicate bees. See *Gent. Mag.* July 1766. The Italians fry the great variety, and indeed any of the others when young, and eat them with ſalt and oil, according to the relation of Marſigli.

LYCOPERSICON. See SOLANUM.

LYCOPHRON, a famous Greek poet and grammarian, born at Colchis in Eubœa, flouriſhed about 304 B. C. and, according to Ovid, was killed by an arrow. He wrote 20 tragedies; but all his works are loſt, except a poem entitled *Caſſandra*, which contains a long train of predictions, which he ſuppoſes to have been made by Caſſandra, Priam's daughter. This poem is extremely obſcure. The beſt edition of it is that of Dr. Potter, printed at Oxford in 1697, folio.

LYCOPODIUM, or CLUB-MOSS; a genus of the natural order of muſci, belonging to the cryptogamia claſs of plants. The antheræ are bivalved and ſeſſile; there are no calyptra. There are 24 ſpecies; of which the following are the moſt remarkable: 1. The *clavatum*, or common club-moſs, is common in dry and mountainous places, and in fir foreſts. The ſtalk is proſtrate, branched, and creeping, from a foot to two or three yards long; the radicles woody. The leaves are numerous, narrow, lanceolated, acute, often incurved at the extremity, terminated with a long white hair, and everywhere ſurround the ſtalk. The peduncles are erect, firm, and naked (except being thinly ſet with lanceolate ſcales), and ariſe from the ends of the branches. They are generally two or three inches long, and terminated with two cylindrical yelloviſh ſpikes, imbricated with oval-acute ſcales, finely lacerated on the edges, and ending with a hair. In the *ala* or boſom of the ſcale is a kidney-ſhaped capſule, which burſts with elaſticity when ripe, and throws out a light yellow powder, which, blown into the flame of a candle, flaſhes with a ſmall exploſion. The Swedes make mats of this moſs to rub their ſhoes upon. In Ruſſia, and ſome other countries, the powder of the capſules is uſed in medicine to heal galls in children, chops in the ſkin, and other ſores. It is alſo uſed to powder over officinal pills, and to make artificial lightning at theatres. The Poles make a decoction of the plant, and, dipping a linen cloth into it, apply it to the heads of perſons afflicted with the diſeaſe called the *plica polonica*, which is ſaid to be cured by this kind of fomentation. 2. The *ſelago*, or fir club-moſs, is common in the Highland mountains of Scotland, and in the Hebrides. The ſtalk at the baſe is ſingle and reclining; but a little higher is divided into upright dichotomous branches, from two to ſix inches high, ſurrounded with eight longitudinal oblique ſeries of lanceolate, ſmooth, rigid, imbricated leaves. Near the ſummits of the branches, in the *læ* of the leaves, are placed ſingle kidney-ſhaped capſules, conſiſting of two valves, which open horizontally like the ſhells of an oyſter, and caſt out a fine yellow powder. Theſe capſules Linnæus ſuppoſes to be *antheræ*, or male parts of fructification. In the *alæ* alſo of many of the leaves, near the tops of the branches, are often found what the ſame great author calls *female flowers*, but which the ingenious Haller eſteems to be only germs or buds of a future plant. They conſiſt, firſt, of four ſtiff, lanceolate, incurved, minute leaves, one

of the outermoſt longer and larger than the reſt. Theſe are ſuppoſed to correſpond to the *calyx* in regular flowers. Again, at the bottom of this *calyx* are five ſmall pellucid ſubſtances reſembling leaves, viſible only by a microſcope, which are ſuppoſed analogous to piſtils. Theſe, in time, grow up into three large broad leaves, two of the five united together like the hoof of an ox; with a third, narrower one annexed at the baſe, and two other minute ones oppoſite to the other three. Theſe five leaves are joined at the baſe; and in autumn, falling from the *calyx*, vegetate, and produce a new plant. See a diſſertation *De feminibus muſcorum, Amœnit. Academ.* II. p. 261. In the iſland of Raaſay, near Sky, in Roſsſhire, and ſome other places, the inhabitants make uſe of this plant inſtead of alum, to fix the colours in dyeing. The Highlanders alſo ſometimes take an infuſion of it as an emetic and cathartic: but it operates violently; and, unleſs taken in a ſmall doſe, brings on giddineſs and convulſions. Linnæus informs us, that the Swedes uſe a decoction of it to deſtroy lice on ſwine and other animals.

LYCOPOLIS, or Lycon, (anc. geog.) ſo called from the worſhip of wolves. *Lycopolitæ*, the people; *Lycopolites*, the diſtrict. There were two towns of this name, one in the Delta, or Lower Egypt, near the Mediterranean; the other in the Thebais, or Higher Egypt, in the northern part, to the weſt of the Nile.

LYCOPSIS, in botany: A genus of the monogynia order, belonging to the pentandria claſs of plants; and in the natural method ranking under the 41ſt order, *Aſperifoliæ*. The corolla has an incurvated tube.

LYCOPUS, in botany: A genus of the monogynia order, belonging to the diandria claſs of plants; and in the natural method ranking under the 42d order, *Verticillatæ*. The corolla is quadrifid, with one of the ſegments emarginated; the ſtamina ſtanding aſunder, with four retuſe ſeeds.

LYCURGIA, a feſtival obſerved by the Spartans, in memory of their lawgiver Lycurgus, whom they honoured with a temple and anniverſary ſacrifice.

LYMPHÆA, were artificial caves or grottos amongſt the Romans, furniſhed with a great many tubes, canals, and various hydraulic apparatus, through which the water guſhed out upon the ſpectators unexpectedly whilſt they were admiring the beautiful arrangement of the ſhell-work in the grotto.

LYCURGUS, the celebrated legiſlator of the Spartans, was the ſon of Eunomes king of Sparta.——He travelled to Greece, to the iſle of Crete, to Egypt, and even to the Indies, to converſe with the ſages and learned men of thoſe countries, and to learn their manners, their cuſtoms, and their laws. After the death of his brother Polydectes, who was king of Sparta, his widow offered the crown to Lycurgus, promiſing that ſhe would make herſelf miſcarry of the child of which ſhe was pregnant, provided he would marry her; but Lycurgus nobly refuſed theſe advantageous offers, and afterwards contented himſelf with being tutor to his nephew Charillos, and reſtored to him the government when he came of age; but notwithſtanding this regular and generous conduct, he was accuſed of a deſign to uſurp the crown. This calumny obliged him to retire to the iſland of Crete, where he applied himſelf to the ſtudy of the laws and cuſtoms of nations. At his return to Lacedemon, he reformed the government: and, to prevent the diſorders occaſioned by luxury and the love of riches, he prohibited the uſe of gold and ſilver; placed all the citizens in a ſtate of equality; and introduced the ſtricteſt temperance, the moſt exact diſcipline, and thoſe admirable laws which (a few excepted) have been celebrated by all hiſtorians. It is ſaid, that, to engage the Lacedemonians to obſerve them inviolably, he made them promiſe with an oath not to change any part of them till his return; and that he afterwards went to the iſland of Crete, where he killed himſelf, after having ordered that his aſhes ſhould be thrown into the ſea, for fear leſt if his body ſhould be carried to Sparta the Lacedemonians ſhould think themſelves abſolved from their oath. He flouriſhed about 870 B. C.

LYDD, a town in the county of Kent, two miles and a half ſouth-weſt of Romney, of which town and port it is a member, and 71 miles from London. It is a populous town, with a market on Thurſday, and fair on July 24th. It is incorporated by the name of a bailiff, elected July 22d, jurats, and commonalty. In the beach near Stone-end is a heap of ſtones fancied to be the tomb of Criſpin and Criſpianus. And near the ſea is a place called *Holmſtone*, conſiſting of beach and pebble-ſtones, which abounds nevertheleſs with holm trees. Here is a charity-ſchool.

LYDGATE (John), called the *Monk of Bury*; not, as Cibber conjectures, becauſe he was a native of that place, for he was born about the year 1380, in the village of Lydgate; but becauſe he was a monk of the Benedictine convent at St. Edmund's-Bury. After ſtudying ſome time in our Engliſh univerſities, he travelled to France and Italy; and, having acquired a competent knowledge of the languages of thoſe countries, he returned to London, where he opened a ſchool, in which he inſtructed the ſons of the nobility in polite literature. At what time he retired to the convent of St. Edmund's-Bury, does not appear; but he was certainly there in 1415. He was living in 1446, aged about 66; but in what year he died is not known. Lydgate, according to Pits, was an elegant poet, a perſuaſive rhetorician, an expert mathematician, an acute philoſopher, and a tolerable divine. He was a voluminous writer; and, conſidering the age in which he lived, an excellent poet. His language is leſs obſolete, and his verſification much more harmonious, than the language and verſification of Chaucer, who wrote about half a century before him. He wrote, 1. Hiſtory of the Theban war, printed at the end of Chaucer's works, 1561, 1602, 1687, 2. Poemation of good counſel; at the end of Chaucer's works. 3. The life of Hector; London 1594, fol. printed by Groſs, dedicated to Henry V. 3. Life of the Bleſſed Virgin: printed by Caxton. 4. The proverbs of Lydgate upon the fall of princes; printed by Wink. Word. Lond. . . . 4to. 5. Diſpute of the horſe, the ſheep, and the gooſe; printed in Caxton's Collect. 4to. 6. The temple of braſs; among the works of Chaucer. 7. London lickpenny; *vide* Stowe's hiſtory, &c. &c. Beſides an incredible number of other poems and tranſlations preſerved in various libraries, and of which the reader will find a catalogue in biſhop Tanner.

LYDIA (anc. geog.), a celebrated kingdom of Aſia Minor.—All the ancient writers tell us, that Lydia was firſt called *Mæonia* or *Meonia*, from Meon king of Phrygia and Lydia; and that it was known under no other denomination till the reign of Atys, when it began to be called *Lydia* from his ſon Lydus. Bochart finding in his learned collection of Phœnician words the verb *luz*, ſignifying "to wind," and obſerving that the country we are ſpeaking of is watered by the Mæander ſo famous for its windings, concludes that it was thence named *Lydia* or *Ludia*. As to the ancient name of Mæonia, he takes it to be a Greek tranſlation of the Phœnician word *lud*; wherein he agrees in ſome meaſure with Stephanus, who derives the name of Mæonia from Mæon the ancient name of the Mæander. Some take the word *mæonia* to be a tranſlation of a Hebrew word ſignifying "metal," becauſe that country, ſay they, was in former times enriched above any other with mines. Though Lydia and Mæonia are by moſt authors indifferently uſed for one and the ſame country, yet they are ſometimes diſtinguiſhed; that part where mount Tmolus ſtood, watered by the Pactolus, being properly called *Mæonia*; and the other, lying on the coaſt, *Lydia*. This diſtinction is uſed by Homer, Callimachus, Dionyſius,

and other ancient writers. In after ages, when the Ionians, who had planted a colony on the coaſt of the Ægean Sea, began to make ſome figure, that part was called *Ionia*, and the name of *Lydia* given to the ancient Mæonia.—Lydia, according to Pliny, Ptolemy, and other ancient geographers, was bounded by the Myſia Major on the north, by Caria on the ſouth, by Phrygia Major on the eaſt, and Ionia on the weſt, lying between the 37th and 39th degrees of north latitude. What the ancients ſtyle the kingdom of *Lydia* was not confined within theſe narrow boundaries, but extended from Halys to the Ægean ſea. Pliny's deſcription includes Æolia, lying between the Hermus and the Caicus.

As to the origin of the Lydians, Joſephus, and after him all the eccleſiaſtic writers, derive them from Lud, Shem's fourth ſon; but this opinion has no other foundation than the ſimilitude of names. Some of the ancients will have the Lydians to be a mixed colony of Phrygians, Myſians, and Carians. Others finding ſome conformity in religion and religious ceremonies between the Egyptians and Tuſcans who were a Lydian colony, conclude them, without any farther evidence, to be originally Egyptians. All we know for certain is, that the Lydians were a very ancient nation, as is manifeſt from their very fables; for Atys, Tantalus, Pelops, Niobe, and Arachne, are all ſaid to have been the children of Lydus. And Zanthus in his *Lydiaca*, quoted by Stephanus, informs us, that the ancient city of Aſcalon, one of the five ſatrapies of the Philiſtines, mentioned in the books of Joſhua and the Judges, was built by one Aſcalus a Lydian, whom Achiamus king of Lydia had appointed to command a body of troops which he ſent, we know not on what occaſion, into Syria. The Heraclidæ, or kings of Lydia, deſcended from Hercules, began to reign before the Trojan war; and had been preceded by a long ſeries of ſovereigns ſprung from Atys, and hence ſtyled *Atyadæ*: a ſtrong proof of the antiquity of that kingdom.

The Lydians began very early to be ruled by kings whoſe government ſeems to have been truly deſpotic and the crown hereditary. We read of three diſtinct races of kings reigning over Lydia, viz. the Atyadæ, the Heraclidæ, and the Mermnadæ.

The *Atyadæ* were ſo called from Atys the ſon of Cotys and grandſon of Manes the firſt Lydian king. But the hiſtory of this family is obſcure and fabulous.

The Atyadæ were ſucceeded by the *Heraclidæ*, or the deſcendants of Hercules. For Hercules being, by the direction of the oracle, ſold as a ſlave to Omphale a queen of Lydia to expiate the murder of Iphitus, had, during his captivity, by one of her ſlaves, a ſon named *Cleolaus*, whoſe grandſon Argon was the firſt of the Heraclidæ that aſcended the throne of Lydia. This race is ſaid to have reigned 505 years, the father ſucceeding the ſon for 22 generations. They began to reign about the time of the Trojan war. The laſt of the family was the unhappy Candaules, who loſt both his life and kingdom by his imprudence; an event of which we have the following account by Herodotus. Candaules had a wife whom he paſſionately loved, and believed the moſt beautiful of her ſex. He extolled her charms to Gyges his favourite, whom he uſed to entruſt with his moſt important affairs; and, the more to convince him of her beauty, reſolved to ſhow her to him quite naked: he accordingly placed him in the porch of her chamber where the queen uſed to undreſs when ſhe went to bed, ordering him to retire after he ſhould have ſeen her, and take all poſſible care not to be obſerved. But notwithſtanding all the caution he could uſe, ſhe plainly diſcovered him going out; and though ſhe did not doubt but it was her huſband's contrivance, yet ſhe paſſed that night in a ſeeming tranquillity, ſuppreſſing her reſentment till next morning, while ſhe ſent for Gyges, and reſolutely told him that he muſt either by his death atone for the criminal action he had been guilty of, or put to death Candaules the contriver of it, and receive both her and the kingdom of Lydia for his reward. Gyges at firſt earneſtly begged of her that ſhe would not drive him to the neceſſity of ſuch a choice. But finding that he could not prevail with her, and that he muſt either kill his maſter or die himſelf, he choſe the former part of the alternative. Being led by the queen to the ſame place where her huſband had poſted him the night before, he ſtabbed the king while he was aſleep, married the queen, and took poſſeſſion of the kingdom, in which he was confirmed by the anſwer of the Delphic oracle. The Lydians having taken up arms to revenge the death of their prince, an agreement was made between them and the followers of Gyges, that if the oracle ſhould declare him to be lawful king of Lydia he ſhould be permitted to reign; if not, he ſhould reſign the crown to the Heraclidæ. The anſwer of the oracle proving favourable to Gyges, he was univerſally acknowledged for lawful king of Lydia. Candaules is ſaid to have purchaſed a picture painted by Bularchas, repreſenting a battle of the Magnetes, for its weight in gold; a circumſtance which ſhows how early the art of painting began to be in requeſt, for Candaules was cotemporary with Romulus.

Gyges having thus poſſeſſed himſelf of the kingdom of Lydia, ſent many rich and valuable preſents to the oracle of Delphos, among others, ſix cups of gold, weighing 30 talents, and greatly eſteemed for the workmanſhip. He made war on Miletus and Smyrna, took the city of Colophon, and ſubdued the whole country of Troas. In his reign, and by his permiſſion, the city of Abydus was built by the Mileſians. Plutarch and other writers relate his acceſſion to the crown of Lydia in a quite different manner, and tell us, without making any mention of the queen, that Gyges rebelled againſt Candaules and ſlew him in an engagement. In Gyges began the third race called *Mermnadæ*; who were alſo, properly ſpeaking, Heraclidæ, being deſcended from a ſon of Hercules by Omphale. Gyges reigned 38 years, and was ſucceeded by his ſon Ardyes.

This prince carried on the war againſt the Mileſians which his father had begun, and poſſeſſed himſelf of Priene, in thoſe days a ſtrong city. In his reign the Cimerians invaded and over-ran all Aſia Minor; but what battles were fought between the Lydians and theſe invaders, and with what ſucceſs, we find no where mentioned. Herodotus only informs us, that in the time of Ardyes they poſſeſſed themſelves of Sardis, the metropolis of Lydia, but could never reduce the caſtle. Ardyes reigned 49 years, and was ſucceeded by his ſon Sadyattes, who reigned 12 years, and warred moſt part of his reign with the Mileſians.

After him came his ſon Alyattes, who for the ſpace of five years continued the war which his father had begun againſt the Mileſians, ravaging their country, and about harveſt time carrying away all their corn yearly, in order to oblige them, for want of proviſions, to ſurrender their city, which he knew he could not reduce any other way, the Mileſians being at that time maſters of the ſea. In the 12th year of this war the Lydians having ſet fire to the corn in the fields, the flames were carried by a violent wind, which happened to blow at that time, to the temple of Minerva at Aſſeſus, and burnt it down to the ground. Not long after, Alyattes falling ſick, ſent to conſult the oracle at Delphos; which refuſed to return any anſwer till ſuch time as the king ſhould rebuild the temple of Minerva at Aſſeſus. Alyattes, thus warned, diſpatched ambaſſadors to Miletus, enjoining them to conclude a truce with the Mileſians till the temple ſhould be rebuilt. On the arrival of the ambaſſadors, Thraſybulus, then king of Miletus, commanded all the corn that was at that time in the city to be brought into the market-place, ordering the citizens to banquet in public, and revel as if the city were

plentifully ſtored with all manner of proviſions. This ſtratagem Thraſybulus practiſed, to the end that the ambaſſadors ſeeing ſuch quantities of corn, and the people every where diverting themſelves, might acquaint their maſter with their affluence, and divert him from purſuing the war. As Thraſybulus had deſigned, ſo it happened; for Alyattes, who believed the Mileſians greatly diſtreſſed for proviſions, receiving a different account from his ambaſſadors, changed the truce into a laſting peace, and ever afterwards lived in amity and friendſhip with Thraſybulus and the Mileſians. He was ſucceeded, after a reign of 57 years, by his ſon Crœſus, whoſe uninterrupted proſperity, in the firſt years of his reign, far eclipſed the glory of all his predeceſſors. He was the firſt that made war on the Epheſians, whoſe city he beſieged and took notwithſtanding their conſecrating it to Diana, and faſtening the walls by a rope to her temple, which was ſeven ſtadia diſtant from the city. After the reduction of Epheſus, he attacked, under various pretences, the Ionians and Æolians, obliging them, and all the other Greek ſtates of Aſia, to pay him a yearly tribute. Having met with ſuch extraordinary ſucceſs by land, the Lydian prince determined to render his power equally conſpicuous by ſea. For this purpoſe he thought ſeriouſly of equipping a fleet; with which he purpoſed to invade and conquer the Grecian iſlands directly fronting his dominions. But this deſign, which, conſidering the ſlow progreſs in maritime power among the nations moſt diligent to attain it, would probably have failed of ſucceſs, was prevented by the advice of a philoſophical traveller conveyed in ſuch a lively turn of wit, as eaſily changed the reſolution of the king. Bias of Priené in Ionia, ſome ſay Pittacus of Mitylene in the iſle of Leſbos, while he travelled, after the Grecian cuſtom, from curioſity and a love of knowledge, was preſented to Crœſus at the Lydian court; and being aſked by that prince what news from Greece; he anſwered with a republican freedom, that the iſlanders had collected powerful ſquadrons of cavalry with an intention of invading Lydia. "May the gods grant (ſaid Crœſus), that the Greeks, who are unacquainted with horſemanſhip, ſhould attack the diſciplined valour of the Lydian cavalry; there would ſoon be an end to the conteſt." "In the ſame manner (replied Bias), as if the Lydians, who are totally unexperienced in naval affairs, ſhould invade the Grecians by ſea." Struck by the acuteneſs of this unexpected obſervation, Crœſus deſiſted from his intended expedition againſt the iſlands, and, inſtead of employing new means for extending his conqueſts, determined peaceably to enjoy the laurels which he had won, and to diſplay the grandeur which he had attained. But his happineſs was ſoon after allayed by the death of his favourite ſon Atys, who was unfortunately killed at the chace of a wild boar. For this loſs he continued diſconſolate for two years and in a ſtate of inaction, till the conqueſts of Cyrus, and growing power of the Perſians, rouſed up his martial ſpirit, and diverted his mind to other thoughts. He apprehended that the ſucceſs which attended Cyrus in all his undertakings, might at laſt prove dangerous to himſelf, and therefore reſolved to put a ſtop, if poſſible, to his progreſs. In taking this reſolution, which might probably be attended with the moſt important conſequences, he was deſirous to learn the will of heaven concerning the iſſue of the war. The principal oracles which he conſulted were thoſe of Branchis in Ionia, of Hammon in Libya, and of Delphi in Greece. Among theſe reſpected ſhrines, the oracle of Delphi maintained its aſcendant, as the moſt faithful interpreter of fate. Crœſus was fully perſuaded of its veracity; and deſirous generouſly to compenſate for the trouble which he had already given, and ſtill meant to give, the prieſts of Apollo, he ſacrificed 3000 oxen to the god, and adorned his ſhrine with dedications equally valuable for the workmanſhip and for the materials; precious veſſels of ſilver, ewers of iron beautifully inlaid and enamelled; various ornaments of pure gold, particularly a golden lion weighing ten talents, and a female figure three cubits or near five feet high. In return for theſe magnificent preſents, the oracle, in ambiguous language, flattered Crœſus with obtaining an eaſy victory over his enemies, and with enjoying a long life and a proſperous reign. The god at the ſame time enjoined him to contract an alliance with the moſt powerful of the Grecian ſtates.

Elevated with theſe favourable predictions of Apollo, Crœſus prepared to yield a ready obedience to the only condition required on his part for the accompliſhment of his aſpiring purpoſe. Not deeming himſelf ſufficiently acquainted with the affairs of Greece, to know what particular republic was meant by the oracle, he made particular inquiry of thoſe beſt informed concerning the ſtate of Europe; and diſcovered, that among all the members of the Grecian confederacy, the Athenians and Lacedemonians were juſtly entitled to the preeminence. In order to learn which of theſe communities deſerved the epithet of *moſt powerful*, it was neceſſary to ſend ambaſſadors into Greece. The Lydians diſpatched with this important commiſſion, ſoon diſcovered that the Athenians, after having been long haraſſed by internal diſſenſions, were actually governed by the tyrant Piſiſtratus. The Spartans, on the other hand, though anciently the worſt regulated of all the Grecian communities, had enjoyed domeſtic peace and foreign proſperity ever ſince they had adopted the wiſe inſtitutions of Lycurgus. After that memorable period, they had repeatedly conquered the warlike Argives, triumphed over the hardy Arcadians; and, notwithſtanding the heroic exploits of Ariſtomenes, ſubdued and enſlaved their unfortunate rivals of Meſſene. To the Lydian ambaſſadors, therefore, the Spartan republic appeared to be pointed out by the oracle as the community whoſe alliance they were enjoined to ſolicit. Having repaired accordingly to Sparta, they were introduced not only to the kings and ſenate, but, as the importance of the negotiation required, to the general aſſembly of the Lacedemonians, to whom they, in few words, declared the object of their commiſſion: "We are ſent, O Lacedemonians! by Crœſus, king of the Lydians and of many other nations, who being commanded by the oracle of Apollo to ſeek the friendſhip of the moſt powerful people of Greece, now ſummons you, who juſtly merit that epithet, to become his faithful allies, in obedience to the will of the god whoſe authority you acknowledge." The Lacedemonians, pleaſed with the alliance of a warlike king, and ſtill more with the fame of their valour, readily accepted the propoſal. To the ſtrict connection of an offenſive and defenſive league, they joined the more reſpected ties of ſacred hoſpitality. A few years before this tranſaction, they had ſent to purchaſe gold at Sardis for making a ſtatue of Apollo. Crœſus had on that occaſion gratuitouſly ſupplied their want. Remembering this generoſity, they gave the Lydian ambaſſadors at their departure, as a preſent for their maſter, a veſſel of braſs containing 300 amphoras (above 12 hogſheads), and beautifully carved on the outſide with various forms of animals.

Crœſus, having thus happily accompliſhed the deſign recommended by the oracle, was eager to ſet out upon his intended expedition. He had formerly entered into alliance with Amaſis king of Egypt, and Labynetus king of Babylon. He had now obtained the friendſhip of the moſt warlike nation of Europe. The newly-raiſed power of Cyrus and the Perſians ſeemed incapable of reſiſting ſuch a formidable confederacy.

Elevated with theſe flattering ideas of his own invincible greatneſs, Crœſus waited not to attack the Perſian dominions until he had collected the ſtrength of his allies. The ſanguine

impetuoſity of his temper, unexperienced in adverſity, unfortunately precipitated him into meaſures no leſs ruinous than daring. Attended only by the arms of Lydia, and a numerous band of mercenaries, whom his immenſe wealth enabled him at any time to call into his ſervice, he marched towards the river Halys; and having croſſed with much difficulty that deep and broad ſtream, entered the province of Cappadocia, which formed the weſtern frontier of the Median dominions. That unfortunate country ſoon experienced all the calamities of invaſion. The Pterian plain, the moſt beautiful and the moſt fertile diſtrict of Cappadocia, was laid waſte; the ports of the Euxine, as well as ſeveral inland cities, were plundered; and the inoffenſive inhabitants were either put to the ſword or dragged into captivity. Encouraged by the unreſiſting ſoftneſs of the natives of thoſe parts, Crœſus was eager to puſh forwards; and if Cyrus did not previouſly meet him in the field, he had determined to proceed in triumph to the mountains of Perſia. Againſt this dangerous reſolution he was in vain exhorted by a Lydian named Sandanis; who, when aſked his opinion of the war, declared it with that freedom which the princes of the Eaſt have in every age permitted, amidſt all the pride and caprices of deſpotic power, to men diſtinguiſhed by the gifts of nature or education. "You are preparing, O king, to march againſt a people who lead a laborious and a miſerable life; whoſe daily ſubſiſtence is often denied them, and is always ſcanty and precarious; who drink only water, and who are clothed with the ſkins of wild beaſts. What can the Lydians gain by the conqueſt of Perſia; they who enjoy all the advantages of which the Perſians are deſtitute? For my part, I deem it a bleſſing of the gods, that they have not excited the warlike poverty of theſe miſerable barbarians to invade and plunder the luxurious wealth of Lydia." The moderation of this advice was rejected by the fatal preſumption of Crœſus; who confounding the dictates of experienced wiſdom with the mean ſuggeſtions of puſillanimity, diſmiſſed the counſellor with contempt.

Meanwhile, the approach of Cyrus, who was not of a temper to permit his dominions to be ravaged with impunity, afforded the Lydian king an opportunity of bringing the war to a more ſpeedy iſſue than by his intended expedition into Perſia. The army of Cyrus gradually augmented on his march; the tributary princes cheerfully contributing with their united ſtrength towards the aſſiſtance of a maſter whoſe valour and generoſity they admired, and who now took arms to protect the ſafety of his ſubjects, as well as to ſupport the grandeur of his throne. Such was the rapidity of his movement, eſpecially after being informed of the deſtructive ravages of the enemy in Cappadocia, that he arrived from the ſhores of the Caſpian at thoſe of the Euxine Sea before the army of Crœſus had provided the neceſſaries for their journey. That prince, when appriſed of the neighbourhood of the Perſians, encamped on the Pterian plain; Cyrus likewiſe encamped at no great diſtance: frequent ſkirmiſhes happened between the light troops; and at length a general engagement was fought with equal fury and perſeverance, and only terminated by the darkneſs of night. The loſs on both ſides hindered a renewal of the battle. The numbers as well as the courage of the Perſians much exceeded the expectation of Crœſus. As they diſcovered not any intention to haraſs his retreat, he determined to move back towards Sardis, to ſpend the winter in the amuſements of his palace, and, after ſummoning his numerous allies to his ſtandard, to take the field early in the ſpring with ſuch increaſe of force as ſeemed ſufficient to overpower the Perſians.

But this deſign was defeated by the careful vigilance of Cyrus. That experienced leader allowed the enemy to retire without moleſtation; carefully informing himſelf of every ſtep which they took, and of every meaſure which they ſeemed determined to purſue. Patiently watching the opportunity of a juſt revenge, he waited until Crœſus had re-entered his capital, and had diſbanded the foreign mercenaries, who compoſed the moſt numerous diviſion of his army. It then ſeemed the proper time for Cyrus to put his Perſians in motion; and ſuch was his celerity, that he brought the firſt news of his own arrival in the plain of Sardis. Crœſus, whoſe firmneſs might well have been ſhaken by the imminence of this unforeſeen danger, was not wanting on the preſent occaſion to the duties which he owed to his fame and the luſtre of the Lydian throne. Though his mercenaries were diſbanded, his own ſubjects, who ſerved him from attachment, who had been long accuſtomed to victory, and who were animated with a high ſenſe of national honour, burned with a deſire of enjoying an opportunity to check the daring inſolence of the invaders. Crœſus indulged and encouraged this generous ardour. The Lydians in that age fought on horſeback, armed with long ſpears; the ſtrength of the Perſians conſiſted in infantry. They were ſo little accuſtomed to the uſe of horſes, that camels were almoſt the only animals which they employed as beaſts of burden. This circumſtance ſuggeſted to a Mede, by name Harpagus, a ſtratagem, which being communicated to Cyrus was immediately adopted with approbation by that prince. Harpagus, having obſerved that horſes had a ſtrong averſion to the ſhape and ſmell of camels, adviſed the Perſian army to be drawn up in the following order: All the camels which had been employed to carry baggage and proviſions were collected into one body, arranged in a long line fronting the Lydian cavalry. The foot ſoldiers of the Perſians were poſted immediately behind the line, and placed at a due diſtance. The Median horſe (for a few ſquadrons of theſe followed the ſtandard of Cyrus) formed the rear of the army. As the troops on both ſides approached to join battle, the Lydian cavalry, terrified at the unuſual appearance of the camels, mounted with men in arms, were thrown into diſorder, and, turning their heads, endeavoured to eſcape from the field. Crœſus, who perceived the confuſion, was ready to deſpair of his fortune; but the Lydians, abandoning their horſes, prepared with uncommon bravery to attack the enemy on foot. Their courage deſerved a better fate; but unaccuſtomed as they were to this mode of fighting, they were received and repelled by the experienced valour of the Perſian infantry, and obliged to take refuge within the fortified ſtrength of Sardis, where they imagined themſelves ſecure. The walls of that city bid defiance to the rude art of attack, as then practiſed by the moſt warlike nations. If the Perſian army ſhould inveſt it, the Lydians were provided with proviſions for ſeveral years; and there was reaſon to expect, that in a few months, and even weeks, they would receive ſuch aſſiſtance from Egypt, Babylonia, and Greece (to which countries they had already ſent ambaſſadors), as would oblige the Perſians to raiſe the ſiege.

The Lydian miniſters diſpatched into Greece met with great ſympathy from the Spartans. That people were particularly obſervant of the faith of treaties; and while they puniſhed their enemies with unexampled ſeverity, they behaved with generous compaſſion towards thoſe whom they had once accepted for allies. They immediately reſolved therefore to ſend him a ſpeedy and effectual relief; and for this purpoſe aſſembled their troops, made ready their veſſels, and prepared every thing neceſſary for the expedition.

The valour of the Spartans might perhaps have upheld the ſinking empire of Lydia; but before their armament could ſet ſail, Crœſus was no longer a ſovereign. Notwithſtanding the ſtrength of Sardis, that city had been taken by ſtorm on the 20th day of the ſiege; the walls having been ſcaled in a quar-

ter which, appearing altogether inacceſſible, was too careleſsly guarded. This was effected by the enterpriſe of Hyreades a Mede, who accidentally obſerved a ſentinel deſcend part of the rock in order to recover his helmet. Hyreades was a native of the mountainous province of Mardia, and being accuſtomed to clamber over the dangerous precipices of his native country, reſolved to try his activity in paſſing the rock upon which he had diſcovered the Lydian. The deſign was more eaſily accompliſhed than he had reaſon to expect: emulation and ſucceſs encouraged the braveſt of the Perſians to follow his example; theſe were ſupported by greater numbers of their countrymen; the garriſon of Sardis was ſurpriſed; the citadel ſtormed; and the rich capital of Lower Aſia ſubjected to the vengeful rapacity of an indignant victor. Thus ended the ancient kingdom of Lydia, which continued ſubject to the Perſians till they alſo were conquered by the Macedonians.

LYDIAT (Thomas), a learned Engliſh divine, born in 1572, and educated at Oxford. About the year 609 he became acquainted with Dr James Uſher, afterwards archbiſhop of Armagh, who carried him to Ireland. He was at Dublin college for about two years, after which he returned to England; and the rectory of Alkrington becoming vacant, he was preſented to it: but at length, being engaged for the debts of a near relation, which for the preſent he was unable to pay, having before ſpent his patrimony in printing ſeveral books, he was ſent to priſon, and was confined at Oxford, in the King's-bench, and elſewhere, till Sir William Boſwell, a generous patron of learned men, Dr. Robert Pink, warden of New-college, biſhop Uther, and Dr. Laud, diſcharged the debt. In the civil wars he ſuffered much in his rectory of Alkrington from the parliament-party; was four times pillaged to the value of at leaſt 70l. and was forced for a quarter of a year together to borrow a ſhirt to ſhift himſelf. He died in 1646. He wrote ſome pieces in Engliſh, and many works in Latin, on chronology and natural hiſtory.

LYDIUS lapis, in the natural hiſtory of the ancients; the name of the ſtone uſed by way of touchſtone for the trial of gold and ſilver, and called by ſome *Heraclius lapis*: both of which names were alſo applied by the ancients to the loadſtone; and hence has ariſen no ſmall miſunderſtanding of their works. Pliny has obſerved, that both the load ſtone and touchſtone were at times called *Lydius* and *Heraclius lapis*. The true *lapis Lydius*, or the touch-ſtone, was anciently found only in the river Tmolus; but was afterwards found in many other places, and is now very common in many of the German rivers. The ancients give us very remarkable and circumſtantial accounts of the uſes they made of it; and it is plain they were able to diſcern the alloys of gold by means of it with very great exactneſs. We at preſent uſe ſeveral different ſtones under this name, and for the ſame purpoſe. In Italy, a green marble called *verdello*, is moſt frequently uſed; and with us, very frequently ſmall pieces of the *baſaltes*, the ſame with that vaſt piece of black marble called the *Giant's Cauſeway* in Ireland. See Basaltes, Giant's *Cauſeway*, Iceland, Staffa, and Volcano.

LYGEUM, in botany: a genus of the monogynia order, belonging to the triandria claſs of plants; and in the natural method ranking under the fourth order, *Gramina*. The ſpatha or ſheath is monophyllous; there are a pair of corollæ upon the ſame germen; the nut is bilocular.

LYGII, Ligii, *Lugii*, or *Logiones*, (anc. geog.), a people of Germany, to the weſt of the Viſtula, where it forms a bend like a creſcent; *Ligii*, (Dio); *Lugii*, (Strabo): *Logiones*, (Zoſimus). Their name *Lugii* is conjectured to be derived from their mutually cloſe confederacy or league. The Viſtula was their boundary to the north, eaſt, and ſouth, with mount Aſciburgius to the weſt. Now the whole of that country lies in Poland, on this ſide the Viſtula.

LYING in-women. See Midwifery.

Lying-*To*, or *Lying-By*, the ſituation of a ſhip, when ſhe is retarded in her courſe, by arranging the ſails in ſuch a manner as to counteract each other with nearly an equal effort, and render the ſhip almoſt immoveable, with reſpect to her progreſſive motion or head way. A ſhip is uſually brought-to by the main and fore-top ſails, one of which is laid aback, whilſt the other is full; ſo that the latter puſhes the ſhip forward, whilſt the former reſiſts this impulſe by forcing her aſtern. This is particularly practiſed in a general engagement, when the hoſtile fleets are drawn up in two lines of battle oppoſite each other. It is alſo uſed to wait for ſome other ſhip, either approaching or expected; or to avoid purſuing a dangerous courſe, eſpecially in dark or foggy weather, &c.

LYME regis, a ſea-port town of Dorſetſhire, 148 miles from London. It lies near the ſea, on the very borders of Devonſhire, in a cavity between two rocky hills, which makes it difficult of acceſs. It is about five furlongs long, and contains about 250 houſes. As it lies on the declivity of a hill, the houſes make a good ſhow, one above another; and ſome of them are built of free-ſtone, and covered with blue ſlate. The corporation conſiſts of a mayor (who is juſtice of peace during his mayoralty and the year after, and in the third year both juſtice and coroner), a recorder, 15 capital burgeſſes, and a town-clerk. This place had formerly a very flouriſhing trade to France, Spain, the Straits, Newfoundland, and the Weſt Indies; during which the cuſtoms amounted ſome years to 16,000l. But it ſtands on ſuch a high ſteep rock, that the merchants are obliged to load and unload their goods at a place a quarter of a mile off, called the *Cobb*, originally built in the reign of Edward III. which coſts a great ſum to maintain, but forms ſuch a harbour as perhaps is not to be equalled in the world, the ſhips being ſheltered by a high thick ſtone wall, raiſed in the main ſea a good way from the ſhore, broad enough for carriages and warehouſes, and the cuſtom-houſe officers have one upon it. The cellars of the low part of the town, near the ſea, are however often overflowed by the ſpring-tides 10 or 12 feet. There are guns planted for defence both of the Cobb and the town, the ſhore here being very proper for batteries. The cuſtom-houſe ſtands on pillars, with the corn-market under it. There is an alms-houſe in Church-ſtreet, alſo Preſbyterian and Anabaptiſt meeting-houſes. The town-hall is near Broad-ſtreet. The church ſtands at the eaſt end of the town on a riſing ground. The market here is on Friday, and there are two fairs in the year. We read, that in 774 the Saxon king Kinwulf gave land hereabouts to the church of Sherborn, for the boiling of ſalt there to ſupply its neceſſities. At this place the duke of Monmouth landed in 1685. A few years ago above 2000l. worth of gold and ſilver coin of Charles I. and II. were diſcovered by ſome labourers.

LYMINGTON, a borough-town of Hampſhire, 67 miles ſouth-weſt of London. It ſtands about a mile from the channel, running between the main land and the iſle of Wight; and has a harbour for veſſels of conſiderable burden. The tide flows near a mile above the town. It has a market on Saturdays, and two fairs in the year; and ſends two members to parliament.

LYMPH, a fine colourleſs fluid, ſeparated in the body from the maſs of blood, and contained in peculiar veſſels called *lymphatics*. See Anatomy.

LYMPHATI, was a name given by the Romans to ſuch as were ſeized with madneſs. It is ſuppoſed to be uſed for *nymphati*, becauſe the ancients imagined that every perſon who had the misfortune to ſee a nymph was inſtantly ſtruck with

phrenſy. *Lymphati* may indeed ſignify "madmen," as derived from *lympha*, "water," over which element the nymphs were thought to preſide: but it appears moſt likely, that diſtracted people were called *lymphati*, from the circumſtance of madmen s being affected with the *hydrophobia* or dread of water after the bite of a mad dog; for this peculiarity, in caſes of canine madneſs, was not unknown to the Romans.

LYNCEUS, in fabulous hiſtory, one of the 50 ſons of Ægeus, married Hypermneſtra, one of the 50 daughters of Danaus. See HYPERMNESTRA.

LYNCEUS, in fabulous hiſtory, one of the Argonauts who went with Jaſon in the expedition to obtain the golden fleece. He was of great uſe to the Argonauts, by enabling them to avoid the ſand-banks and rocks they found in their way. The poets ſay, that Lynceus had ſo piercing a ſight, that it could not only penetrate to the bottom of the ſea, but even to hell. Some mythologiſts ſuppoſe, that this fable is taken from Lynceus's ſkill in obſerving the ſtars, and diſcovering the mines of gold and ſilver concealed in the earth.

LYNCURIUM, a ſtone thought to be the ſame with the tourmalin. The name is derived from λυγξ, "lynx;" and ουρον, "urine."

LYNCURIUS LAPIS, a ſtone capable of producing muſhrooms. In the Ephemerides of the Curious we find mention made of a ſtone ſo called by Dr. John George Wolckamerus, who ſaw one in Italy, which never ceaſes to produce in a few days muſhrooms of an excellent flavour, by the moſt ſimple and eaſy proceſs imaginable. "It is (ſays he) of the bigneſs of an ox's head, rough and uneven on its ſurface, and on which alſo are perceived ſome clefts and crevices. It is black in ſome parts, and in others of a lighter and greyiſh colour. Internally it is porous, and nearly of the nature of the pumice-ſtone, but much heavier; and it contains a ſmall piece of flint, which is ſo incorporated with it as to appear to have been formed at the ſame time the ſtone itſelf received its form. This gives room to judge, that thoſe ſtones have been produced by a fat and viſcid juice, which has the property of indurating whatever matter it filtrates into. The ſtone here ſpoken of, when it has been lightly covered with earth, and ſprinkled with warm water, produces muſhrooms of an exquiſite flavour, which are uſually round, ſometimes oval, and whoſe borders, by their inflexions and different curvities, repreſent in ſome meaſure human ears. The principal colour of theſe muſhrooms is ſometimes yellowiſh, and ſometimes of a bright purple; but they are always diſſeminated with different ſpots of a deep orange-colour, or red brown; and when theſe ſpots are recent, and ſtill in full bloom, they produce a very agreeable effect to the ſight. But what appears admirable is, that the part of the ſtalk which remains adhering to the ſtone when the muſhroom has been ſeparated from it, grows gradually hard, and petrifies in time; ſo that it ſeems that this fungites reſtores to the ſtone the nutritive juice it received from it, and that it thus contributes to its increaſe." John Baptiſt Porta pretends that this ſtone is found in ſeveral parts of Italy, and that it is not only to be met with at Naples, taken out of mount Veſuvius, but alſo on mount Pantherieo, in the principality of Arellino; on mount Garganus, Apulia; and on the ſummit of ſome other very high mountains. He adds, that the muſhrooms which grow on thoſe ſorts of ſtones, and are uſually called *fungi lyncurii*, have the property of diſſolving and breaking the ſtone of the kidneys and bladder; and that, for this purpoſe, nothing more is required than to dry them in the ſhade, and, being reduced to powder, to make the patient, faſting, take a ſufficient quantity of this powder in a glaſs of white wine, which will ſo cleanſe the excretory ducts of the urine, that no ſtones will ever after be collected in them. As to the form of thoſe muſhrooms, their root is ſtony, uneven, divided according to its longitudinal direction, and compoſed of fibres as fine as hairs, interwoven one with another. Their form, on firſt ſhooting out, reſembles a ſmall bladder, ſcarce then larger than the bud of a vine; and if in this ſtate they are ſqueezed between the fingers, an aqueous ſubacid liquor iſſues out. When they are at their full growth, their pedicle is of a finger's length, larger at top than at bottom, and becomes inſenſibly ſlenderer in proportion as it is nearer the earth. Theſe muſhrooms are alſo formed in an umbella, and variegated with an infinity of little ſpeeks ſituated very near one another. They are ſmooth and even on the upper part, but underneath leafy like the common muſhrooms. Their taſte is likewiſe very agreeable, and the ſick are not debarred eating of them when they have been dreſſed in a proper manner. Curioſity having prompted ſome naturaliſts and phyſicians to ſubmit theſe ſtones to a chemical analyſis, in order to be more competent judges of the uſes they might be put to in medicine, there firſt came forth, by diſtillation, an inſipid water, and afterwards a ſpirituous liquor. The retort having been heated to a certain point, there aroſe an oil, which had nearly the ſmell and taſte of that of guaiacum; and a very acrid ſalt was extracted from the aſhes.

LYNN-REGIS, a town of Norfolk, diſtant 98 miles from London. It is a handſome, large, well-built place, and ſends two members to parliament. It was a borough by preſcription in 1298. King John, on account of its adherence to him againſt the barons, made it a free borough, with large privileges. He appointed it a provoſt, and gave it a large ſilver cup of 73 ounces doubly gilt and enamelled, and a large ſilver ſword that is carried before the mayor; though this laſt, according to ſome, is Henry VIII's ſword, which he gave to the town when it came into his hands by exchange with the biſhop of Norwich; after which it was called King's Lynn, whereas before it was Biſhop's Lynn. Henry III. made it a mayor-town, for its ſerving him againſt the barons. It has had 15 royal charters; and is governed by a mayor, high-ſteward, under-ſteward, recorder, 12 aldermen, and 18 common-councilmen. It has two churches, beſides St Nicholas, a chapel of eaſe to St. Margaret's, a preſbyterian and a quakers meeting-houſe, with a bridewell or workhouſe, ſeveral almshouſes, and a free-ſchool. In September 1741 the ſpires of its two churches were both blown down by a ſtorm of wind; and that of St. Margaret's, which was 193 feet in height, having beat in the body of the church, it has been ſince rebuilt, towards which king George II. gave 1000l and the then earl of Orford, late Sir Robert Walpole, 500l. This church was formerly an abbey, and afterwards one of the largeſt pariſh-churches in England. The town-houſe, called Trinity-hall, is a noble old fabric; and ſo is the Exchange, which is of free-ſtone, with two orders of columns. St. Nicholas's chapel is very ancient, and reckoned one of the fineſt and largeſt of the kind in England. It has a bell-tower of free-ſtone, and an eight-ſquare ſpire over it, both which together are 170 feet from the ground. There is a library in it that was erected by ſubſcription; and there is another at St. Margaret's. Here have been formerly ſeveral monaſteries; but the only fabric remaining that belongs to any religious order is the Grey-friars ſteeple, a noted ſea-mark. The ſituation of this town, near the fall of the Ouſe into the ſea, after having received ſeveral other rivers, of which ſome are navigable, gives it an opportunity of extending its trade into eight different counties; by which many conſiderable cities and towns, viz. Peterborough, Ely, Stamford, Bedford, St. Ives, Huntingdon, St. Neot's, Northampton, Cambridge, St. Edmundſbury, and the north part of Bucks, as well as the inland parts of Norfolk and

Suffolk, are ſupplied with heavy goods, not only from our own produce, as coals and ſalt from Newcaſtle, but alſo of merchandize imported from abroad, eſpecially wine; of which two articles, viz. coals and wine, this is the greateſt port for importation of any place in all the eaſtern coaſt of England; and thoſe wherein the Lynn merchants deal more largely than any town in England, except London, Briſtol, and Newcaſtle. In return for this, Lynn receives back all the corn which the counties juſt mentioned produce, for exportation; and therefore ſends more of it abroad than any port except Hull. The foreign trade of the merchants here is very conſiderable, eſpecially to Holland, Norway, and the Baltic, and alſo to Spain and Portugal; and formerly they drove a good trade to France, till it was turned off, by treaties on one hand, and by prohibitions, high duties, &c. on the other, to Spain and Portugal. The harbour is ſafe when ſhips are in it, but difficult to enter by reaſon of the many flats and ſhoals in the paſſage; which, however, are well buoyed, and good pilots are always ready. The town conſiſts of about 2400 houſes; and appears to have been very ſtrong, by the ruins of the works demoliſhed in the civil wars. St. Ann's platform at the north end mounts 12 great guns, and commands all the ſhips paſſing near the harbour; and towards the land, beſides the wall, there is a ditch. Four rivulets run through the town; and the tide of the Ouſe, which is about as broad here as the Thames at London bridge, riſes 20 feet perpendicular. In the great market-place a ſtatue was erected in 1686 to the honour of king James II. There is another ſpacious market-place, adorned with a ſtatue of king William III. and a fine croſs with a dome and gallery round it ſupported by 16 pillars. The market-houſe is of free-ſtone, ſupported by 16 columns; and is 70 feet high, erected on four ſteps, neatly adorned with ſtatues, &c. Every firſt Monday in the month, the mayor, aldermen, preachers, &c. meet to hear and determine all controverſies amicably, for preventing law-ſuits. This was firſt eſtabliſhed in 1588, and is called *The Feaſt of Reconciliation.* The markets are on Tueſdays and Saturdays; and it has two fairs: one of which, beginning Feb. 14, laſts for a fortnight, and is called Lynn-mart; the other is a cheeſe fair on Oct. 6. The adherence of this town to king John and to Henry VIII. as above mentioned, are not the only inſtances of its loyalty to its ſovereigns; for, in the late civil wars, it held out for king Charles I. and ſuſtained a formal ſiege of about 18,000 men of the parliament-army, for above three weeks; but, for want of relief, was obliged to ſurrender, and ſubmit to the terms of paying 10s. a head for every inhabitant, and a month's pay to the ſoldiers, to ſave the town from plunder. There are more gentry, and conſequently more gaiety, in this town than in Yarmouth or even Norwich; there being ſuch plenty of eatables and drinkables, that Spelman ſays Ceres and Bacchus ſeem to have eſtabliſhed their magazines at this place; the caſt ſide abounding with corn, ſheep, rabbits, hares, &c. the weſt ſide with cheeſe, butter, black-cattle, ſwans, and the wild fowl common to marſhes, beſides the abundance of ſea and river fiſh; ſo that he thinks there is no place in Great Britain, if in Europe, has ſuch a variety in ſo ſmall a compaſs of ground. At a ſmall diſtance from the town ſtands a mount called the Lady's or Red Mount, where was once a chapel dedicated to the Virgin Mary, which was a reſting-place for pilgrims on their way towards her convent at Walſingham. The king's ſtaith-yard, or quay, where the greateſt part of the imported wines is landed and put into large vaults, is a handſome ſquare, with brick buildings, in the centre whereof is a ſtatue of king James I. People paſs hence into the fen-country, and over the famous waſhes into Lincolnſhire in boats, which are often loſt, by venturing out at an improper ſeaſon and without guides.

LYNX, in zoology. See FELIS.

LYON KING OF ARMS. See KING. This office is of great antiquity and reſpect in Scotland; and although the preciſe time of its inſtitution is unknown, yet it muſt have been as early as the introduction of armorial figures as hereditary marks of gentility and diſtinction into this country, which was in the 12th century. His regalia are, a crown of gold, with a crimſon velvet cap, a gold taſſel, and an ermine lining; a velvet robe reaching to his feet, with the arms of the kingdom embroidered thereon before and behind in the proper tinctures; a triple row of gold chain round his neck, with an oval gold medal pendent thereto, on one ſide of which is the royal bearing, and on the other St. Andrew with his croſs enamelled in proper colours, and a baton of gold enamelled green, powdered with the badges of the kingdom. The Lord Lyon's rank is ſuperior to that of any other king of arms, as he holds his office immediately from the ſovereign by commiſſion under the great ſeal; whereas the kings of arms in England are deputies to the Earl Marſhal, and act under his authority. Formerly Scotland was divided into two provinces, the one on the north and the other on the ſouth ſide of Forth; and theſe provinces were under the management of two deputies appointed by the Lord Lyon to ſuperintend the execution of all the buſineſs of his office. Before the revolution, the Lord Lyon, at his admiſſion into office, was moſt ſolemnly crowned by the ſovereign or his commiſſioner, in preſence of the nobility, the officers of ſtate, and other great men, after a ſuitable ſermon preached at the royal chapel; and his crown was of the ſame form with the imperial crown of the kingdom. On ſolemn occaſions he wears the regalia above deſcribed; at all other times, he wears the oval gold medal or badge on his breaſt, ſuſpended by a broad green ribbon. He has the abſolute diſpoſal of all the offices in his own court, and of the heralds' and purſuivants' places. The meſſengers at arms throughout Scotland are alſo created by him, and are amenable to his juriſdiction. And the powers veſted in him by his commiſſion are the ſame with thoſe of the ſovereign in all matters relative to the marks of gentility.

LYONET (PETER), an ingenious naturaliſt, and member of ſeveral learned ſocieties, was born at Meſtricht, and was deſcended from a very ancient and reſpectable family of Lorrain. He had ſcarcely attained his ſeventh year before he diſplayed an uncommon ſtrength and agility in all bodily exerciſes; but he was not leſs diligent in the improvement of his mind. Being placed at the Latin ſchool, he learned chronology, and exerciſed himſelf in Latin, Greek, and French poetry, as alſo in Hebrew, logic, and the Carteſian Phyſics. He was particularly fond of the ſtudy of languages, whereof he underſtood no leſs than nine, living and dead. Having entered the univerſity of Leyden, he ſtudied the Newtonian philoſophy, geometry, algebra, &c. but his father (who was a clergyman), deſiring he ſhould attach himſelf to divinity, he reluctantly abandoned the former ſtudies, as his paſſion for them was not eaſily to be overcome. He at the ſame time applied himſelf to anatomy, and alſo to muſic and drawing. He began afterwards to practiſe ſculpture: and performed ſeveral pieces in wood, ſome of which are preſerved, and have been greatly admired by the artiſts. After this, he betook himſelf to drawing portraits of his friends from life; wherein, after three or four months practice, he became a great proficient. Having attained the degree of candidate in divinity, he reſolved to ſtudy law, to which he applied himſelf with ſo much zeal, that he was promoted at the end of the firſt year. Arrived at the Hague, he undertook the ſtudy of decyphering; and became ſecretary of the cyphers, tranſlator of the Latin and French languages, and patent-maſter, to their High Mightineſſes. Meanwhile, having taken a ſtrong liking to the ſtudy

of infects, he undertook an hiſtorical deſcription of ſuch as are found about the Hague, and to that end collected materials for ſeveral volumes; and having invented a method of drawing adapted thereto, he enriched this work with a great number of plates, univerſally admired by all the connoiſſeurs who had ſeen them. In the year 1742 was printed at the Hague a French tranſlation of a German work, the 'Theology of Inſects,' by Mr. Leſſer. Love of truth engaged Mr. Lyonet to defer the publication of his above mentioned deſcription, and to make ſome obſervations on that work, to which he has added two moſt beautiful plates, engraved from his deſigns. This performance cauſed his merit to be univerſally known and admired. The celebrated M. de Reaumur had the above tranſlation reprinted at Paris, not ſo much on account of the work itſelf as of Mr. Lyonet's obſervations; and beſtowed on it, as did alſo many other authors, the higheſt encomiums. He afterwards executed drawings of the freſhwater polypus for Mr. Trembley's beautiful work, 1744. The ingenious Wandelaar had engraved the firſt five plates; when Mr. Lyonet, who had never witneſſed this operation, concerned at the difficulties he experienced in getting the remaining eight finiſhed in the ſuperior ſtyle he required, reſolved to perform the taſk himſelf. He accordingly took a leſſon of one hour of Mr. Wandelaar, engraved three or four ſmall plates, and immediately began upon the work itſelf, which he performed in ſuch a manner as drew on him the higheſt degree of praiſe, both from Mr. Trembley and from many other artiſts, particularly the celebrated Van Gool; who declared that the performance aſtoniſhed not only the amateurs, but alſo the moſt experienced artiſts. In 1748 he was choſen member of the Royal Society of London. In 1749 he began (by mere chance) his amazing collection of horns and ſhells, which, according to the univerſal teſtimony of all travellers and amateurs who have viſited it, is at preſent the moſt beautiful, and certainly one of the moſt valuable, in Europe. In 1753 he became member of the newly-eſtabliſhed Dutch Society of Sciences at Haerlem; and in 1757, after the celebrated M. le Cat, profeſſor in anatomy and ſurgery, and member of almoſt all the principal ſocieties in Europe, had ſeen Mr. Lyonet's incomparable *Traité Anatomique de la Chenille qui ronge le Bois de Saule*, with the drawings belonging to it (which work was afterwards publiſhed), he was elected member of the Royal Academy of Sciences of Rome, whereof M. le Cat was perpetual ſecretary. After the publication of this treatiſe, he became, in 1760, member of the Royal Academy of Sciences of Berlin; in 1761, of the Imperial Academy of Naturaliſts; and, in 1762, of the Imperial Academy of Sciences at St. Peterſburg. In order to enable ſuch as might be deſirous of following him in his intricate and moſt aſtoniſhing diſcoveries reſpecting the ſtructure of this animal, Mr. Lyonet publiſhed, in the 'Tranſactions of the Dutch Society of Sciences at Haerlem,' a deſcription and a plate (as he alſo afterwards did in French at the beginning of his *Traité Anatomique*) of the inſtrument and tools he had invented for the purpoſe of diſſection, and likewiſe of the method he uſed to aſcertain the degree of ſtrength of his magnifying glaſſes. Notwithſtanding all this labour, which was conſiderably increaſed by the extenſive correſpondence which he for many years carried on with ſeveral learned and reſpectable perſonages, he ſtill found means to ſet apart a large portion of his time (as he himſelf mentions in his preface) for the immediate ſervice of his country; but was not fortunate enough (as appears by his writings) to get any other recompenſe for his exertions than ſorrow and diſappointment.—During the laſt fifteen or twenty years of his life, Mr. Lyonet added to the valuable treaſure he had already collected of natural curioſities, a moſt ſuperb cabinet of paintings, conſiſting of more than 560 performances; among which are many of the moſt eminent works of the firſt Dutch maſters. He did this with a view to procure himſelf ſome amuſement during the latter part of his life, when old age and infirmities muſt weaken his powers, and ſet bounds to his activity. He had always indeed accuſtomed himſelf to employment, inſomuch that he has written ſome pieces of Dutch poetry; and this diſpoſition remained with him till within a fortnight of his death, when he was attacked with an inflammation in his breaſt, which, though apparently cured, was, in the end, the cauſe of his diſſolution. He died at the Hague in January 1789, aged 83 years, leaving behind him a moſt eſtimable character.

LYONOIS, a late province of France, which, with that of Forez, forms the department of Rhone and Loire.

LYONS, the ſecond city of France for beauty, commerce, and opulence. It is the capital of the department of Rhone and Loire, and is ſeated at the confluence of the Rhone and Saone. It was founded about the year 42 B. C. by the Romans, who made it the centre of the commerce of the Gauls. About the year 145, it was totally deſtroyed by fire, but was rebuilt, by the munificence of Nero. Many antiquities are ſtill obſerved, that evince its Roman origin. Lyons is the ſee of an archbiſhop, and before its recent calamities contained 100,000 inhabitants, upwards of 30,000 of whom were employed in various manufactures, particularly of rich ſtuffs, of the moſt exquiſite workmanſhip, in ſilk, gold, ſilver, &c. The quays were adorned with magnificent ſtructures. The Hotel-de-ville vied with that of Amſterdam; and the theatre was not ſurpaſſed by any in France. The other principal public buildings were the Hotel-Dieu, the Hoſpital of Charity, the Exchange, the Cuſtom-houſe, the Palace of Juſtice, the Arſenal, a public library, and two colleges. The bridge, which unites the city with the ſuburb de la Guillotiere, is 1560 feet long; and there are three other principal ſuburbs, ſix gates, and ſeveral fine churches. Such was Lyons before the fatal year 1793, when, in June, it revolted againſt the National Convention. Being obliged to ſurrender, in October, the convention decreed, that the walls and public buildings of Lyons ſhould be deſtroyed, and the name of the city changed to that of VILLE AFFRANCHIE. The chiefs of the inſurgents had fled, but ſeveral of them were afterward taken; and of 3528 perſons, that were tried before the revolutionary tribunal, 1682 were either ſhot or beheaded. In 1794, however, on the deſtruction of the faction of the Jacobins, the convention decreed, that the city ſhould reſume its ancient name, and that meaſures ſhould be taken to reſtore its manufactures and commerce; and, in 1795, the friends of thoſe who were ſo wantonly put to death in 1793, avenged their fate by a general maſſacre of the judges of the revolutionary tribunal, and of all the Jacobins who were then confined in the priſons of Lyons. This city is 15 miles north of Vienne, and 220 ſouth-eaſt of Paris. E. lon. 4. 55. N. lat. 45. 46.

LYRA, in ichthyology. See CALLYONIMUS.

LYRA, in aſtronomy, a conſtellation in the northern hemiſphere. The number of its ſtars, in Ptolemy's catalogue, is ten; in Tycho's eleven; in Hevelius's ſeventeen; and in the Britannic catalogue twenty-one.

LYRE, a muſical inſtrument of the ſtringed kind, much uſed by the ancients. Concerning the number of ſtrings with which this inſtrument was furniſhed, there is great controverſy. Some aſſert it to be only three; and that the ſounds of the two remote were acute, and that of the intermediate one a mean between thoſe two extremes: that Mercury, the inventor, reſembled thoſe three chords to as many ſeaſons of the year, which were all that the Greeks reckoned, namely, Summer, Winter, and Spring: aſſigning the acute to the firſt, the grave to the ſecond, and the mean to the third. Others

aſſert that the lyre had four ſtrings; that the interval between the firſt and the fourth was an octave; that the ſecond was a fourth from the firſt, and the fourth the ſame diſtance from the third, and that from the ſecond to the third was a tone.

Another claſs of writers contend that the lyre of Mercury had ſeven ſtrings. Nicomachus, a follower of Pythagoras, and the chief of them, gives the following account of the matter: "The lyre made of the ſhell was invented by Mercury; and the knowledge of it, as it was conſtructed by him of ſeven ſtrings, was tranſmitted to Orpheus: Orpheus taught the uſe of it to Thamyris and Linus; the latter of whom taught it to Hercules, who communicated it to Amphion the Theban, who built the ſeven gates of Thebes to the ſeven ſtrings of the lyre." The ſame author proceeds to relate, "That Orpheus was afterwards killed by the Thracian women; and that they are reported to have caſt his lyre into the ſea, which was afterwards thrown up at Antiſſa, a city of Leſbos: that certain fiſhers finding it, they brought it to Terpander, who carried it to Egypt, exquiſitely improved, and, ſhowing it to the Egyptian prieſts, aſſumed to himſelf the honour of its invention."

This difference among authors ſeems to have ariſen from their confounding together the Egyptian and the Grecian Mercuries.—The invention of the primitive lyre with three ſtrings was due to the firſt Egyptian HERMES.—The lyre attributed to the Grecian Mercury is deſcribed by almoſt all the poets to be an inſtrument of ſeven ſtrings. Vincenzio Galilei has collected the various opinions of the ſeveral Greek writers who have mentioned the invention of the chelys or teſtudo; and the late Mr. Spence has done the ſame in a very circumſtantial but ludicrous manner. "Horace talks of Mercury as a wonderful muſician, and repreſents him with a lyre. There is a ridiculous old legend relating to this invention, which informs us, that Mercury, after ſtealing ſome bulls from Apollo, retired to a ſecret grotto, which he uſed to frequent, at the foot of a mountain in Arcadia. Juſt as he was going in, he found a tortoiſe feeding at the entrance of his cave: he killed the poor creature, and perhaps ate the fleſh of it. As he was diverting himſelf with the ſhell, he was mightily pleaſed with the noiſe it gave from its concave figure. He had poſſibly been cunning enough to find out, that a thong pulled ſtrait and faſtened at each end, when ſtruck by the finger, made a ſort of muſical ſound. However that was, he went immediately to work, and cut ſeveral thongs out of the hides he had lately ſtolen, and faſtened them as tight as he could to the ſhell of this tortoiſe; and, in playing with them, made a new kind of muſic with them to divert himſelf in his retreat." This, conſidered only as an account of the firſt invention of the lyre, is not altogether ſo unnatural.

The moſt ancient repreſentations of this inſtrument agree very well with the account of its invention: the lyre, in particular on the old celeſtial globes, was repreſented as made of one entire ſhell of a tortoiſe; and that Amphion in the celebrated group of the Dirce or Toro, in the Farneſe palace at Rome, which is of Greek ſculpture, and very high antiquity, is figured in the ſame manner.

There have, however, been many other claimants to the ſeven-ſtringed lyre. For though Mercury invented this inſtrument in the manner already related, it is ſaid he afterwards gave it to Apollo, who was the firſt that played upon it with method, and made it the conſtant companion of poetry. According to Homer's account of this tranſaction, in his hymn to Mercury, it was given by that god to Apollo, as a peace-offering and indemnification for the oxen which he had ſtolen from him:

> To Phœbus Maia's ſon preſents the lyre,
> A gift intended to appeaſe his ire.
> The god receives it gladly, and eſſays
> The novel inſtrument a thouſand ways;
> With dext'rous ſkill the plectrum wields; and ſings,
> With voice accordant to the trembling ſtrings,
> Such ſtrains as gods and men approv'd, from whence
> The ſweet alliance ſprung of ſound and ſenſe.

Diodorus informs us, that Apollo, ſoon repenting of the cruelty with which he had treated Marſyas in conſequence of their muſical conteſt, broke the ſtrings of the lyre, and by that means put a ſtop for a time to any further progreſs in the practice of that new inſtrument. "The muſes (adds he) afterwards added to this inſtrument the ſtring called *meſe*; Linus, that of *lichanos*; and Orpheus and Thamyras, thoſe ſtrings which are named *hypate* and *parhypate* *.

Again, many ancient and reſpectable authors tell us, that, before the time of Terpander, the Grecian lyre had only four ſtrings; and, if we may believe Suidas, it remained in this ſtate 856 years, from the time of Amphion, till Terpander added to it three new ſtrings, which extended the muſical ſcale to a heptachord, or ſeventh, and ſupplied the player with two conjoint tetrachords. It was about 150 years after this period, that Pythagoras is ſaid to have added an eighth ſtring to the lyre, in order to complete the octave, which conſiſted of two diſjoint tetrachords.

Boethius gives a different hiſtory of the ſcale, and tells us, that the ſyſtem did not long remain in ſuch narrow limits as a tetrachord. Chorœbus, the ſon of Athis, or Atys, king of Lydia, added a fifth ſtring; Hyagnis, a ſixth; Terpander, a ſeventh; and, at length, Lychaon of Samos, an eighth. But all theſe accounts are irreconcileable with Homer's hymn to Mercury, where the chelys, or teſtudo, the invention of which he aſcribes to that god, is ſaid to have had ſeven ſtrings. There are many claimants among the muſicians of ancient Greece to the ſtrings that were afterwards added to theſe, by which the ſcale, in the time of Ariſtoxenus, was extended to two octaves. Athenæus, more than once, ſpeaks of the nine-ſtringed inſtrument; and Ion of Chios, a tragic and lyric poet and philoſopher, who firſt recited his pieces in the 82d olympiad, 452 B. C. mentions, in ſome verſes quoted by Euclid, the ten-

* It has been already related, that the lyre invented by the Egyptian Mercury had but three ſtrings; and by putting theſe two circumſtances together, Dr. Burney obſerves, we may perhaps acquire ſome knowledge of the progreſs of muſic, or, at leaſt, of the extenſion of its ſcale, in the higheſt antiquity.

Meſe, in the Greek muſic, is the fourth ſound of the ſecond tetrachord of the great ſyſtem, and firſt tetrachord invented by the ancients, anſwering to our A, on the fifth line in the baſe. If this ſound then was added to the former three, it proves two important points: firſt, that the moſt ancient tetrachord was that from E in the baſe to A; and that the three original ſtrings in the Mercurian and Apollonian lyre were tuned E, F, G, which the Greeks called *Hypate Meſon*, *Parhypate Meſon*, *Meſon Diatonos*. The addition therefore of *Meſe* to theſe, completed the firſt and moſt ancient tetrachord, E, F, G, A.

The ſtring *lichanos*, then being added to theſe, and anſwering to our D on the third line in the baſe, extended the compaſs downwards, and gave the ancient lyre a regular ſeries of five ſounds in the Dorian mode, the moſt ancient of all the Greek modes; and the two ſtrings called *Hypate* and *Parhypate*, correſponding with our B and C in the baſe, completed the heptachord, or ſeven ſounds, B, C, D, E, F, G, A, a compaſs that received no addition till after the time of Pindar, who calls the inſtrument then in uſe the *ſeven-tongued lyre*.

ſtringed lyre; a proof that the third conjoint tetrachord was added to the ſcale in his time, which was about 50 years after Pythagoras is ſuppoſed to have conſtructed the octachord.

The different claimants among the Greeks to the ſame muſical diſcoveries, only prove, that muſic was cultivated in different countries; and that the inhabitants of each country invented and improved their own inſtruments, ſome of which happening to reſemble thoſe of other parts of Greece, rendered it difficult for hiſtorians to avoid attributing the ſame invention to different perſons. Thus the ſingle flute was given to Minerva and to Marſyas; the ſyrinx or fiſtula, to Pan and to Cybele; and the lyre or cithara, to Mercury, Apollo, Amphion, Linus, and Orpheus. Indeed, the mere addition of a ſtring or two to an inſtrument without a neck, was ſo obvious and eaſy, that it is ſcarce poſſible not to conceive many people to have done it at the ſame time.

With reſpect to the form of the ancient lyre, as little agreement is to be found among authors as about the number of ſtrings. The beſt evidences concerning it are the repreſentations of that inſtrument in the hands of ancient ſtatues, bas-reliefs, &c. See Plate 9. where fig. 1. is a repreſentation of the teſtudo, or lyre of Amphion, in front, as it appears on the baſe of the celebrated Toro Farneſe at Rome. This admirable work, conſiſting of four figures bigger than the life, beſides the toro, or bull, was found in Caracalla's baths, where the Farneſe Hercules was likewiſe diſcovered: and, except the Laocoon, is the only piece of Greek ſculpture mentioned by Pliny that is now remaining. The two projections near the bottom ſeem to have been faſtenings for the ſtrings, and to have anſwered the purpoſe of tail-pieces in modern inſtruments. 2. The lyre held by Terpſichore, in the picture of that muſe dug out of Herculaneum. 3. The Abyſſinian teſtudo, or lyre in uſe at preſent in the province of Tigre, from a drawing of Mr. Bruce, communicated to Dr. Burney. "This inſtrument (ſays he) has ſometimes five, ſometimes ſix, but moſt frequently ſeven ſtrings, made of the thongs of raw ſheep or goat ſkins, cut extremely fine, and twiſted; they rot ſoon, are very ſubject to break in dry weather, and have ſcarce any ſound in wet. From the idea, however, of this inſtrument being to accompany and ſuſtain a voice, one would think that it was better mounted formerly. "The Abyſſinians have a tradition, that the ſiſtrum, lyre, and tambourine, were brought from Egypt into Ethiopia, by Thot, in the very firſt ages of the world. The flute, kettle-drum, and trumpet, they ſay, were brought from Paleſtine, with Menelek, the ſon of their queen of Saba by Solomon, who was their firſt Jewiſh king.

"The lyre in Amharic is called *beg*, 'the ſheep;' in Ethiopic, it is called *meſinko*; the verb *ſinko* ſignifies to ſtrike ſtrings with the fingers: no plectrum is ever uſed in Abyſſinia; ſo that meſinko, being literally interpreted, will ſignify the 'ſtringed inſtrument played upon with the fingers.'

"The ſides which conſtitute the frame of the lyre were anciently compoſed of the horns of an animal of the goat kind called *agazan*, about the ſize of a ſmall cow, and common in the province of Tigre. I have ſeen ſeveral of theſe inſtruments very elegantly made of ſuch horns, which nature ſeems to have ſhaped on purpoſe. Some of the horns of an African ſpecies of this animal may be ſeen in M. Buffon's hiſtory of the king of France's cabinet. They are bent, and leſs regular than the Abyſſinian: but after fire-arms became common in the province of Tigre, and the woods were cut down, this animal being more ſcarce, the lyre has been made of a light red wood: however, it is always cut into a ſpiral twiſted form, in imitation of the ancient materials of which the lyre was compoſed. The drawing I ſend you was one of theſe inſtruments made of wood.

"The kingdom of Tigre, which is the largeſt and moſt populous province of Abyſſinia, and was during many ages the ſeat of the court, was the firſt which received letters and civil and religious government; it extended once to the Red Sea: various reaſons and revolutions have obliged the inhabitants to reſign their ſea-coaſt to different barbarous nations, Pagan and Mahometan: while they were in poſſeſſion of it, they ſay that the Red Sea furniſhed them with tortoiſe-ſhells, of which they made the bellies of their lyres, as the Egyptians did formerly, according to Apollodorus and Lucian; but having now loſt that reſource, they have adopted, in its place, a particular ſpecies of gourd, or pumpkin, very hard and thin in the bark, ſtill imitating with the knife the ſquares, compartments, and figure of the ſhell of the tortoiſe.

"The lyre is generally from three feet to three feet ſix inches high; that is, from a line drawn through the point of the horns, to the lower part of the baſe of the ſounding-board. It is exceedingly light and eaſy of carriage, as an inſtrument ſhould naturally be in ſo rugged and mountainous a country.

"When we conſider the parts which compoſe this lyre, we cannot deny it the earlieſt antiquity. Man in his firſt ſtate was a hunter and a fiſher, and the oldeſt inſtrument was that which partakes moſt of that ſtate. The lyre, compoſed of two principal pieces, owes the one to the horns of an animal, the other to the ſhell of a fiſh.

"It is probable that the lyre continued with the Ethiopians in this rude ſtate as long as they confined themſelves to their rainy, ſteep, and rugged mountains; and afterwards, when many of them deſcended along the Nile in Egypt, its portability would recommend it in the extreme heats and wearineſs of their way. Upon their arrival in Egypt, they took up their habitation in caves, in the ſides of mountains, which are inhabited to this day. Even in theſe circumſtances, an inſtrument larger than the lyre muſt have been inconvenient and liable to accidents in thoſe caverns; but when theſe people increaſed in numbers and courage, they ventured down into the plain, and built Thebes. Being now at their eaſe, and in a fine climate, all nature ſmiling around them, muſic and other arts were cultivated and refined, and the imperfect lyre was extended into an inſtrument of double its compaſs and volume. The ſize of the harp could be now no longer an objection; the Nile carried the inhabitants every where eaſily, and without effort; and we may naturally ſuppoſe, in the fine evenings of that country, that the Nile was the favourite ſcene upon which this inſtrument was practiſed; at leaſt the ſphinx and lotus upon its head ſeem to hint that it was ſomeway connected with the overflowings of that river." See HARP.

4. An Etruſcan lyre, with ſeven ſtrings, in the collection of Etruſcan, Greek, and Roman antiquities, publiſhed from the cabinet of the Hon. Sir William Hamilton, vol. i. Naples, 1766. pl. cix. With reſpect to this inſtrument, it is worthy of obſervation, that though the vaſe upon which it is repreſented is of ſuch indiſputable and remote antiquity, the tail-piece, bridge, belly, and ſound-holes, have a very modern appearance, and manifeſt a knowledge in the conſtruction of muſical inſtruments among the Etruſcans ſuperior to that of the Greeks and Romans in much later times. The lower part of the inſtrument has much the appearance of an old baſs-viol, and it is not difficult to diſcover in it more than the embryo of the whole violin family. The ſtrings lie round, as if intended to be played on with a bow; and even the croſs lines on the tail-piece are ſuch as we frequently ſee on the tail-pieces of old viols.

5. The Tripodian lyre of Pythagoras the Zacynthian, from a baſs-relief in the Maffei palace at Rome, repreſenting the whole choir of the muſes. Athenæus gives the following account of this extraordinary inſtrument, lib. xiv. cap. 15. p. 637. "Many ancient inſtruments are recorded (ſays Ar-

temon), of which we have ſo little knowledge, that we can hardly be certain of their exiſtence; ſuch as the tripod of Pythagoras the Zacynthian, which, on account of its difficulty, continued in uſe but a ſhort time. It reſembled in form the Delphic tripod, whence it had its name. The legs were equidiſtant, and fixed upon a moveable baſe that was turned by the foot of the player; the ſtrings were placed between the legs of the ſtool; the vaſe at the top ſerved for the purpoſe of a ſound-board, and the ſtrings of the three ſides of the inſtrument were tuned to three different modes, the Doric, Lydian, and Phrygian. The performer ſat on a chair made on purpoſe; ſtriking the ſtrings with the fingers of the left hand, and uſing the plectrum with the right, at the ſame time turning the inſtrument with his foot to whichever of the three modes he pleaſed; ſo that by great practice he was enabled to change the modes with ſuch velocity, that thoſe who did not ſee him would imagine they heard three different performers playing in three different modes. After the death of this admirable muſician, no other inſtrument of the ſame kind was ever conſtructed."

6. A lyre in the famous ancient picture dug out of Herculaneum, upon which Chiron is teaching the young Achilles to play. See CHIRON.

LYRIC POETRY, was ſuch as the ancients ſung to the lyre or harp. It was originally employed in celebrating the praiſes of gods and heroes, and its characteriſtic was ſweetneſs. Who was the author of it is not known. It was much cultivated by the Greeks; and Horace was the firſt who attempted it in the Latin language. Anacreon, Alcæus, Steſichorus, Sappho, and Horace, were the moſt celebrated lyric poets of antiquity.

LYRODI, among the ancients, a kind of muſicians who played on the lyre and ſung at the ſame time. This appellation was alſo given to ſuch as made it their employment to ſing lyric poems compoſed by others.

LYS, or LIS. See LIS.

LYS, the name of a meaſure uſed by the Chineſe in eſtimating diſtances. Two hundred lys make 60 geographical miles, which are equal to one degree.

LYSANDRIA, a Samian feſtival, celebrated with games and ſacrifices in honour of the Lacedemonian general Lyſander. It was anciently called *berea*; but this name the Samians aboliſhed by a public decree.

LYSIARCH, an ancient magiſtrate, who ſuperintended the ſacred games, and preſided in matters of religion in the province of Lycia. He was created in a council conſiſting of deputies from all the provincial cities, in number 23. The lyſiarchs were both heads of the council and pontiffs of the province.

LYSIAS, an ancient Grecian orator, was born at Syracuſe in the 80th olympiad. At 15, he went to Thurion, a colony of the Athenians, and, when grown up, aſſiſted in the adminiſtration of the government there many years. When about 47 years of age he returned to Athens; whence, being afterwards baniſhed by the 30 tyrants, he went to Megara. Upon his return, Thraſybulus would have had him employed again in ſtate matters; but this not taking place, he ſpent the remainder of his life as a private man. He was very familiar with Socrates and other illuſtrious philoſophers. He profeſſed to teach the art of ſpeaking; not that he pleaded at the bar himſelf, but he ſupplied others with ſpeeches. "Fuit Lyſias in cauſis forenſibus non verſatus" (ſays Cicero), ſed egregie ſubtilis ſcriptor atque elegans," &c. Quintilian calls him "ſubtilis atque elegans, et quo nihil, ſi Oratorio ſatis ſit docere, quæras perfectius. Nihil enim eſt inane, nihil arceſſitum: puro tamen fonti, quam magno flumini, proprior." Plutarch and Photius relate, that 425 orations were formerly exhibited under the name of Lyſias; of which 34 only are now extant. The beſt edition of them is by Dr. John Taylor at London, 1739, 4to; Cambridge, 1740, 8vo.

LYSIMACHIA, LOOSESTRIFE, in botany: a genus of the monogynia order, belonging to the pentandria claſs of plants; and in the natural method ranking under the 20th order, *Rotaceæ*. The corolla is rotaceous; the capſule globular, beaked, and ten-valved. There are ten ſpecies, but only four are commonly cultivated in gardens. Theſe are hardy herbaceous perennials and biennials, riſing with erect ſtalks from 18 inches to two or three feet high; garniſhed with narrow entire leaves; and terminated by ſpikes and cluſters of monopetalous, rotated, five-parted ſpreading flowers of white and yellow colours.—They are eaſily propagated by ſeeds, and will thrive in any ſoil or ſituation.

LYSIPPUS, a celebrated Greek ſtatuary, was born at Sicyone, and at firſt followed the buſineſs of a lockſmith, which he quitted in order to practiſe painting: but he afterwards applied himſelf entirely to ſculpture, in which he acquired an immortal reputation, and made a great number of ſtatues that were the admiration of the people of Athens and Rome. His grand ſtatue of the ſun repreſented in a car drawn by four horſes, was worſhipped at Rhodes: he made ſeveral ſtatues of Alexander and his favourites, which were brought to Rome by Metellus after he had reduced the Macedonian empire; and the ſtatue of a man wiping and anointing himſelf after bathing, being particularly excellent, was placed by Agrippa before his baths in that city. He lived in the time of Alexander the Great, about 334 B. C. and left three ſons, who were all famous ſtatuaries.

LYTHRUM, PURPLE LOOSESTRIFE, in botany: a genus of the monogynia order, belonging to the decandria claſs of plants; and in the natural method ranking under the 17th order, *Calycanthemæ*. The calyx is cleft in 12 parts; and there are ſix petals inſerted into it; the capſule is bilocular and polyſpermous. There are 10 ſpecies, of which the moſt remarkable are, 1. The *ſalicaria*, or common purple looſeſtrife, with oblong leaves, is a native of Britain, and grows naturally by the ſides of ditches and rivers. It hath a perennial root, from which come forth ſeveral upright angular ſtalks, riſing from three to four feet high, garniſhed with oblong leaves placed ſometimes by pairs; but ſometimes there are three leaves at each joint ſtanding round the ſtalk. The flowers are purple, and produced in a long ſpike at the top of the ſtalk; ſo make a fine appearance. 2. The *hyſſopum*, or Spaniſh looſeſtrife, with an hyſſop leaf, grows naturally in Spain and Portugal. It hath a perennial root. The ſtalks are ſlender, not more than nine or ten inches long, ſpreading out on every ſide. The lower part of the ſtalks is garniſhed with oblong oval leaves placed oppoſite. The flowers come out ſingly from the ſide of the ſtalks at each joint; they are larger than thoſe of the common ſort, and make a fine appearance in the month of July, when they are in beauty. The firſt kind is propagated by parting the roots in autumn, but requires a moiſt ſoil:—the ſecond is propagated by ſeeds brought from thoſe countries where it is native.

LYTTELTON (EDWARD), lord Lyttelton, keeper of the great ſeal in the reign of Charles I. was eminent for his probity and his moderation at the commencement of that monarch's diſputes with his ſubjects. Without forfeiting his fidelity to the king, he preſerved the eſteem of the parliament till 1644, when he was made colonel of a regiment in the king's army at York. He died in 1645. Beſides ſeveral of his ſpeeches which have been printed, he wrote reports in the common-pleas and exchequer, printed at London in 1683, in folio; ſeveral arguments and diſcourſes, &c.

LYTTELTON (George lord), eldeſt ſon of Sir Thomas Lyt-

telton, Bart. deſcended from the great judge Lyttelton, was born in 1709, at ſeven months; and the midwife ſuppoſing him to be dead, threw him careleſsly into the cradle; where, had not ſome ſigns of life been taken notice of by one of the attendants, he might never have recovered. He received the elements of his education at Eton-ſchool, where he ſhowed an early inclination to poetry. His paſtorals and ſome other light pieces were originally written in that ſeminary of learning; from whence he was removed to the univerſity of Oxford, where he purſued his claſſical ſtudies with uncommon avidity, and ſketched the plan of his Perſian Letters, a work which afterwards procured him great reputation, not only from the elegance of the language in which they were compoſed, but from the excellent obſervations they contained on the manners of mankind.

In the year 1728 he ſet out on the tour of Europe; and, on his arrival at Paris, accidentally became acquainted with the honourable Mr. Poyntz, then our miniſter at the court of Verſailles; who was ſo ſtruck with the extraordinary capacity of our young traveller, that he invited him to his houſe, and employed him in many political negotiations, which he executed with great judgment and fidelity.

Mr. Lyttelton's conduct, while on his travels, was a leſſon of inſtruction to the reſt of his countrymen. Inſtead of lounging away his hours at the coffee-houſes frequented by the Engliſh, and adopting the faſhionable follies and vices of France and Italy, his time was paſſed alternately in his library and in the ſociety of men of rank and literature. In this early part of his life he wrote a poetical epiſtle to Dr. Ayſcough, and another to Mr. Pope, which ſhow ſingular taſte and correctneſs.

After continuing a conſiderable time at Paris with Mr. Poyntz, who, to uſe his own words, behaved like a ſecond father to him, he proceeded to Lyons and Geneva; and from thence to Turin, where he was honoured with great marks of friendſhip by his Sardinian majeſty. He then viſited Milan, Venice, Genoa, and Rome, where he applied himſelf cloſely to the ſtudy of the fine arts; and was, even in that celebrated metropolis, allowed a perfect judge of painting, ſculpture, and architecture.

During his continuance abroad he conſtantly correſponded with Sir Thomas, his father. Several of his letters are yet remaining, and place his filial affection in a very diſtinguiſhed light. He ſoon after returned to his native country, and was elected repreſentative for the borough of Okehampton in Devonſhire; and behaved ſo much to the ſatisfaction of his conſtituents, that they ſeveral times re-elected him for the ſame place, without putting him to the leaſt expence.

About this period he received great marks of friendſhip from Frederic prince of Wales, father of his preſent majeſty; and was, in the year 1737, appointed principal ſecretary to his royal highneſs, and continued in the ſtricteſt intimacy with him till the time of his death. His attention to public buſineſs did not, however, prevent him from exerciſing his poetical talent. A moſt amiable young lady, miſs Forteſcue, inſpired him with a paſſion, which produced a number of little pieces, remarkable for their tenderneſs and elegance; and he had a happy facility of ſtriking out an extemporе compliment, which obtained him no ſmall ſhare of reputation. One evening being in company with lord Cobham, and ſeveral of the nobility, at Stowe, his lordſhip mentioned his deſign of putting up a buſt of lady Suffolk in his beautiful gardens; and, turning to Mr. Lyttelton, ſaid, "George, you muſt furniſh me with a motto for it." "I will, my lord," anſwered Mr. Lyttelton; and directly produced the following couplet:

Her wit and beauty for a court were made,
But truth and goodneſs fit her for a ſhade.

When Mr. Pitt, the late earl of Chatham, loſt his commiſſion in the guards, in conſequence of his ſpirited behaviour in parliament, Mr. Lyttelton was in waiting at Leiceſter-houſe, and, on hearing the circumſtance, immediately wrote theſe lines:

Long had thy virtue mark'd thee out for fame,
Far, far ſuperior to a cornet's name:
This generous Walpole ſaw; and, griev'd to find
So mean a poſt diſgrace that noble mind,
The ſervile ſtandard from thy free-born hand
He took, and bade thee lead the patriot-band.

In the year 1742 he married Lucy, the daughter of Hugh Forteſcue, Eſq. of Filleigh in the county of Devon, the lady above mentioned, whoſe exemplary conduct, and uniform practice of religion and virtue, eſtabliſhed his conjugal happineſs upon the moſt ſolid baſis.

In 1744 he was appointed one of the lords commiſſioners of the treaſury; and, during his continuance in that ſtation, conſtantly exerted his influence in rewarding merit and ability. He was the friend and patron of the late Henry Fielding, James Thomſon author of the Seaſons, Mr. Mallet, Dr. Young, Mr. Hammond, Mr. Weſt, Mr. Pope, and Voltaire. On the death of Thomſon, who left his affairs in a very embarraſſed condition, Mr. Lyttelton took that poet's ſiſter under his protection. He reviſed the tragedy of Coriolanus, which that writer had not put the laſt hand to; and brought it out at the Theatre-royal, Covent-garden, with a prologue of his own writing, in which he ſo affectingly lamented the loſs of that delightful bard, that not only Mr. Quin, who ſpoke the lines, but almoſt the whole audience, ſpontaneouſly burſt into tears.

In the beginning of the year 1746 his felicity was interrupted by the loſs of his wife, who died in the 29th year of her age; leaving him one ſon, Thomas, the late lord Lyttelton, and a daughter, Lucy, who ſome time ſince married lord viſcount Valentia. The remains of his amiable lady were depoſited at Over-Arley in Worceſterſhire; and an elegant monument was erected to her memory in the church of Hagley, which contains the following inſcription written by her huſband:

Made to engage all hearts, and charm all eyes:
Tho' meek, magnanimous; tho' witty, wiſe;
Polite, as all her life in courts had been;
Yet good, as ſhe the world had never ſeen:
The noble fire of an exalted mind
With gentleſt female tenderneſs combin'd.
Her ſpeech was the melodious voice of love,
Her ſong the warbling of the vernal grove;
Her eloquence was ſweeter than her ſong,
Soft as her heart, and as her reaſon ſtrong.
Her form each beauty of her mind expreſs'd,
Her mind was virtue by the graces dreſs'd.

Beſides theſe beautiful lines, Mr. Lyttelton wrote a monody on the death of his lady, which will be remembered while conjugal affection and a taſte for poetry exiſt in this country.

His maſterly obſervations on the converſion and apoſtleſhip of St. Paul were written at the deſire of Gilbert Weſt, Eſq. in conſequence of Mr. Lyttelton's aſſerting, that, beſide all the proofs of the Chriſtian religion which might be drawn from the prophecies of the Old Teſtament, from the neceſſary connection it has with the whole ſyſtem of the Jewiſh religion, from the miracles of Chriſt, and from the evidence given of his reſurrection by all the other apoſtles, he thought the converſion of St. Paul alone, duly conſidered, was of itſelf a demonſtration ſufficient to prove Chriſtianity to be a divine revelation. Mr. Weſt was ſtruck with the thought; and aſſured his friend, that ſo compendious a proof would be of great uſe to convince thoſe unbelievers that will not attend to a longer

ſeries of arguments; and time has ſhown he was not out in his conjecture, as the tract is eſteemed one of the beſt defences of Chriſtianity which has hitherto been publiſhed.

In 1754 he reſigned his office of lord of the treaſury, and was made cofferer to his majeſty's houſehold, and ſworn of the privy-council: previous to which, he married, a ſecond time, Elizabeth, daughter of field-marſhal Sir Robert Rich, whoſe indiſcreet conduct gave him great uneaſineſs, and from whom he was ſeparated, by mutual conſent, a few years after his marriage.

After being appointed chancellor and under-treaſurer of the court of exchequer, he was, by letters-patent dated the 19th of November 1757, 31 Geo. II. created a peer of Great Britain, by the ſtyle and title of *lord Lyttelton, baron of Frankley, in the county of Worceſter*. His ſpeeches on the Scotch and mutiny bills in the year 1747, on the Jew bill in 1753, and on the privilege of parliament in 1763, ſhowed ſound judgment, powerful eloquence, and inflexible integrity. During the laſt ten years he lived chiefly in retirement, in the continual exerciſe of all the virtues which can ennoble private life. His laſt work was Dialogues of the Dead, in which the morality of Cambray and the ſpirit of Fontenelle are happily united.

He was ſuddenly ſeized with an inflammation of the bowels, in the middle of July 1773, at his ſeat at Hagley; which terminated in his death on the 22d of that month. His laſt moments were attended with unimpaired underſtanding, unaffected greatneſs of mind, calm reſignation, and humble but confident hopes in the mercy of God. As he had lived univerſally eſteemed, he died lamented by all parties. A complete collection of his works has been publiſhed, ſince his deceaſe, by his nephew George Ayſcough, Eſq.

M.

MAB MAC

M, A liquid conſonant, and the twelfth letter in the alphabet.

It has one unvaried ſound, and is pronounced by ſtriking the lower lip againſt the upper; in which the pronunciation of this letter agrees with that of *b*; the only difference between the two conſiſting in a little motion made in the noſe in pronouncing *m*, and not in *b*: whence it happens that thoſe who have taken cold, for *m* ordinarily pronounce *b*, the noſe in that caſe being diſabled from making the neceſſary motion.

All conſonants are formed with the aid of vowels; in *em* the vowel precedes, in *be* it follows; and *m* is never mute.

Quintilian obſerves, that the *m* ſometimes ends Latin words, but never Greek ones; the Greeks always changing it in that caſe into *n*, for the ſake of the better ſound.

M is alſo a numeral letter, and among the ancients was uſed for a thouſand; according to the verſe,

M *caput eſt numeri, quem ſcimus mille teneri.*

When a daſh is added to the top of it, as $\bar{M}$, it ſignifies a thouſand times a thouſand.

M, as an abbreviature, ſtands for Manlius, Marcus, Martius, and Mucius: M A. ſignifies *magiſter artium*, or maſter of arts; MS manuſcript, and MSS. manuſcripts.

M, in aſtronomical tables, and other things of that kind, is uſed for *meridional* or ſouthern; and ſometimes for *meridian* or mid-day.

M, in medicinal preſcription, is frequently uſed to ſignify a maniple or handful: and it is ſometimes alſo put at the end of a recipe, for *miſce* "mingle;" or for *mixtura* "a mixture." Thus, *m. f. julapium* ſignifies "mix and make a julep."

M, in law, the brand or ſtigma of a perſon convicted of manſlaughter, and admitted to the benefit of his clergy. It is to be burnt on the brawn of his left thumb.

MAAT (John). See Blankof.

MABA, in botany: A genus of the triandria order, belonging to the dioecia claſs of plants. The perianthium of the male is trifid; that of the female is as in the male; the fruit is a plum two-celled ſuperior.

MABILLON (John), a very learned writer of France in the 17th century, was born at Perre monte, on the frontiers of Champagne, in 1632. He was educated in the univerſity of Rheims, and afterwards entered into the abbey of the Benedictines of St. Remy. In the year 1662, he was appointed keeper of the treaſures and monuments of France at St. Denys: but having unfortunately broken a looking-glaſs there, which was pretended to have belonged to Virgil, he deſired leave of his ſuperiors to quit an employment which frequently obliged him to tell things he did not believe. Next year he went to Paris; and was very ſerviceable to Father d'Acheri, who was deſirous of having ſome young monk who could aſſiſt him in compiling his *Spicilegium*. This made him known. Soon after, the congregation of St. Maur having formed a deſign of publiſhing new editions of the Fathers, reviſed from the MSS. in the libraries of the Benedictines, Mabillon was charged with the edition of St. Bernard, which he prepared with extraordinary diligence. After that, he publiſhed many other works, which are evidences of his vaſt capacity and induſtry. In 1682 he was employed by M. Colbert in examining ſome ancient titles relating to the royal family. The year following he ſent him into Germany, to ſearch the archives and libraries of the ancient abbeys, for what was moſt curious and proper to illuſtrate the hiſtory of the church in general, and that of France in particular. He has publiſhed an account of this journey. In 1685 he undertook another journey into Italy, by order of the king of France; and returned the year following with a very noble collection. He placed in the king's library above 3000 volumes of rare books, printed and in MS. and compoſed two volumes of the pieces which he had diſcovered in that country. He was highly eſteemed for his virtues as well as his learning.

MACACO, or Macauco. See Lemur.

MACAO, a town of China, in the province of Canton, ſeated in an iſland at the mouth of the river Tae. The Portugueſe have been in poſſeſſion of the harbour for 150 years. Formerly they had a great trade here; but now they have only a fort with a ſmall garriſon. The houſes are built after the European manner; and there is a Chineſe mandarin, as well as a Portugueſe governor, to take care of the town and the neighbouring country. E. lon. 112. 13. N. lat. 22. 12.

Macao, in ornithology. See Psittacus.

MACARIANS, in eccleſiaſtical hiſtory; the followers of Macarius, an Egyptian monk, who was diſtinguiſhed towards the cloſe of the fourth century for his ſanctity and virtue. In his writings there are ſome ſuperſtitious tenets, and alſo certain opinions that ſeem tainted with Origenism. The name has been alſo applied to thoſe who adopted the ſentiments of Macarius a native of Ireland, who, about the cloſe of the ninth century, propagated in France the error afterwards maintained

by Averrhoes, that one individual intelligence or ſoul performed the ſpiritual and rational functions in all the human race.

MACARONI. See FOLENGIO, and the next article.

MACARONIC, or MACARONIAN, a kind of burleſque poetry, conſiſting of a jumble of words of different languages, with words of the vulgar tongue Latinized, and Latin words modernized. *Maccaroni* among the Italians, as has been obſerved by Cælius Rhodiginus, ſignifies *a courſe clowniſh man*; and becauſe this kind of poetry is patched out of ſeveral languages, and full of extravagant words, &c. the Italians, among whom it had its riſe, gave it the name of *maccaronian* or *maccaronic* poetry. Others chooſe to derive it *à macaronibus*, from *macaroons*, a kind of confection made of meal not boulted, ſweet-almonds, ſugar, and the white of eggs, accounted a great dainty among the country-people in Italy; which, from their being compoſed of various ingredients, occaſioned this kind of poetry, which conſiſts of Latin, Italian, Spaniſh, French, Engliſh, &c. to be called by their name.

Example.—A bold fellow in the *macaronic* ſtyle ſays,

Enfilavi omnes ſcadrones & regimandos, &c.

Another example:

Archelos piſtoliſeros furiamque manantum,
Et grandem eſmeutam quæ inopinum facta ruelle eſt:
Toxinumque alto troublantem corda clochero, &c.

Theoph. Folengius, a Benedictine monk of Mantua, was the firſt who invented, or at leaſt cultivated, this kind of verſe. See FOLENGIO.

The beſt pieces of this kind are, the *Baldus* of Folengio, and *Macaronis Forza* by Steſonio a Jeſuit, among the Italians; and the *Reatus veritabilis ſuper terribili eſmeuta paiſanarum de Ruellis*, among the French. The famous Rabelais firſt tranſferred the *macaronic* ſtyle out of the Italian verſe into French proſe: and on the model thereof formed ſome of the beſt things in his *Pantagruel*. We have little in Engliſh in the *macaronian* way; nothing ſcarce, but ſome little looſe pieces collected in Camden's Remains. But the Germans and Netherlanders have had their *macaronic* poets; witneſs the *Certamen Catholicum cum Calviniſtis*, of one Martinius Hamconius Friſius, which contains about 1200 verſes, all the words whereof begin with the letter *C*.

MACARSKA, a town of Dalmatia, and capital of Primogria, with a pretty good harbour, and a biſhop's ſee, ſeated on the gulph of Venice. E. lon. 17. 57. N. lat. 43. 42.

MACASSAR, a conſiderable kingdom of the iſland of Celebes, in the Eaſt-Indies. The climate is very hot; and would be intolerable, were it not for the rains which fall when the ſun is directly over their heads. The ſoil is extremely fertile, and there are ripe fruits at all times of the year. There are great numbers of monkeys, who are devoured by monſtrous ſerpents; ſome of which are ſo large, that they will ſwallow one of theſe animals entire. The Macaſſars are large, robuſt, courageous, and greatly addicted to war. They profeſs the Mahometan religion.

MACASSAR, a large, ſtrong, and handſome town of the iſland of Celebes, and capital of the kingdom of the iſland of Celebes, where the king reſides. The houſes are all built of wood, and ſupported by thick poſts; and they have ladders to go up into them, which they draw up as ſoon as they have entered. The roofs are covered with very large leaves, which prevent the rain from entering. It is ſeated near the mouth of a large river, which runs through the kingdom from north to ſouth. E. lon. 117. 55. S. lat. 5. 0.

MACASSAR *Poiſon*, in natural hiſtory, called *ippo* in the Macaſſar and Malayan tongue, is the gum of a certain tree, ſhining, brittle, black, and every way like ſtone-pitch, growing in the iſland Celebes, in the South Seas; with which all the natives arm themſelves in travel, having a long hollow trunk of a hard red wood like braſil, accurately bored, and at one end is fixed a large lance-blade of iron. Then they make a ſmall arrow, very ſtraight, and ſomewhat bigger than a large wheaten ſtraw: at one end they fix it into a round piece of white, light, ſoft, wood, like cork, about the length of the little finger, juſt fit for the bore of the trunk, to paſs clear by the force of one's breath, and to fill it ſo exactly, that the air may not paſs by, but againſt it, in order to carry it with the greater force. At the other end they fix in it either a ſmall fiſh-tooth for that purpoſe, or make a blade of wood of the bigneſs of the point of a lancet, about three-quarters of an inch long, and making a little notch in the end of the arrow, they ſtrike it firm therein, which they anoint with poiſon. The poiſonous gum, when gathered, is put into hollow bamboos or canes, ſtopped up very cloſe, and thus brought to Macaſſar. When they fit it for uſe, they take a piece of ſmooth turtle-ſhell, and a ſtick cut flat and ſmooth at the end: then they take green galangal root, grate it, and, with the addition of a little fair water, preſs the juice into a clean china diſh; then with a knife ſcraping a little of the poiſon upon the ſhell, dip the end of the ſtick in the forementioned liquor, and with this diſſolve the poiſon to the conſiſtence of a ſyrup: when this is done, they anoint the fiſh-tooth or wooden blade with the ſame ſtick, and lay it in the ſun, ſo that it may be baked hard. The pointed arrows thus prepared, are put in hollow bamboos, cloſe ſhut, and in this ſtate they retain their virtue for a month.

MACCABÆUS (JUDAS). See JUDAS.

MACCABEES, two apocryphal books of ſcripture, containing the hiſtory of Judas and his brothers, and their wars againſt the Syrian kings in defence of their religion and liberties, ſo called from Judas Mattathias, ſurnamed *Maccabeus*, as ſome ſay from the word מכבי, formed of the initials of מי כמכה באלם יהוה, q. d. *Who is like unto thee, O Lord, among the Gods?* which was the motto of his ſtandard; whence thoſe who fought under his ſtandard were called *Maccabees*, and the name was generally applied to all who ſuffered in the cauſe of the true religion, under the Egyptian or Syrian kings. The firſt book of the Maccabees is an excellent hiſtory, and comes neareſt to the ſtyle and manner of the ſacred hiſtorians of any extant. It was written originally in the Chaldee language of the Jeruſalem dialect, and was extant in this language in the time of Jerom. From the Chaldee it was tranſlated into Greek, from the Greek into Latin. It is ſuppoſed to have been written by John Hyrcanus the ſon of Simon, who was prince and high-prieſt of the Jews near 30 years, and began his government at the time where this hiſtory ends. It contains the hiſtory of 40 years, from the reign of Antiochus Epiphanes to the death of Simon the high-prieſt; that is, from the year of the world 3829 to the year 3869; 131 years before Chriſt. The ſecond book of the Maccabees begins with two epiſtles ſent from the Jews of Jeruſalem to the Jews of Egypt and Alexandria; to exhort them to obſerve the feaſt of the dedication of the new altar erected by Judas on his purifying the temple. The firſt was written in the 169th year of the era of the Seleucidæ, *i. e.* before Chriſt 144; and the ſecond in the 188th year of the ſame era, or 125 before Chriſt; and both appear to be ſpurious. After theſe epiſtles follows the preface of the author to his hiſtory, which is an abridgement of a larger work, compoſed by one Jaſon, a Jew of Cyrene, who wrote in Greek the hiſtory of Judas Maccabeus and his brethren, and the wars againſt Antiochus Epiphanes, and Eupator his ſon. This ſecond book does not by any means equal the accuracy and excellency of the firſt. It contains a hiſtory of about 15 years, from the execution of Heliodorus's com-

miſſion, who was ſent by Seleucus to ſeteh away the treaſures of the temple, to the victory obtained by Judas Maccabens over Nicanor; that is, from the year of the world 3828 to the year 3843, 147 years before Chriſt.

There are in the Polyglot Bibles, both of Paris and London, Syriac verſions of both theſe books; but they, as well as the Engliſh verſions which we have among the apocryphal writers in our Bibles, are derived from the Greek. There is alſo a third book of the Maccabees, containing the hiſtory of the perſecution of Ptolemy Philopator againſt the Jews in Egypt, and their ſufferings under it; and ſeems to have been written by ſome Alexandrian Jew in the Greek language, not long after the time of Siracides. It is in moſt of the ancient manuſcript copies of the Greek Septuagint, particularly in the Alexandrian and Vatican, but was never inſerted into the vulgar Latin verſion of the Bible, nor conſequently into any of our Engliſh copies. Moreover, Joſephus's hiſtory of the martyrs that ſuffered under Antiochus Epiphanes is found in ſome manuſcript Greek Bibles, under the name of the fourth book of the *Maccabees*.

MACBETH, a Scots nobleman in the 11th century, nearly allied to Duncan king of Scotland. Not contented with curbing the king's authority, he carried his peſtilent ambition ſo far as to put him to death; and, chaſing Malcolm Kenmure his ſon and heir into England, uſurped the crown. Siward earl of Northumberland, whoſe daughter Duncan had married, undertook, by order of Edward the Confeſſor, the protection of the fugitive prince.—He marched with an army into Scotland; defeated and killed Macbeth; and reſtored Malcolm to the throne of his anceſtors. Shakeſpeare has made this tranſaction the ſubject of one of his beſt tragedies.

MACBRIDE (Dr. David), an eminent phyſician and philoſopher, was deſcended from an ancient family in the county of Gallowdy in Scotland. His grandfather, a clergyman, had ſettled in Ireland about the end of the laſt century, as miniſter to a Preſbyterian congregation at Belfaſt; and his father, who followed the ſame line, was ſettled at Ballymony in the county of Antrim, where he married, and where our author was born in April 1726. After a proper ſchool-education, and having paſſed ſome time under the tuition of an eminent ſurgeon in his native place, he was ſent to the univerſity of Glaſgow. Having there completed the uſual courſe of academical ſtudies, he came to Edinburgh for the further proſecution of medical ſcience. After a ſhort ſtay here, a war then prevailing between France and Britain, he was induced to go on board the navy in the ſtation of a ſurgeon's mate. In the ſervice of his country he continued for ſeveral years; and after diſcharging for ſome time the duties of an aſſiſtant, he was raiſed to the rank of ſurgeon. In this ſituation he firſt turned his thoughts towards the diſcovery of a remedy for the ſea-ſcurvy. It was not, however, at this period, that either chance or reaſoning ſuggeſted to him the employment of an article which has ſince been attended with the moſt beneficial conſequences. Here he had an opportunity only of obſerving the ſymptoms, of ſtudying the nature, and of lamenting the conſequences, of the diſeaſe.

The termination of the war by the peace of Aix la-Chapelle put a period to Dr. Macbride's employment as a naval ſurgeon. He had now probably obtained much medical knowledge in the ſchool of experience; but he was ſenſible that he had ſtill much to acquire in that of ſcience. An ardent keenneſs to mingle in active life had led him from the ſchools of medicine at an earlier period than could have been wiſhed; and an earneſt deſire to found his future practice in the beſt eſtabliſhed principles led him back to them, when a judgment, matured by years, and informed from the obſervation of facts, rendered him capable of hearing teachers with greater advantage. He returned therefore to Edinburgh, and again entered on the career of academical purſuits, under the tuition of Dr. Monro, and thoſe other teachers, whoſe abilities raiſed the fame of the medical ſchool at this place. But not ſatisfied with the inſtructions to be had from any one ſet of profeſſors, the celebrity of the medical teachers in London led him alſo to viſit that capital. There he particularly became the pupil of thoſe diſtinguiſhed lecturers, Dr. Hunter and Dr. Smellie. And while from the former he laboured to acquire an accurate chirurgical knowledge, from the latter he endeavoured to obtain the true principles of midwifery conſidered as a ſcience. At the ſame time, he was no leſs induſtrious in improving himſelf in the ſucceſsful practice of both arts by attention at hoſpitals.

Thus prepared for the exerciſe of his profeſſion, about the end of the year 1749 he fixed his reſidence in Dublin in the character of ſurgeon and accoucheur. If amiable manners, and extenſive knowledge of his profeſſion, could alone have been ſufficient introductions to practice, he might in a ſhort time have looked for a competent ſhare of buſineſs in that capital; but while he had to combat that objection which very generally ariſes from youth, his progreſs was alſo not a little retarded by an uncommon degree of modeſty. Hence for ſeveral years he remained almoſt in a ſtate of obſcurity, and was employed by but few people either of rank or fortune. But, if it is to be regretted that for many years his time was not ſo fully employed in the lucrative part of his profeſſion as was due to his merit, it ought ſtill to be remembered, that this eſſentially promoted the cauſe of ſcience: for by this means his genius and induſtry were directed to medical reſearches, and were productive of diſcoveries which will with honour tranſmit his name to lateſt poſterity. Theſe, though ſome of them might have been ſucceſsfully turned to his own emolument, were freely communicated to the world in different publications; and he did not ſhow greater ingenuity in making diſcoveries, than liberality of ſentiment in publiſhing them for the advantage of others.—His firſt publication, entitled, "Experimental Eſſays on Medical and Philoſophical Subjects," made its appearance in the year 1764.—Theſe eſſays are five in number: 1. On the fermentation of alimentary mixture and the digeſtion of the food. 2. On the nature and properties of fixed air. 3. On the different kinds of antiſeptics. 4. Of the diſſolvent power of quicklime. 5. Of the ſea-ſcurvy. The merit of all theſe is ſufficiently known and acknowledged: but the laſt of them is unqueſtionably the moſt important; the method therein propoſed of both the prevention and cure of that dreadful diſeaſe the ſcurvy, having been confirmed by repeated and undeniable obſervation.

Having thus equally diſtinguiſhed himſelf as an ingenious philoſopher and able practitioner, the world were not now ſlow in beſtowing upon him the tribute of applauſe to which he was entitled. His name was enrolled with honour in the liſts of many learned ſocieties; and the univerſity where his ſtudies had firſt been commenced, was proud to confer upon him the degree of Doctor of Medicine.

The reputation, however, of being a diſtinguiſhed author was to him but a ſecondary object; and his talents were not confined to the advancement of medicine alone. Having ſucceſsfully diſcovered a conſiderable improvement in the art of tanning, with that ſpirited generoſity which is ever the concomitant of real worth, he ſpeedily and freely communicated it to the public, by publiſhing, firſt, "An Account of a New Method of Tanning;" and afterwards, "Inſtructions for carrying on the New Method of Tanning." As a mark of approbation for this liberal conduct, as well as a teſtimony of reſpect for his ingenuity, prize-medals were conferred upon him by the Societies of Arts both in London and Dublin. But his laſt and moſt extenſive publication was more immediately in the

line of his own profeſſion: It is entitled, "A Methodical Introduction to the Theory and Practice of Medicine." In that valuable work he has given a conciſe and connected view of the principles and practice of the healing art, as beſt eſtabliſhed by ſound reaſon, and confirmed by accurate obſervation. Moſt if not all of theſe publications not only went through various editions, but were tranſlated into different languages.

After the merit of Dr. Macbride came to be properly known, the public ſeemed to ſhow a deſire of making compenſation for having ſo long overlooked it. His employment increaſed ſo rapidly, that he had more buſineſs than he could tranſact either with eaſe or ſafety. This having kept him in perpetual agitation both of body and mind, at laſt induced an almoſt total incapacity of ſleeping. From this circumſtance his health could not fail to be impaired. In this ſituation, after accidental expoſure to cold, he was attacked with a fever, which put an end to his life on the 13th of December 1778, in the 53d year of his age.

Thoſe who were his moſt intimate acquaintance were inclined to believe that his death was not a little haſtened by domeſtic calamities. During his reſidence in Dublin he was twice married, and was as often ſubjected to that inexpreſſible diſtreſs which muſt reſult from a final ſeparation in this world from the moſt intimate and loving friends. By both of his wives he had ſeveral children; but none of them ſurvived their father. And on theſe calamitous events, although he was able to conceal his feelings from the world, yet they gave a ſevere ſhock to his conſtitution. After his death, ſeveral of the playful trinkets of his infants, with the ſignature of *dulces exuviæ*, were found in his repoſitories among papers on medical and other important ſubjects: an incontrovertible proof, that in him at leaſt the great mind of the philoſopher was conjoined with the feeling heart of the affectionate father. But if his abilities were remarkable as a philoſopher and phyſician, if his conduct was exemplary as an huſband and parent, his manners were no leſs amiable as a companion and friend. His polite and benevolent conduct, joined to his taſte for the fine arts, conciliated the affections and eſteem of all who knew him. His death was univerſally and ſincerely lamented in the city of Dublin.

MACCLESFIELD, a town of Cheſhire, diſtant 171 miles from London, is ſeated on the edge of a foreſt of the ſame name, upon a high bank near the river Bollin; and is a large handſome town, with a fine church and a very high ſteeple. It was erected into a borough by king Edward III. is governed by a mayor, and enjoys great privileges and juriſdictions by virtue of the court and the liberties of the foreſt. In its church are two braſs plates, on one of which there is a promiſe of 26,000 years and 26 days pardon for ſaying five Pater-Noſters and five Aves. Its chief manufacture is mohair buttons. The market is on Mondays; the fairs are June 11 and 30, and Nov. 2. In Macclesfield foreſt are many pits dug for the ſake of the turf; in which it is common to ſee fir-trees buried, which are dug up for various uſes, but chiefly for ſplinters that ſerve the poor for candles. W. lon. 2. 10 N. lat. 53. 1.

MACE, an ancient weapon, formerly much uſed by the cavalry of all nations. It was commonly made of iron; its figure much reſembles a chocolate-mill; many ſpecimens may be ſeen in the Tower. It was with one of theſe that Walworth mayor of London knocked the rebel Wat Tyler from off his horſe in Smithfield for approaching the young king Richard II. in an inſolent manner; and as he fell, he diſpatched him with his dagger. The mace in modern times changed its form; and being no longer a war inſtrument, is made of copper or ſilver gilt, ornamented with a crown, globe, and croſs, and is now the chief inſignia of authority throughout Great Britain. Similar to the ancient maces, were thoſe ſtaves at the end of which iron or leaden balls armed with ſpikes were ſuſpended by chains: they were till lately carried by the pioneers of the trained-bands or city militia.

MACE, in the materia medica, the ſecond coat or covering of the kernel of the nutmeg, is a thin and membranaceous ſubſtance, of an oleaginous nature, and a yelloviſh colour; being met with in flakes of an inch or more in length, which are divided into a multitude of ramifications. It is of an extremely fragrant, aromatic, and agreeable flavour; and of a pleaſant, but acrid oleaginous taſte. Mace is carminative, ſtomachic, and aſtringent; and poſſeſſes all the virtues of nutmeg, but has leſs aſtringency.—The oils of mace and nutmeg, whether prepared by diſtillation or expreſſion, are ſo much of the ſame nature, that they may be indiſcriminately uſed for one another on all occaſions. They give eaſe in colics, and often in nephritic caſes, taken internally from one drop to five or ſix of the diſtilled oil, or an equal quantity of the expreſſed; and externally, they are of uſe to rub paralytic limbs; they alſo aſſiſt digeſtion; and will often ſtop vomitings and hiccoughs, only by being rubbed on the region of the ſtomach. The nurſes have a cuſtom of applying oil of mace by expreſſion to children's navels to eaſe their gripes, and that often with ſucceſs; and we are aſſured, by authors of credit, that when rubbed on the temples it promotes ſleep.

MACEDON, or MACEDONIA, a moſt celebrated kingdom of antiquity, was bounded on the eaſt by the Ægean ſea; on the ſouth by Theſſaly and Epirus; on the weſt by the Ionian ſea or Adriatic; on the north, at firſt by the river Strymon and the Scardian mountains, but afterwards by the river Neſſus or Neſtus. In a direct line the whole country extended only 150 miles in length: but the windings of the coaſt lengthened it out to three times that extent; in which almoſt every convenient ſituation was occupied by a Grecian ſea port. The country was naturally divided by the Thermaic and Strymonic gulphs, into the provinces of Pieria, Chalcis, and Pangæus. The middle region, which took its name from a city of Eubœa from whence it was originally peopled, was very fertile and pleaſant; the inland country, being diverſified by lakes, rivers, and arms of the ſea, was extremely convenient for inland navigation, while the towns of Amphipolis, Potidæa, Acanthus, and many others, afforded marts for the commerce of the republics of Greece, as well as of Thrace and Macedon. On one ſide of this diſtrict were the mountains of Pangæus, and on the other the plains of Pieria. The Pangæan mountains, which extended 90 miles towards the eaſt and the river Neſſus, though proper neither for corn nor paſture, produced plenty of timber for ſhip-building; while the ſouthern branches of the mountain contained rich veins of gold and ſilver: but theſe, though wrought ſucceſſively by the Thaſians and the Athenians, were only brought to perfection by Philip of Macedon, who extracted from them gold and ſilver to the value of 200,000l. ſterling annually. Pieria extended 50 miles along the Thermaic gulph, to the confines of Theſſaly and mount Pindus. The inland part of the country was beautifully diverſified with ſhady hills and fountains; and ſo admirably calculated for ſolitary walks and retirement, that the ancients looked upon it to be the favourite haunt of the muſes, and accordingly beſtowed upon them the title of *Pierides*.

In the moſt early times this country was called *Æmathia*, from *Æmathius* one of its princes. The name of *Macedon* is ſaid to have been derived from *Macedo* a deſcendant of Deucalion; though others ſuppoſe it to have been only a corruption of *Mygdonia* a diſtrict of the country. In thoſe remote ages of antiquity, Macedon, like moſt other countries of Europe, was divided into a great number of petty principalities, of which ſcarce even the names are known at this time. All authors agree, however, that *Caranus* was the firſt who eſtabliſhed any permanent ſovereignty in Macedon. He was an Argive,

a deſcendant of Hercules, and about 800 years B. C. conducted a ſmall colony of his countrymen into the inland diſtrict of Macedon at that time diſtinguiſhed by the name of *Æmathia* as already mentioned. This territory was about 300 miles in circumference. On the ſouth it was ſeparated from the ſea by a number of Greek republics, of which the moſt conſiderable were thoſe of Olynthus and Amphipolis; and on the north, eaſt, and weſt, was ſurrounded by the barbarous kingdoms of Thrace, Pœonia, and Illyricum. According to the traditions of thoſe times, Caranus, having conſulted the oracle on the ſucceſs of his intended expedition, was commanded to be directed by the goats in the eſtabliſhment of his empire. For ſome time he proceeded at random, without knowing what to make of the oracle's anſwer; but happening to enter the ſmall kingdom of *Æmathia*, at that time governed by king Midas, he obſerved a herd of goats running towards *Edeſſa* the capital. Recollecting then the anſwer of the oracle, he attacked and took the city, by ſurpriſe; ſoon after making himſelf maſter of the whole kingdom. In memory of this remarkable event he called the city *Ægea*, and the people *Ægiates*, from the goats which conducted him, and made uſe of the figure of a goat in his ſtandard. From this fable alſo we ſee why the figure of a goat is ſo frequently ſeen on the coins of Philip and his ſucceſſors.

The little colony of Argives led into Æmathia by Caranus would ſoon have been overwhelmed by the barbarous nations who ſurrounded it, had not this prince and his ſubjects taken care to ingratiate themſelves with their neighbours, rather than to attempt to ſubdue them by force of arms. They inſtructed them in the Grecian religion and government, and in the knowledge of many uſeful arts; adopting themſelves, in ſome degree, the language and manners of the barbarians; imparting to them in return ſome part of the Grecian civilization and polite behaviour. Thus they gradually aſſociated with the fierce and warlike tribes in their neighbourhood; and this prudent conduct, being followed by ſucceeding generations, may be looked upon as one of the cauſes of the Macedonian greatneſs.

This country, the theatre of the moſt warlike exploits recorded by the pen of hiſtory, after various intereſting viciſſitudes, was at length reduced to a Roman province in 148 B. C. To them it continued ſubject till the year 1357, when it was reduced by the Turkiſh ſultan Bajazet, and hath remained in the hands of the Turks ever ſince.

MACEDONIANS, in eccleſiaſtical hiſtory, the followers of Macedonius, biſhop of Conſtantinople, who, through the influence of the Eunomians, was depoſed by the council of Conſtantinople in 360, and ſent into exile. He conſidered the Holy Ghoſt as a divine energy diffuſed throughout the univerſe, and not as a perſon diſtinct from the Father and the Son. The ſect of Macedonians was cruſhed before it had arrived at its full maturity, by the council aſſembled by Theodoſius in 381, at Conſtantinople. See SEMIARIANS.

MACEDONIUS. See MACEDONIANS.

MACER (EMILIUS), an ancient Latin poet, was born at Verona, and flouriſhed under Auguſtus Cæſar. Euſebius relates, that he died a few years after Virgil. Ovid ſpeaks of a poem of his, on the nature and quality of birds, ſerpents, and herbs; which he ſays Macer being then very old had often read to him:

Sæpe ſuas volucres legit mihi grandior ævo,
Quæque nocet ſerpens, quæ juvat herba, Macer.
De Ponto, lib. iv. *eleg.* 10.

There is extant a poem upon the nature and power of herbs under Macer's name; but it is ſpurious. He alſo wrote a ſupplement to Homer, as Quintus Calaber did afterwards in Gr[illegible]

Tu canis æterno quicquid reſtabat Homero:
Ne careant ſumma Troica bella manu.
De Ponto, lib. ii. *eleg.* 10.

MACERATION, is an infuſion of, or ſoaking ingredients in water or any other fluid, in order either to ſoften them or draw out their virtues.

MACERATA, a handſome and populous town of Italy, in the territory of the church, and in the Marche of Ancona, with a biſhop's ſee, and an univerſity. It is ſeated near the mountain Chiento, in E. lon. 13. 37. N. lat. 43. 15.

MACHAON, a celebrated phyſician among the ancients, ſon of Æſculapius and brother to Podalirius. He went to the Trojan war with the inhabitants of Trica, Ithome, and Œchalia. According to ſome, he was king of Meſſenia. He was phyſician to the Greeks, and healed the wounds which they received during the Trojan war. Some ſuppoſe he was killed before Troy by Eurypylus the ſon of Telephus. He received divine honours after death, and had a temple in Meſſenia.

MACHÆRUS (anc. geog.), a citadel on the other ſide Jordan, near the mountains of Moab, not far from and to the north of the *Lacus Aſphaltites*. It was the ſouth boundary of the Peræa; ſituated on a mountain encompaſſed round with deep and broad valleys; built by Alexander king of the Jews, deſtroyed by Gabinius in the war with Ariſtobulus, and rebuilt by Herod with a cognominal town round it. Here John the Baptiſt was beheaded (Joſephus).

MACHIAN, one of the Molucca iſlands, in the Eaſt Indian Ocean, about 20 miles in circumference, and the moſt fertile of them all. It likewiſe produces the beſt cloves; and is in poſſeſſion of the Dutch, who have three ſtrong forts built on it.

MACHIAVEL (NICHOLAS), a famous political writer of the 16th century, was born of a diſtinguiſhed family at Florence. He wrote in his native language with great elegance and politeneſs, though he underſtood very little of the Latin tongue; but he was in the ſervice of Marcellus Virgilius, a learned man, who pointed out to him many of the beautiful paſſages in the ancients, which Machiavel had the art of placing properly in his works. He compoſed a comedy upon the ancient Greek model; in which he turned into ridicule many of the Florentine ladies, and which was ſo well received, that Pope Leo X. cauſed it to be acted at Rome. Machiavel was ſecretary, and afterwards hiſtoriographer, to the republic of Florence. The houſe of Medicis procured him this laſt office, together with a handſome ſalary, in order to pacify his reſentment for having ſuffered the torture upon ſuſpicion of being an accomplice in the conſpiracy of the Soderini againſt that houſe, when Machiavel bore his ſufferings without making any confeſſion. The great encomiums he beſtowed upon Brutus and Caſſius, both in his converſations and writings, made him ſtrongly ſuſpected of being concerned in another conſpiracy againſt cardinal Julian de Medicis, who was afterwards Pope under the name of *Clement VII.* However, they carried on no proceedings againſt him; but from that time he turned every thing into ridicule, and gave himſelf up to irreligion. He died in 1530, of a remedy which he had taken by way of prevention.—Of all his writings, that which has made the moſt noiſe, and has drawn upon him the moſt enemies, is a political treatiſe entitled the *Prince*; which has been tranſlated into ſeveral languages, and wrote againſt by many authors. The world is not agreed as to the motives of this work; ſome thinking, he meant to recommend tyrannical maxims; others, that he only delineated them to excite abhorrence. Machiavel alſo wrote Reflections on Titus Livius, which are extremely curious; The Hiſtory of Florence, from the year 1205 to 1494; and a quarto volume of Poems and other pieces. Mr.

Harrington conſiders him as a ſuperior genius, and as the moſt excellent writer on politics and government that ever appeared.

MACHINE, (*Machina*), in the general, ſignifies any thing that ſerves to augment or to regulate moving powers: Or it is any body deſtined to produce motion, ſo as to ſave either time or force. The word comes from the Greek μαχανη, "machine, invention, art:" And hence, in ſtrictneſs, a machine is ſomething that conſiſts more in art and invention, than in the ſtrength and ſolidity of the materials; for which reaſon it is that the inventors of machines are called *ingenieurs* or *engineers*.

Machines are either ſimple or compound. The ſimple ones are the ſeven mechanical powers, viz. lever, balance, pully, axis and wheel, wedge, ſcrew, and inclined plane. See MECHANICS. From theſe the compound ones are formed by various combinations, and ſerve for different purpoſes. See MECHANICS and HYDROSTATICS; alſo the articles HUSBANDRY, CANNON, CENTRIFUGAL, FIRE, STEAM, &c. &c.

MACHINES uſed in war amongſt the Greeks were principally theſe: 1. Κλιμακες, or ſcaling ladders; 2. The battering ram; 3. The *helepolis*; 4. The χελωνη or tortoiſe, called by the Romans *teſtudo*; 5. The χωμα or *agger*, which was faced with ſtone, and raiſed higher than the wall; 6. Upon the χωμα were built πυργοι or towers of wood; 7. Γερραι, or other hurdles; 8. *Catapultæ*, or καταπελται, from which they threw arrows with amazing force; and, 9. The λιθοβολοι, πετροβολοι, or αφετηρια, from which ſtones were caſt with great velocity. The principal warlike machines made uſe of by the Romans were, the ram, the *lupus* or wolf, the *teſtudo* or tortoiſe, the *baliſta*, the *catapulta*, and the *ſcorpion*.

MACHINERY, in epic and dramatic poetry, is when the poet introduces the uſe of machines; or brings ſome ſupernatural being upon the ſtage, in order to ſolve ſome difficulty or to perform ſome exploit out of the reach of human power. The ancient dramatic poets never made uſe of machines, unleſs where there was an abſolute neceſſity for ſo doing: whence the precept of Horace:

Nec Deus interſit, niſi dignus vindice nodus
Incidrit.

It is quite otherwiſe with epic poets, who introduce machines in every part of their poems; ſo that nothing is done without the intervention of the gods. In Milton's Paradiſe Loſt, by far the greater part of the actors are ſupernatural perſonages: Homer and Virgil do nothing without them; and, in Voltaire's Henriade, the poet has made excellent uſe of St. Louis. As to the manner in which theſe machines ſhould act, it is ſometimes inviſibly, by ſimple inſpirations and ſuggeſtions; ſometimes by actually appearing under ſome human form; and, laſtly, by means of dreams and oracles, which partake of the other two. However, all theſe ſhould be managed in ſuch a manner as to keep within the bounds of probability.

MACHUL, an inſtrument of muſic among the Hebrews. See plate 11. Kircher apprehends that this name was given to two kinds of inſtruments, one of the ſtringed and the other of the pulſatile kind. That of the former ſort had ſix chords: though there is great reaſon to doubt whether an inſtrument requiring the aid of the hair-bow, and ſo much reſembling the violin, be ſo ancient. The ſecond kind was of a circular form, made of metal, and either hung round with little bells, or furniſhed with iron rings ſuſpended on a rod or bar that paſſed acroſs the circle. Kircher ſuppoſes that it was moved to and fro by a handle fixed to it, and thus emitted a melancholy kind of murmur.

MACHYNLETH, a town of Montgomeryſhire in North Wales, 198 miles from London, and 32 from Montgomery. It is an ancient town; and has a market on Mondays, and fairs on May 16, June 26, July 9, September 18, and November 25, for ſheep, horned cattle, and horſes. It is ſeated on the river Douay, over which there is a large ſtone bridge, which leads into Merionethſhire. It was here that Owen Glyndwr exerciſed the firſt acts of his royalty in 1402. Here he accepted the crown of Wales, and aſſembled a parliament; and the houſe wherein they met is now ſtanding, divided into tenements.

MACKENZIE (Sir GEORGE), an able lawyer, a polite ſcholar, and a celebrated wit, was born at Dundee in the county of Angus in Scotland in 1636, and ſtudied at the univerſities of Aberdeen and St. Andrew's; after which he applied himſelf to the civil law, travelled into France, and proſecuted his ſtudy in that faculty for about three years. At his return to his native country, he became an advocate in the city of Edinburgh; and ſoon gained the character of an eminent pleader. He did not, however, ſuffer his abilities to be confined entirely to that province. He had a good taſte for polite literature; and he gave the public, from time to time, inconteſtable proofs of an uncommon proficiency therein. He had practiſed but a few years, when he was promoted to the office of a judge in the criminal court; and, in 1674, was made king's advocate, and one of the lords of the privy council in Scotland. He was alſo knighted by his majeſty. In theſe ſtations he met with a great deal of trouble, on account of the rebellions which happened in his time; and his office of advocate requiring him to act with ſeverity, he did not eſcape being cenſured, as if in the deaths of ſome particular perſons who were executed he had ſtretched the laws too far. But there does not ſeem to have been any juſt foundation for this clamour againſt him; and it is generally agreed, that he acquitted himſelf like an able and upright magiſtrate. Upon the abrogation of the penal laws by king James II. our advocate, though he had always been remarkable for his loyalty, and even cenſured for his zeal againſt traitors and fanatics, thought himſelf obliged to reſign his poſt; being convinced, that he could not diſcharge the duties of it in that point with a good conſcience. But he was ſoon after reſtored, and held his offices till the revolution; an event which, it ſeems, he could not bring himſelf to approve. He had hoped that the prince of Orange would have returned to his own country when matters were adjuſted between the king and his ſubjects; and upon its proving otherwiſe, he quitted all his employments in Scotland, and retired into England, reſolving to ſpend the remainder of his days in the univerſity of Oxford. He arrived there in September 1689, and proſecuted his ſtudies in the Bodleian Library, being admitted a ſtudent there by a grace paſſed in the congregation, June 2, 1690. In the ſpring following, he went to London; where he fell into a diſorder, of which he died in May 1691. His corpſe was conveyed by land to Scotland, and interred there with great pomp and ſolemnity. "The politeneſs of his learning, and the ſprightlineſs of his wit, were (ſays the reverend Mr. Grainger) conſpicuous in all his pleadings, and ſhone in his ordinary converſation." Mr. Dryden acknowledges, that he was unacquainted with what he calls the *beautiful turn of words and thoughts in poetry*, till they were explained and exemplified to him in a converſation with that noble wit of Scotland Sir George Mackenzie.—He wrote ſeveral pieces of hiſtory and antiquities; Inſtitutions of the laws of Scotland; Eſſays upon various ſubjects, &c. His works were printed together at Edinburgh in 1716, in 2 vols. folio.

MACKEREL, in ichthyology. See SCOMBER.

MACKEY (JOHN), an Engliſhman, employed by the government as a ſpy upon James II. after the revolution, was author of Memoirs of James's court at St. Germaine, and of

the court of England in the reigns of William III. and queen Anne; in which are many curious anecdotes not to be met with in any other work. He died in 1726.

MACLAURIN (Colin), a moſt eminent mathematician and philoſopher, was the ſon of a clergyman, and born at Kilmoddan in Scotland in 1698. He was ſent to the univerſity of Glaſgow in 1709; where he continued five years, and applied himſelf to ſtudy in a moſt intenſe manner. His great genius for mathematical learning diſcovered itſelf ſo early as at twelve years of age; when, having accidentally met with an Euclid in a friend's chamber, he became in a few days maſter of the firſt ſix books without any aſſiſtance: and it is certain, that in his 16th year he had invented many of the propoſitions which were afterwards publiſhed under the title of *Geometria organica*. In his 15th year he took the degree of maſter of arts; on which occaſion he compoſed and publicly defended a theſis On the power of Gravity, with great applauſe. After this he quitted the univerſity, and retired to a country-ſeat of his uncle, who had the care of his education; for his parents had been dead ſome time. Here he ſpent two or three years in purſuing his favourite ſtudies; but, in 1717, he offered himſelf a candidate for the profeſſorſhip of mathematics in the Mariſchal college of Aberdeen, and obtained it after a ten days trial with a very able competitor. In 1719, he went to London, where he became acquainted with Dr. Hoadley then biſhop of Bangor, Dr. Clarke, Sir Iſaac Newton, and other eminent men; at which time alſo he was admitted a member of the Royal Society: and in another journey in 1721, he contracted an intimacy with Martin Folkes, Eſq. the preſident of it, which laſted to his death.

In 1722, lord Polwarth, plenipotentiary of the king of Great-Britain at the congreſs of Cambray, engaged him to go as a tutor and companion to his eldeſt ſon, who was then to ſet out on his travels. After a ſhort ſtay at Paris, and viſiting other towns in France, they fixed in Lorrain; where Maclaurin wrote his piece On the Percuſſion of Bodies, which gained the prize of the Royal Academy of Sciences for the year 1724. But his pupil dying ſoon after at Montpelier, he returned immediately to his profeſſion at Aberdeen. He was hardly ſettled here, when he received an invitation to Edinburgh; the curators of that univerſity being deſirous that he ſhould ſupply the place of Mr. James Gregory, whoſe great age and infirmities had rendered him incapable of teaching. He had ſome difficulties to encounter, ariſing from competitors, who had good intereſt with the patrons of the univerſity, and alſo from the want of an additional fund for the new profeſſor; which however at length were all ſurmounted, principally by the means of Sir Iſaac Newton. In Nov. 1725 he was introduced into the univerſity; as was at the ſame time his learned colleague and intimate friend, Dr. Alexander Monro, profeſſor of anatomy. After this, the mathematical claſſes ſoon became very numerous, there being generally upwards of 100 young gentlemen attending his lectures every year; who being of different ſtandings and proficiency, he was obliged to divide them into four or five claſſes, in each of which he employed a full hour every day, from the firſt of November to the firſt of June.

He lived a bachelor to the year 1733: but being not leſs formed for ſociety than for contemplation, he then married Anne, the daughter of Mr. Walter Stewart ſolicitor-general to his late majeſty for Scotland. By this lady he had ſeven children, of whom two ſons and three daughters, together with his wife, ſurvived him. In 1734, Berkeley, biſhop of Cloyne, publiſhed a piece called "The Analyſt;" in which he took occaſion, from ſome diſputes that had ariſen concerning the grounds of the fluxionary method, to explode the method itſelf, and alſo to charge mathematicians in general with infidelity in religion. Maclaurin thought himſelf included in this charge, and began an anſwer to Berkeley's book: but, as he proceeded, ſo many diſcoveries, ſo many new theories and problems occurred to him, that, inſtead of a vindicatory pamphlet, his work came out A complete ſyſtem of Fluxions, with their application to the moſt conſiderable problems in geometry and natural philoſophy. This work was publiſhed at Edinburgh in 1742, 2 vols. 4to; and as it coſt him infinite pains, ſo it is the moſt conſiderable of all his works, and will do him immortal honour. In the mean time, he was continually obliging the public with ſome performance or obſervation of his own; many of which were publiſhed in the fifth and ſixth volumes of the "Medical Eſſays" at Edinburgh. Some of them were likewiſe publiſhed in the Philoſophical Tranſactions; as the following: 1. Of the conſtruction and meaſure of curves, No. 356. 2. A new method of deſcribing all kinds of curves, No. 359. 3. A letter to Martin Folkes, Eſq. on equations with impoſſible roots, May 1726, No. 394. 4. Continuation of the ſame, March 1729, No. 408. 5. December the 21ſt, 1732, on the deſcription of curves; with an account of farther improvements, and a paper dated at Nancy, Nov. 27, 1722, No. 439. 6. An account of the treatiſe of fluxions, Jan. 27, 1742, No. 467. 7. The ſame continued, March 10, 1742, No. 469. 8. A rule for finding the meridional parts of a ſpheroid with the ſame exactneſs as of a ſphere, Auguſt 1741, No. 461. 9. Of the baſis of the cells wherein the bees depoſit their honey; Nov. 3, 1734. No 471.

In the midſt of theſe ſtudies, he was always ready to lend his aſſiſtance in contriving and promoting any ſcheme which might contribute to the ſervice of his country. When the earl of Morton ſet out in 1739 for Orkney and Shetland, to viſit his eſtates there, he deſired Mr. Maclaurin to aſſiſt him in ſettling the geography of thoſe countries, which is very erroneous in all our maps; to examine their natural hiſtory, to ſurvey the coaſts, and to take the meaſure of a degree of the meridian. Maclaurin's family affairs, and other connections, would not permit him to do this: he drew, however, a memorial of what he thought neceſſary to be obſerved, furniſhed the proper inſtruments, and recommended Mr. Short, the famous optician, as a fit operator for the management of them. He had ſtill another ſcheme for the improvement of geography and navigation, of a more extenſive nature; which was the opening a paſſage from Greenland to the South Sea by the north pole. That ſuch a paſſage might be found, he was ſo fully perſuaded, that he has been heard to ſay, if his ſituation could admit of ſuch adventures, he would undertake the voyage, even at his own charge. But when ſchemes for finding it were laid before the parliament in 1741, and himſelf conſulted by ſeveral perſons of high rank concerning them, before he could finiſh the memorials he propoſed to ſend, the premium was limited to the diſcovery of a North-weſt paſſage: and he uſed to regret, that the word Weſt was inſerted, becauſe he thought that paſſage, if at all to be found, muſt lie not far from the pole.

In 1745, having been very active in fortifying the city of Edinburgh againſt the rebel army, he was obliged to fly from thence to the north of England; where he was invited by Herring, then archbiſhop of York, to reſide with him during his ſtay in this country. In this expedition, however, being expoſed to cold and hardſhips, and naturally of a weak and tender conſtitution, he laid the foundation of an illneſs which put an end to his life, in June 1746, at the age of 48.

Mr. Maclaurin was a very good as well as a very great man, and worthy of love as well as admiration. His peculiar merit as a philoſopher was, that all his ſtudies were accommodated to general utility; and we find, in many places of his

works, an application even of the moſt abſtruſe theories to the perfecting of mechanical arts. He had reſolved, for the ſame purpoſe, to compoſe a courſe of practical mathematics, and to reſcue ſeveral uſeful branches of the ſcience from the bad treatment they often met with in leſs ſkilful hands. But all this his death prevented; unleſs we ſhould reckon, as a part of his intended work, the tranſlation of Dr. David Gregory's "Practical Geometry," which he reviſed, and publiſhed with additions, 1745. In his lifetime, however, he had frequent opportunities of ſerving his friends and his country by his great ſkill. Whatever difficulty occurred concerning the conſtructing or perfecting of machines, the working of mines, the improving of manufactures, the conveying of water, or the execution of any other public work, he was at hand to reſolve it. He was likewiſe employed to terminate ſome diſputes of conſequence that had ariſen at Glaſgow concerning the gauging of veſſels; and for that purpoſe preſented to the commiſſioners of exciſe two elaborate memorials, with their demonſtrations, containing rules by which the officers now act. He made alſo calculations relating to the proviſion, now eſtabliſhed by law, for the children and widows of the Scots clergy, and of the profeſſors in the univerſities, entitling them to certain annuities and ſums, upon the voluntary annual payment of a certain ſum by the incumbent. In contriving and adjuſting this wiſe and uſeful ſcheme, he beſtowed a great deal of labour, and contributed not a little towards bringing it to perfection. It may be ſaid of ſuch a man, that "he lived to ſome purpoſe;" which can hardly be ſaid of thoſe, how uncommon ſoever their abilities and attainments, who ſpend their whole time in abſtract ſpeculations, and produce nothing to the real uſe and ſervice of their fellow creatures.

Of his works we have mentioned his *Geometria Organica*, in which he treats of the deſcription of curve lines by continued motion. We need not repeat what has been ſaid concerning his piece which gained the prize of the Royal Academy of Sciences in 1724. In 1740, the academy adjudged him a prize, which did him ſtill more honour, for ſolving the motion of the tides from the theory of gravity; a queſtion which had been given out the former year, without receiving any ſolution. He had only ten days to draw this paper up in, and could not find leiſure to tranſcribe a fair copy; ſo that the Paris edition of it is incorrect. He afterwards reviſed the whole, and inſerted it in his Treatiſe of Fluxions; as he did alſo the ſubſtance of the former piece. Theſe, with the Treatiſe of Fluxions, and the pieces printed in the Philoſophical Tranſactions, of which we have given a liſt, are all the writings which our author lived to publiſh. Since his death, two volumes more have appeared; his Algebra, and his Account of Sir Iſaac Newton's Philoſophical Diſcoveries. His Algebra, though not finiſhed by himſelf, is yet allowed to be excellent in its kind; containing, in one volume, a complete elementary treatiſe of that ſcience, as far as it has hitherto been carried. His Account of Sir Iſaac Newton's Philoſophy was occaſioned in the following manner: Sir Iſaac dying in the beginning of 1728, his nephew, Mr. Conduitt, propoſed to publiſh an account of his life, and deſired Mr. Maclaurin's aſſiſtance. The latter, out of gratitude to his great benefactor, cheerfully undertook, and ſoon finiſhed, the hiſtory of the progreſs which philoſophy had made before Sir Iſaac's time, and this was the firſt draught of the work in hand; which not going forward, on account of Mr. Conduitt's death, was returned to Mr. Maclaurin.—To this he afterwards made great additions, and left it in the ſtate in which it now appears. His main deſign ſeems to have been, to explain only thoſe parts of Sir Iſaac's philoſophy which have been, and ſtill are, controverted: and this is ſuppoſed to be the reaſon why his grand diſcoveries concerning light and colours are but tranſiently and generally touched upon. For it is known, that ever ſince the experiments on which his doctrine of light and colours is founded have been repeated with due care, this doctrine has not been conteſted; whereas his accounting for the celeſtial motions, and the other great appearances of nature, from gravity, is miſunderſtood, and even ridiculed by ſome to this day.

MACQUER (Philippe), advocate of the parliament of Paris, where he was born in 1720, being deſcended from a reſpectable family. A weakneſs in his lungs having prevented him from engaging in the laborious exerciſes of pleading, he dedicated himſelf to literary purſuits. His works are, 1. *L'Abregé Chronologique de l'Hiſtoire Eccleſiaſtique*, 3 vols. 8vo. written in the manner of the Preſident Henault's Hiſtory of France, but not poſſeſſed of equal ſpirit and elegance. 2. *Les Annales Romaines*, 1756, 8vo.; another chronological abridgment, and much better ſupported than the former. Into this work the author has introduced every thing moſt worthy of notice which has been written by Saint Evremond, Abbé Saint-Real, Preſident Monteſquieu, Abbé Mably, &c. concerning the Romans; and, if we except a difference of ſtyle, which is eaſily diſcernible, it is, in other reſpects, a very judicious compilation. 3. *Abregé Chronologique de l'Hiſtoire d'Eſpagne et de Portugal*, 1759, 1765, in two volumes 8vo. This book, in point of accuracy, is worthy of the Preſident Henault, by whom it was begun; but it diſplays no diſcrimination of character nor depth of reſearch. The author received aſſiſtance from M. Lacombe, whoſe talents for chronological abridgment are well known. The republic of letters ſuſtained a loſs by the death of M. Macquer, which happened on the 27th of January 1770, at the age of 50. As to his character, he was induſtrious, agreeable, modeſt, and ſincere, and an enemy to all fooliſh vanity and affectation. He had a cold imagination, but a correct taſte. He had an eager thirſt for knowledge of every kind, and he had neglected no uſeful branch of ſtudy. He had a ſhare in the Dictionary of Arts and Profeſſions, in 2 vols. 8vo. and in the Tranſlation of the Syphilis of Fracaſtor publiſhed by Lacombe.

Macquer (Pierre Joſeph), brother to the former, was born at Paris the 9th of October 1718, and died there February 16th 1784. He was a member of the academy of ſciences, and late profeſſor of pharmacy: and was engaged in the *Journal des Savans*, for the articles of medicine and chemiſtry. With the latter ſcience he was intimately acquainted. He had a ſhare in the *Pharmacopœia Pariſienſis*, publiſhed in 1758, in 4to. His other works are, 1. *Elemens de Chimie theorique*; Paris, 1749, 1753, 12mo; which have been tranſlated into Engliſh and German. 2. *Elemens de Chimie pratique*, 1751, 2 vols. 12mo. Theſe two works were republiſhed together in 1756, in 3 vols. 12mo. 3. *Plan d'un cours de Chimie experimentale et raiſonnée*, 1757, 12mo; in the compoſition of which he was aſſociated with M. Beaumé. 4. *Formulæ Medicamentorum Magiſtralium*, 1763. 5. *L'Art de la Teinture en Soie*, 1763.—6. *Dictionnaire de Chimie, contenant la théorie et la pratique de cet art*, 1766, 2 vols. 8vo; which has been tranſlated into German, with notes; and into Engliſh, with notes, by Mr. Keir. Macquer has, by his labours and writings, greatly contributed to render uſeful an art which formerly tended only to ruin the health of the patient by foreign remedies, or to reduce the profeſſors of it to beggary, while they proſecuted the idle dreams of converting every thing into gold.

MACRIN (Salmon), one of the beſt Latin poets of the 16th century, was born at Loudon. His true name was *John Salmon*; but he took that of *Macrin*, from his being frequently ſo called in ridicule by Francis I. on account of his extraordinary leanneſs. He was preceptor to Claudius of

Savoy, count of Tende; and to Honorius the count's brother; and wrote ſeveral pieces of poetry in lyric verſe, which were ſo admired, that he was called *the Horace of his time*. He died of old age, at Loudon, in 1555.—*Charles Ma rin*, his ſon, was not inferior to him as a poet, and ſurpaſſed him in his knowledge of the Greek tongue. He was preceptor to Catherine of Navarre, the ſiſter of Henry the Great; and periſhed in the maſſacre on St. Bartholomew's day in 1572.

MACROBII, a people of Ethiopia, celebrated for their juſtice, and the innocence of their manners: alſo a people in the iſland Meröe. The Hyperboreans were alſo called Macrobii: They generally lived to their 120th year; and from their longevity they obtained their name (*μακρος βιος, long life.*)

MACROBIUS (Ambrosius Aurelius Theodosius), an ancient Latin writer, who flouriſhed towards the latter part of the fourth century.—Of what country he was, is not clear: Eraſmus, in his Ciceronianus, ſeems to think he was a Greek; and he himſelf tells us, in the preface to his Saturnalia, that he was not a Roman, but laboured under the inconveniences of writing in a language which was not natural to him. Of what religion he was, Chriſtian or Pagan, is uncertain. Barthius ranks him among the Chriſtians; but Spanheim and Fabricius ſuppoſe him to have been a heathen. This, however, is certain, that he was a man of conſular dignity, and one of the chamberlains or maſters of the wardrobe to Theodoſius; as appears from a reſcript directed to Florentius, concerning thoſe who were to obtain that office. He wrote a Commentary upon Cicero's *Somnium Scipionis*, and ſeven books of *Saturnalia*, which treat of various ſubjects, and are an agreeable mixture of criticiſm and antiquity. He was not an original writer, but made great uſe of other people's works, borrowing not only their materials, but even their language; and for this he has been ſatirically rallied by ſome modern authors, though rather unfairly, conſidering the expreſs declaration and apology which he makes on this head, at the very entrance of his work. "Don't blame me," ſays he, "if what I have collected from multifarious reading I ſhall frequently expreſs in the very words of the authors from whom I have taken it: for my view in this preſent work is, not to give proofs of my eloquence, but to collect and digeſt into ſome regularity and order ſuch things as I thought might be uſeful to be known. I ſhall therefore here imitate the bees, who ſuck the beſt juices from all ſorts of flowers, and afterwards work them up into various forms and orders, with ſome mixture of their own proper ſpirit." The *Somnium Scipionis* and *Saturnalia* have been often printed; to which has been added, in the later editions, a piece entitled, *De Differentiis et Societatibus Græci Latinique Verbi.*

MACROCEPHALUS (compounded of *μακρος* "great," and *κεφαλη* "head"), denotes a perſon with a head larger or longer than the common ſize. Macrocephali, or Long-heads, is a name given to a certain people, who, according to the accounts of authors, were famous for the unſeemly length of their heads: yet cuſtom ſo far habituated them to it, that, inſtead of looking on it as a deformity, they eſteemed it a beauty, and, as ſoon as the child was born, moulded and faſhioned its head in their hands to as great a length as poſſible, and afterwards uſed all ſuch rollers and bandages as might ſeem moſt likely to determine its growing long. The greater part of the iſlanders in the Archipelago, ſome of the people of Aſia, and even ſome of thoſe of Europe, ſtill preſs their children's heads out lengthwiſe. We may obſerve alſo, that the Epirots, many people of America, &c. are all born with ſome ſingularity in the conformation of their heads; either a flatneſs on the top, two extraordinary protuberances behind, or one on each ſide; ſingularities which we can only regard as an effect of an ancient and ſtrange mode, which at length is become hereditary in the nation. According to the report of many travellers, the operation of compreſſing the head of a child lengthwiſe, while it is yet ſoft, is with a view inſenſibly to enlarge the interval between the two eyes, ſo that the viſual rays turning more to the right and left, the ſight would embrace a much larger portion of the horizon; the advantage of which they are well acquainted with, either in the conſtant exerciſe of hunting, or on a thouſand other occaſions. Ever ſince the 16th century, the miſſionaries eſtabliſhed in the countries inhabited by the ſavages of America, have endeavoured to deſtroy this cuſtom; and we find in the ſeſſions of the third council of Lima, held in 1585, a canon which expreſsly prohibits it. But if it has been repreſſed one way, the free negroes and Maroons, although Africans, have adopted it, ſince they have been eſtabliſhed among the Caribs, ſolely with the view of diſtinguiſhing their children, which are born free, from thoſe who are born in ſlavery. The Omaquas, a people of South America, according to P. Veigh, preſs the heads of their children ſo violently between two planks that they become quite ſharp at the top, and flat before and behind. They ſay they do this to give their heads a greater reſemblance to the moon.

MACROCERCI, a name given to that claſs of animalcules which have tails longer than their bodies.

MACROCOLUM, or Macrocollum (formed of *μακρος* "large," and *κολλαω* "I join,") among the Romans, the largeſt kind of paper then in uſe. It meaſured ſixteen inches, and frequently two feet.

MACROCOSM, a word denoting the great world or univerſe. It is compounded of the Greek words *μακρος* "great," and *κοσμος* "world."

MACROOMP, or Macroom, a town of Ireland, in the barony of Muſkerry, county of Cork, and province of Munſter, 142 miles from Dublin: it is ſituated amongſt hills, in a dry gravelly limeſtone ſoil.—This place is ſaid to take its name from an old crooked oak, ſo called in Iriſh, which formerly grew here. The caſtle was firſt built in king John's time, ſoon after the Engliſh conqueſt, (according to Sir Richard Cox) by the Carews, but others attribute it to the Daltons. It was repaired and beautified by Teague Macarty, who died in the year 1565, and was father to the celebrated Sir Cormac Mac Teague mentioned by Cambden and other writers as an active perſon in queen Elizabeth's time. The late earls of Glancarty altered this caſtle into a more modern ſtructure, it being burnt down in the wars of 1641. Oppoſite to the bridge is the pariſh-church, dedicated to St. Colman of Cloyne. Here is a barrack for a foot company, a market-houſe, and handſome Roman Catholic chapel. A conſiderable number of perſons have been employed in this town in combing wool and ſpinning yarn, and ſome ſalt-works have been erected here. At half a mile's diſtance is a ſpa, that riſes on the very brink of a bog; its waters are a mild chalybeate, and are accounted ſerviceable in hypochondriacal caſes and in cutaneous eruptions. The fairs are four in the year.

MACROPYRENIUM, in natural hiſtory, a genus of foſſils conſiſting of cruſtated ſeptariæ, with a long nucleus ſtanding out at each end of the maſs.

MACROTELOSTYLA, in natural hiſtory, the name of a genus of cryſtals, which are compoſed of two pyramids joined to the end of a column; both the pyramids, as alſo the column, being hexangular, and the whole body conſequently compoſed of 18 planes.

MACTATIO, in the Roman ſacrifices, ſignifies the act of killing the victim. This was performed either by the prieſt himſelf, or ſome of his inferior officers, whom we meet with

under the names of *popæ*, *agones*, *cultrarii*, and *victimarii*; but, before the beaſt was killed, the prieſt, turning himſelf to the eaſt, drew a crooked line with his knife, from the forehead to the tail. Among the Greeks, this ceremony was performed moſt commonly by the prieſt, or, in his abſence, by the moſt honourable perſon preſent. If the ſacrifice was offered to the celeſtial gods, the victim's throat was bent up towards heaven; if to the infernal, or to heroes, it was killed with its throat towards the ground. The manner of killing the animal was by a ſtroke on the head, and, after it was fallen, thruſting a knife into its throat. Much notice was taken, and good or ill ſucceſs predicted, from the ſtruggles of the beaſt, or its quiet ſubmiſſion to the blow, from the flowing of the blood, and the length of time it happened to live after the fall, &c.

MACULÆ, in aſtronomy, dark ſpots appearing on the luminous ſurfaces of the ſun and moon, and even ſome of the planets. See ASTRONOMY.

MAD-APPLE. See SOLANUM.

MADAGASCAR, the largeſt of the African iſlands, is ſituated between 43° and 51° of E. lon. and between 12° and 26° of S. lat.; extending in length near 1000 miles from north-north-eaſt to ſouth-ſouth-weſt, and about 300 in breadth where broadeſt. It was diſcovered in 1506 by Laurence Almeyda; but the Perſians and the Arabians were acquainted with it from time immemorial under the name of *Serandib*. Alphonzo Albukerque ordered Ruy Pereira dy Conthinto to viſit the interior parts, and that general entruſted Triſtan d'Acunha with the ſurvey. The Portugueſe called it the iſland of *St. Laurence*; the French, who viſited it in the reign of Henry IV. named it *Iſle Dauphine*; its proper name is *Madegaſſe*. It is now, however, by common conſent, called *Madagaſcar*.

This large iſland, according to many learned geographers, is the Cerné of Pliny, and the Menuthiaſde of Ptolemy. It is every where watered by large rivers, ſtreams, and rivulets, which have their ſource at the foot of that long chain of mountains which runs through the whole extent of the iſland from eaſt to weſt. The two higheſt promontories are called *Vivagora* and *Botiſmene*.

Theſe mountains (according to the Abbé Rochon) encloſe within their boſoms a variety of precious minerals and uſeful foſſils. The traveller (who for the firſt time rambles over ſavage and mountainous countries, interſected with valleys and with hills, where nature left to herſelf brings forth the moſt ſingular and the moſt varied productions) is involuntarily ſurpriſed and terrified at the ſight of precipices, the ſummits of which are crowned with monſtrous trees that ſeem coeval with the world. His aſtoniſhment is redoubled at the noiſe of thoſe grand caſcades, the approach to which is generally inacceſſible. But to thoſe views ſo ſublimely pictureſque, rural ſcenes ſoon ſucceed; little hills, gently riſing grounds, and plains, the vegetation of which is never repreſſed by the intemperance or the viciſſitude of the ſeaſons. The eye contemplates with pleaſure thoſe vaſt ſavannas which nouriſh numberleſs herds of bullocks and of ſheep. You behold a flouriſhing agriculture, produced almoſt ſolely by the fertiliſing womb of nature. The fortunate inhabitants of Madagaſcar do not bedew the earth with their ſweat; they ſcarce ſtir the ground with a rake, and even that ſlight preparation is ſufficient. They ſcrape little holes at a ſmall diſtance from each other, into which they ſcatter a few grains of rice, and cover them with their feet; and ſo great is the fertility of the ſoil, that the lands ſown in this careleſs manner produce an hundred fold.

The foreſts preſent a prodigious variety of the moſt uſeful and the moſt beautiful trees; ebony, wood for dyeing, bamboos of an enormous thickneſs, and palm-trees of every kind. The timber employed in ſhip-building is no leſs common than thoſe kinds ſo much prized by the cabinet-maker. We are told by the French governor Flacourt, in his hiſtory of this iſland, that in the year 1650 he ſent to France 52,000 weight of aloes of an excellent quality. All of theſe various trees and ſhrubs are ſurrounded by an infinite number of paraſitical plants: muſhrooms of an infinite diverſity of kinds and colours are to be met with every where in the woods; and the inhabitants know well how to diſtinguiſh thoſe which are prejudicial to the health. They collect large quantities of uſeful gums and reſins: and out of the milky ſap of a tree, denominated by them *finguiore*, the inhabitants, by means of coagulation, make that ſingular ſubſtance known to naturaliſts by the name of *gum elaſtic*. (See CAOUTCHOUC and JATROPHA.)

Beſides the aromatic and medicinal herbs which abound in the foreſts, the iſland produces flax and hemp of a length and ſtrength which ſurpaſs any in Europe. Sugar-canes, wax, honey of different kinds, tobacco, indigo, white pepper, gum-lac, ambergris, ſilk, and cotton, would long ſince have been objects of commerce which Madagaſcar would have yielded in profuſion, if the Europeans, in viſiting the iſland, had furniſhed the inhabitants with the neceſſary information for preparing and improving theſe ſeveral productions.

The ſugar-canes (as we are informed by another traveller) are much larger and finer than any in the Weſt Indies; being as thick as a man's wriſt, and ſo full of juice, that a foot of them will weigh two pounds. When the natives travel, they carry a ſugar-cane along with them, which will ſupport them for two or three days. Here are alſo plenty of tamarinds; and ſuch quantities of limes and oranges, that very large caſks may be filled with their juices at a trifling expence, as they may be purchaſed for iron pots, muſkets, powder, ball, &c. During the ſhort time that Admiral Watſon's ſquadron ſtaid here in 1754, Mr. Ives preſerved about half a hogſhead full of thoſe juices, which proved afterwards of the greateſt ſervice to the ſhips' crews. It muſt be obſerved, however, that no good water is to be had at St. Auguſtine in the ſouth-weſt part of the iſland, where ſhips uſually touch, unleſs boats are ſent for it four or five miles up the river; and inſtead of filling their caſks at low water (as is the caſe in moſt other rivers), they muſt begin to fill at about a quarter's flood. The reaſon aſſigned for this is, that the river has a communication with the ſea at other places beſides this of St. Auguſtine's bay; and it has been found by experience, that the ſea-water brought into the river by the flood-tide is not diſcharged till a quarter's flood of the next tide in St. Auguſtine's bay; and for three miles up the river the water is always very brackiſh, if not quite ſalt.

The abundance and variety of proviſions of every kind, which a fine climate and fertile ſoil can produce, are on no part of the globe, according to M. Rochon, ſuperior to thoſe of Madagaſcar: game, wild-fowl, poultry, fiſh, cattle, and fruits, are alike plentiful. The oxen, Mr. Ives alſo informs us, are large and fat, and have each a protuberance of fat between the ſhoulders, weighing about 20 pounds. Their fleſh is greatly eſteemed by all the European nations trading to India, and ſhips are ſent to Madagaſcar on purpoſe to kill and ſalt them on the iſland. The protuberance of fat above mentioned is particularly eſteemed after it has lain ſome time in ſalt; but our author ſays, that he could not join in the encomiums either on this piece or the beef in general; as the herbage on which the creatures feed gives their fleſh a particular taſte, which to him was diſagreeable. The ſheep differ little from the goats; being equally hairy, only that their heads are ſomewhat larger: their necks reſemble that of a calf, and their tails weigh at leaſt ten pounds. Vaſt quantities of locuſts riſe here from the low lands in thick clouds, extending ſometimes to an incredible length and breadth. The natives eat theſe inſects, and even prefer them to their fineſt fiſh. Their method of dreſſing them is to ſtrip off their legs and wings, and fry them in oil.

The inhabitants (termed *Melagaches* or *Madecaſſes*), M. Rochon informs us, are in perſon above the middle ſize of Europeans. The colour of the ſkin is different in different tribes: among ſome it is of a deep black, among others tawney; ſome of the natives are of a copper colour, but the complexion of by far the greateſt number is olive. All thoſe who are black have woolly hair like the negroes of the coaſt of Africa: thoſe, on the other hand, who reſemble Indians and Mulattoes, have hair equally ſtraight with that of the Europeans; the noſe is not broad and flat; the forehead is large and open; in ſhort, all the features are regular and agreeable. Their phyſiognomy diſplays the appearance of frankneſs and of ſatisfaction: they are deſirous only of learning ſuch things as may adminiſter to their neceſſities; that ſpecies of knowledge which demands reflection is indifferent to them; ſober, agile, active, they ſpend the greateſt part of their time either in ſleep or in amuſement. In fine, according to the Abbé, the native of Madagaſcar, like ſavages in general, poſſeſſes a character equally devoid of vice and of virtue; the gratifications of the preſent moment ſolely occupy his reflections; he poſſeſſes no kind of foreſight whatever; and he cannot conceive the idea that there are men in the world who trouble themſelves about the evils of futurity.

The population of the iſland has been eſtimated at four millions; but this calculation is thought exaggerated by our author, and indeed it appears incredible to us. Every tribe or ſociety inhabits its own canton, and is governed by its own cuſtoms. Each of theſe acknowledges a chief; this chief is ſometimes elective, but more uſually hereditary. The lands are not divided and portioned out, but belong to thoſe who are at the trouble of cultivating them. Theſe iſlanders make uſe of neither locks nor keys; the principal part of their food conſiſts in rice, fiſh, and fleſh; their rice is moiſtened with a ſoup which is ſeaſoned with pimento, ginger, ſaffron, and aromatic herbs. They diſplay wonderful cunning in catching a variety of birds, many of which are unknown in Europe; they have the pheaſant, the partridge, the quail, the pintado, the wild duck, teal of five or ſix different kinds, the blue hen, the black paroquet, and the turtle-dove, in great plenty: and alſo a bat of a monſtrous ſize, which is much prized on account of its exquiſite flavour. Theſe laſt are ſo hideous in their appearance, that they at firſt terrify the European ſailors; but after they have vanquiſhed their repugnance to them, they prize their fleſh infinitely before that of the pullets of their own country. The Melagaches alſo catch an immenſe quantity of ſea-fiſh; ſuch as the dorado, the ſole, the herring, the mackarel, the turtle, &c with oyſters, crabs, &c. The rivers afford excellent eels, and mullets of an exquiſite flavour.

The inhabitants near St. Auguſtine's bay, Mr. Ives informs us, ſpeak as much broken Engliſh as enables them to exchange their proviſions for European articles. Theſe, on the part of the Melagaches, are cattle, poultry, milk, fruit, rice, ſalt, porcelain, potatoes, yams, fiſh, lances, and ſhells. From the Europeans they receive muſkets, powder, bullets, flints, *clouties*, (including handkerchiefs, and linen of all kinds), beads, iron pots, &c.—Silver, which they call *Manila*, is in great eſteem with them, and is made by them into bracelets for their wives.

That part of the iſland at which the Engliſh ſquadron touched, is the dominions of the king of *Baba*, who, by the account of Mr. Ives, ſeemed greatly to affect to be an Engliſhman. They had no ſooner touched at the iſland, than they were waited on by one called *Robin Hood*, and another perſon, both of whom bore the office of *purſers*. Along with theſe were *Philbey* the general; John Anderſon and Frederic Martin, captains. Nor did the king himſelf and his family diſdain to pay them a viſit; who, in like manner, were diſtinguiſhed by Engliſh names; the king's eldeſt ſon being called the prince of Wales, and the court not being without a duke of Cumberland, a prince Auguſtus, princeſſes, &c. as in England. All theſe grandees came on board naked, excepting only a ſlight covering about their loins and on their ſhoulders, made of a kind of graſs growing on the iſland; which they had adorned with ſmall glaſs beads by way of border or fringe. Their hair reſembled that of the Indians in being long and black, rather than the woolly heads of the African negroes. "The wives of the Melagaches (according to our author) take great pains with their huſbands' hair; ſometimes putting it in large and regular curls; at other times braiding it in great order, and making it ſhine with a particular oil which the iſland produces. The men always carry in their hands a wooden lance headed with iron, which is commonly made very neat; and they are ſuch excellent marksmen, that they will ſtrike with it a very ſmall object at 30 or 40 yards diſtance. They have alſo commonly a muſket, which they get from Europeans in exchange for cattle, and are always ſure to keep in excellent order. I am ſorry to ſay (continues Mr. Ives) that the Engliſh are frequently guilty of great impoſitions in this kind of traffic, by diſpoſing of cheap and ill-tempered barrels among the poor inhabitants, who ſometimes loſe their lives by the burſting of theſe pieces. Such iniquitous practices as theſe muſt in the end prove injurious to the nation; and have indeed already made the name of more than one half of theſe traders truly infamous among the deluded but hitherto friendly Madagaſcarians.

"They are a civil and good-natured people, but eaſily provoked, and apt to ſhow their reſentment on the leaſt provocation, eſpecially when they think themſelves injured or ſlighted. Another characteriſtic of them is, the very high notions of dignity they entertain of their king; which is carried to ſuch a height, that they are never more ſenſibly hurt than when they imagine he is treated with incivility or diſreſpect. This mighty monarch reſides in a town built with mud, about twelve miles up the country from St. Auguſtine's Bay. On the eaſt ſide of the bay, as you enter, there reſided one Prince William, a relation and tributary to the king; but who in moſt caſes acted as an independent prince, and always uſed his utmoſt endeavours with the officers to cauſe them to buy their proviſions from him, and not from the king or his ſubjects. In this prince's territories, not far from the ſea, are the remains of a fort built by Avery the pirate.

"All the women of Madagaſcar, excepting the very pooreſt ſort, wear a covering over their breaſts and ſhoulders, ornamented with glaſs beads, and none go without a cloth about their loins. They commonly walk with a long ſlender rod or ſtick. The men are allowed to marry as many women as they can ſupport.

"During our ſtay at this iſland (ſays Mr. Ives) I obſerved, with great concern, ſeveral miſerable objects in the laſt ſtage of the venereal diſeaſe. They had not been able to find any cure; and as far as I could learn, their doctors are totally ignorant of medicine. The only method they uſe for curing all diſtempers, as well external as internal, is the wearing on the arm or neck a particular charm or amulet; or beſmearing the part affected with earth moiſtened with the juice of ſome plant or tree, and made up into a ſoft paſte.

"I took ſome pains to learn their religious tenets; and find that they worſhip one Univerſal Father; whom, when they ſpeak in Engliſh, they call *God*; and in whom they conceive all kinds of perfection to reſide. The ſun they look upon as a glorious body; and, I believe, as a ſpiritual being, but created and dependent. They frequently look up to it with wonder, if not with praiſe and adoration. They make their ſupplications to the *One* Almighty, and offer ſacrifices to him in their diſtreſſes. I had the curioſity to attend a ſacrifice, at the hut of John Anderſon, whoſe father had for a long time been

afflicted with ſickneſs. About ſun-ſet an ox was brought into the yard; and the ſon, who officiated as prieſt, ſlew it. An altar was reared nigh, and the poſt of it was ſprinkled with the blood of the victim. The head, after its being ſevered from the body, was placed, with the horns on, at the foot of the altar: the caul was burned on the fire, and moſt of the pluck and entrails boiled in a pot. The ſick man, who was brought to the door, and placed on the ground ſo as to face the ſacrifice, prayed often, and ſeemingly with great fervency. His eyes were fixed attentively towards the heavens, and his hands held up in a ſupplicating poſture. The ceremony ended with the ſon's cutting up the ox into ſmall pieces; the greateſt part of which he diſtributed among the poor ſlaves belonging to his father and himſelf; reſerving, however, ſome of the beſt pieces for his own uſe. Upon the whole, I ſaw ſo many circumſtances in this Madagaſcarian ſacrifice ſo exactly reſembling thoſe deſcribed in the Old Teſtament as offered up by the Jews, that I could not turn my thoughts back to the original without being ſenſibly ſtruck by the exactneſs of the copy."

When the ſquadron firſt arrived at Madagaſcar, the king of Baba, a man of about 60 years of age, was ill of the gout. Having demanded of admiral Watſon ſome preſents, the latter complimented him, among other things, with ſome brandy. The monarch then aſked him if he had any doctor with him, and if he was a great doctor, and a king's doctor? To all which being anſwered in the affirmative, he deſired him to bring ſome *mahomets* (medicines) for his ſick knee. With this requiſition Mr. Ives deſigned to comply; but having waited until ſome officers ſhould be ready to accompany him, his majeſty, in the mean time, took ſuch a doſe of brandy as quickly ſent the gout into his head, and occaſioned his death. Mr. Ives obſerves, that it happened very luckily for him that the monarch's deceaſe happened without his having taken any of the medicines intended for him, as it would have been impoſſible to avoid the imputation of having poiſoned him, which would certainly have been reſented by his loyal ſubjects.

The king's death occaſioned great confuſion; the grandees being deſirous that it ſhould be concealed for ſome time. This, however, was found impoſſible; on which they ſet off for the *Mud Town* about 11 o'clock the ſame evening. All the inhabitants of the village followed their example; leaving only the dogs, who ſet up the moſt hideous howling. Captain Frederic Martin coming to take leave of the Engliſh, begged with great earneſtneſs for a freſh ſupply of gunpowder; whiſpering that the king was dead, and that they ſhould in all probability go to war about making another. They had been formerly told, that one who had the title of *duke* of Baba would certainly ſucceed to the throne; but they afterwards learned, that Philibey the general having eſpouſed the cauſe of *Raphani* the late king's ſon, and taken him under his tutelage and protection, this youth, who was only about 16 years of age, ſucceeded his father as king of Baba.

The following is a deſcription of the ſouthern diviſion of the iſland, from the abbé Rochon:

"That part of Madagaſcar in which Fort Dauphin is ſituated is very populous. Almoſt all the villages are placed on eminences, and ſurrounded with two rows of ſtrong palliſadoes, ſomewhat in the manner of ſuch of our fences as are compoſed of hurdles and turf. Within is a parapet of ſolid earth about four feet in height; large pointed bamboos placed at the diſtance of five feet from each other, and ſunk in a pit, form a kind of loop-holes, which contribute towards the defence of theſe villages, ſome of which are beſides fortified with a ditch ten feet in breadth and ſix in depth. The dwelling of the chief is called a *donac*. When the chiefs go abroad, they are always provided with a muſket and a ſtick armed with iron, and adorned at the extremity with a little tuft of cow's hair. They wear a bonnet of red wool. It is chiefly by the colour of their bonnet that they are diſtinguiſhed from their ſubjects. Their authority is extremely limited: however, in the province of *Carcanoſſi*, the lands by cuſtom belong to their chiefs, who diſtribute them among their ſubjects for the purpoſes of cultivation: they exact a trifling quit-rent in return, which in their language is called *facnſa*.—The people of Carcanoſſi are not altogether ignorant of the art of writing; they even poſſeſs ſome hiſtorical works in the Madagaſcar tongue: but their learned men, whom they term *Ombiaſſes*, make uſe of the Arabic characters alone. They have treatiſes on medicine, geomancy, and judicial aſtrology; the moſt renowned live in the province of *Matatane*: it is in that diſtrict that magic ſtill remains in all its glory: the Matanes are actually dreaded by the other Madecaſſees on account of their excellence in this deluſive art. The Ombiaſſes have public ſchools in which they teach geomancy and aſtrology. The natives have undoubtedly learned the art of writing from the Arabians, who made a conqueſt of this iſland about 300 years ſince.

"The people of the province of *Anoſſi*, near Fort Dauphin, are lively, gay, ſenſible, and grateful; they are paſſionately fond of women; are never melancholy in their company; and their principal occupation is to pleaſe the ſex: indeed, whenever they meet their wives, they begin to ſing and dance. The women, from being happy, are always in good humour. Their lively and cheerful character is extremely pleaſing to the Europeans. I have often been preſent at their aſſemblies, where affairs of importance have been agitated; I have obſerved their dances, their ſports, and their amuſements, and I have found them free from thoſe exceſſes which are but too common among poliſhed nations. Indeed I was too young at this time for my obſervations to be of much weight: but if my experience be inſufficient to inſpire confidence, I beg the reader will rather conſider the nature of things, than the relations given by men without principles or intelligence, who fancy that they have a right to tyrannize over the inhabitants of every country which they can ſubdue. If the people of Madagaſcar have ſometimes availed themſelves of treachery, they have been forced to it by the tyranny of the Europeans. The weak have no other arms againſt the ſtrong. Could they defend themſelves by any other means from our artillery and bayonets? They are uninformed and helpleſs; and we avail ourſelves of their weakneſs, in order to make them ſubmit to our covetouſneſs and caprice. They receive the moſt cruel and oppreſſive treatment, in return for the hoſpitality which they generouſly beſtow on us; and we call them traitors and cowards, when we force them to break the yoke with which we have been pleaſed to load them."

In the ſecond volume of count Benyowſky's Memoirs and Travels we have the following account of the religion, government, &c. of the people of this iſland:

"The Madagaſcar nation believe in a Supreme Being, whom they call *Zanhare*, which denotes creator of all things. They honour and revere this Being; but have dedicated no temple to him, and much leſs have they ſubſtituted idols. They make ſacrifices by killing oxen and ſheep, and they addreſs all theſe libations to God. It has been aſſerted, that this nation likewiſe makes offerings to the devil: but in this there is a deception; for the piece of the ſacrificed beaſt which is uſually thrown into the fire is not intended in honour of the devil, as is uſually pretended. This cuſtom is very ancient, and no one can tell the true reaſon of it. With regard to the immortality of the ſoul, the Madagaſcar people are perſuaded that, after their death, their ſpirit will return again to the region in which the Zanhare dwells; but they by no means admit that the ſpirit of man, after his death, can ſuffer any evil. As to the diſtinction of evil or good, they are perſuaded that the good and upright man ſhall be recompenſed, in this life, by a good

ſtate of health, the conſtancy of his friends, the increaſe of his fortunes, the obedience of his children, and the happineſs of beholding the proſperity of his family: and they believe that the wicked man's fate ſhall be the contrary to this. The Madagaſcar people, upon this conviction, when they make oaths, add benedictions in favour of thoſe who keep them, and curſes againſt thoſe who break them. In this manner it is that they appeal to the judgment of Zanhare, in making agreements; and it has never been known, or heard of, that a native of Madagaſcar has broken his oath, provided it was made in the uſual manner, which they ſay was preſcribed by their forefathers.

"As to their kings and form of government, &c. the Madagaſcar people have always acknowledged the line of Ramini, as that to which the rights of Ampanſacabe or ſovereign belongs. They have conſidered this line as extinct ſince the death of Dian Ramini Larizon, which happened 66 years ago, and whoſe body was buried upon a mountain, out of which the river Manangourou ſprings; but having acknowledged the heir of this line on the female ſide, they re-eſtabliſhed this title in the year 1776. The right of the Ampanſacabe conſiſts in nominating the Rohandrians to aſſiſt in the cabars, at which all thoſe who are cited are bound to appear, and the judgment of the Ampanſacabe in his cabar is deciſive. Another prerogative of the Ampanſacabe is, that each Rohandrian is obliged to leave him by will a certain proportion of his property, which the ſucceſſors uſually purchaſe by a ſlight tribute or fine. Thirdly, the Ampanſacabe has a right to exact from each Rohandrian one tenth of the produce of his land, and a number of horned cattle and ſlaves, in proportion to the riches of the country poſſeſſed by each Rohandrian.—The ſecond order is compoſed of the Rohandrians or princes. Since the loſs of the Ampanſacabe, three of theſe Rohandrians have aſſumed the title of *kings*; namely, the Rohandrian of the province of Mahavelou, named *Hiavi*; of the province of Voemar, named *Lambouin*; and a third at Bombetoki, named *Cimaxounpou*. The third order conſiſts of the Voadziri, or lords of a diſtrict, compoſed of ſeveral villages. The fourth order conſiſts of the Lohavohits, or chiefs of villages. The fifth order, Ondzatzi, who are freemen, and compoſe the attendants or followers of the Rohandrians, Voadziri, or Lohavohits. The ſixth order conſiſts of Ombiaſſes, or learned men: and this order forms the warriors, workmen, phyſicians, and diviners: theſe laſt poſſeſs no charge. The ſeventh order conſiſts of Ampurias, or ſlaves.

"Having made enquiries from Bombetoki paſſing to the northward, and as far as Itapere, the reſult proved that there are 38 Rohandrians actually reigning, and 287 Voadziri. With reſpect to the Lohavohits, Ondzatzi, and Ombiaſſes, it was not poſſible to obtain any accurate determination of their number. Theſe orders preſerve a regular gradation, reſpecting which it would be very difficult to give a detailed account. They live in the manner we read of concerning the ancient patriarchs. Every father of a family is prieſt and judge in his own houſe, though he depends upon the Lohavohits, who ſuperintends his conduct. This laſt is anſwerable to his Voadziri, and the Voadziri to the Rohandrian.

"The Madagaſcar people having no communication with the main land of Ethiopia, have not altered their primitive laws; and the language throughout the whole extent of the iſland is the ſame. It would be a raſh attempt to determine the origin of this nation; it is certain that it conſiſts of three diſtinct races, who have for ages paſt formed intermixtures which vary to infinity. The firſt race is that of Zaſe Ibrahim, or deſcendants of Abraham; but they have no veſtige of Judaiſm, except circumciſion, and ſome names, ſuch as Iſaac, Reuben, Jacob, &c. This race is of a brown colour.—The ſecond race is that of Zaſe Ramini: with reſpect to this, ſome books which are ſtill extant among the Ombiaſſes affirm, that it is not more than ſix centuries ſince their arrival at Madagaſcar.—With reſpect to the third race, of Zaſe Canambou, it is of Arabian extraction, and arrived much more lately than the others from the coaſts of Ethiopia: hence it poſſeſſes neither power nor credit, and fills only the charges of writers, hiſtorians, poets, &c.

"In regard to arts and trades, the Madagaſcar nation are contented with ſuch as are neceſſary to make their moveables, tools, utenſils, and arms for defence; to conſtruct their dwellings, and the boats which are neceſſary for their navigation; and laſtly, to fabricate cloths and ſtuffs for their clothing. They are deſirous only of poſſeſſing the neceſſary ſupplies of immediate utility and convenience. The principal and moſt reſpected buſineſs, is the manufacture of iron and ſteel. The artiſts in this way call themſelves *ampaneſa vibe*. They are very expert in fuſing the ore, and forging utenſils, ſuch as hatchets, hammers, anvils, knives, ſpades, ſagayes, razors, pincers, or tweezers, for pulling out the hair, &c. The ſecond claſs conſiſts of the goldſmiths *(ompaneſa vola mena)*: they caſt gold in ingots, and make up bracelets, buckles, earrings, drops, rings, &c. The third are called *ompavillanga*, and are potters. The fourth are the *ompanevatta*, or turners in wood, who make boxes called *vatta*, plates, wooden and horn ſpoons, bive-hives, coffins, &c. The fifth, *ompan cacaſou*, or carpenters. They are very expert in this buſineſs, and make uſe of the rule, the plane, the compaſſes, &c. The ſixth are the *ompaniavi*, or rope-makers. They make their ropes of different kinds of bark of trees, and likewiſe of hemp. The ſeventh, *ampan lamba*, or weavers. This buſineſs is performed by women only, and it would be reckoned diſgraceful in a man to exerciſe it. The *ombiaſſes* are the literary men and phyſicians, who give advice only. The *herauvitz* are comedians and dancers.

"The Madagaſcar people always live in ſociety; that is to ſay, in towns and villages. The towns are ſurrounded by a ditch and palliſades (as already mentioned), at the extremities of which a guard from 12 to 20 armed men is kept. The houſes of private people conſiſt of a convenient cottage, ſurrounded by ſeveral ſmall ones: the maſter of the houſe dwells in the largeſt, and his women or ſlaves lodge in the ſmaller. Theſe houſes are built of wood, covered with leaves of the palm-tree or ſtraw.

"The houſes of the great men of the country are very ſpacious; each houſe is compoſed of two walls and four apartments: round about the principal houſe other ſmaller habitations are built for the accommodation of the women, and the whole family of the chief; but the ſlaves cannot paſs the night within them. Moſt of the houſes inhabited by the Rohandrians are built with taſte and admirable ſymmetry."

The French attempted to conquer and take poſſeſſion of the whole iſland, by order, and for the uſe of, their Moſt Chriſtian Majeſties Louis XIII. and XIV. and they maintained a footing on it from the year 1642 to 1657. During this period, by the moſt cruel treachery, they taught the native princes the barbarous traffic in ſlaves, by villainouſly ſelling to the Dutch governor of Mauritius a number of innocent people, who had been aſſiſting them in forming a ſettlement at Fort Dauphin.

The Abbé Rochon tells us, that the inſalubrity of the air in Madagaſcar determined his countrymen in 1664 to quit that immenſe iſland, in order to eſtabliſh themſelves at ſo inconſiderable a place as the Iſle of Bourbon, which is ſcarcely perceptible in a map of the globe: but it is apparent, from the account of the ſtate of the French affairs on the iſland of Madagaſcar in 1661, when Flacourt's narrative was publiſhed,

that their ill treatment of the natives had raiſed ſuch a general and formidable oppoſition to their reſidence in the country, that the French were obliged to abandon their poſſeſſions for other reaſons than the unhealthy qualities of the climate. We have not room here for a detail of all the oppreſſive meaſures of the French, which the Abbé himſelf candidly cenſures in the ſtrongeſt terms; but ſhall extract the following narrative, both becauſe it is intereſting in itſelf, and exhibits the cauſes and the means of their expulſion.

La Caſe, one of the French officers employed by the governor of Fort Dauphin againſt the natives, was ſo ſucceſsful in all his enterpriſes, that they called him *Deaan Pous*, the name of a chief who had formerly conquered the whole iſland. The French governor, jealous of his renown, treated him harſhly, and refuſed to allow him the rank or honours due to his valour. The ſovereign of the province of Amboulle, called *Deaan Raſcitat*, taking advantage of his diſcontent, prevailed on him to become his general. Five Frenchmen followed him. Deaan Nong, the daughter of Raſcitat, captivated by the perſon and heroiſm of La Caſe, offered him her hand with the conſent of her father. The chief, grown old, infirm, and arrived at the laſt ſtage of exiſtence, had the ſatisfaction of ſecuring the happineſs of his ſubjects, by appointing his ſon-in-law abſolute maſter of the rich province of Amboulle. La Caſe, in marrying Deaan Nong, refuſed to take the titles and honours attached to the ſovereign power: he would accept of no other character, than that of the firſt ſubject of his wife, who was declared ſovereign at the death of her father. Secure in the affection of this princeſs, who was not only poſſeſſed of perſonal charms, but of courage and great qualities, he was beloved and reſpected by her family, and by all the people of Amboulle, who reverenced him as a father; and yet, how much ſoever he wiſhed it, he was unable to contribute to the proſperity of his countrymen at Fort Dauphin, whom he knew to be in the utmoſt diſtreſs. The governor, regarding him as a traitor, had ſet a price on his head, and on the heads of the five Frenchmen who had followed him. The neighbouring chiefs, irritated at this treatment of a man whom they ſo much venerated, unanimouſly refuſed to ſupply the fort with proviſions This occaſioned a famine in the place, which, with a contagious fever and other maladies, reduced the French garriſon to 80 men.

The eſtabliſhment at Fort Dauphin, on the point of being totally deſtroyed, was preſerved for a ſhort time from ruin by the arrival of a veſſel from France, commanded by Kercadio an officer of Brittany, who, with the aſſiſtance of a young advocate who had been kidnapped on board the veſſel, prevailed on the envious and implacable governor Chamargou to make peace with La Caſe and his ſovereign ſpouſe Deaan Nong. This peace, however, laſted but for a ſhort time; the French, reſtleſs and inſolent to the neighbouring nations, again drew on them the vengeance of the natives. Even the few friends whom they had been able to acquire by means of La Caſe, were rendered hoſtile to them by the tyrannic zeal of the miſſionaries; who, not contented with being tolerated and allowed to make converts, inſiſted on Deaan Manang ſovereign of Mandrarey, a powerful, courageous, and intelligent chief, well-diſpoſed to the French, to divorce all his wives but one. This prince, not convinced of the neceſſity of ſuch a meaſure, aſſured them that he was unable to change his habits and way of living, which were thoſe of his forefathers. "You would allow me (ſays he) to have one wife; but if the poſſeſſion of one woman is a bleſſing, why ſhould a numerous ſeraglio be an evil, while peace and concord reign among thoſe of whom it is compoſed? Do you ſee among us any indications of jealouſy or hatred? No, all our women are good; all try to make me happy; and I am more their ſlave than their maſter." This ſpeech had no effect on Father Stephen, ſuperior of the Madagaſcar miſſion. He peremptorily ordered him inſtantly to repudiate all his wives except one; and threatened, in preſence of the women, to have them taken from him by the French ſoldiers if he heſitated in complying with his commands. It is eaſy to imagine, ſays M. Rochon, with what indignation this language muſt have been heard in the *donac* or palace of this prince. The females aſſailed the miſſionary on all ſides; loaded him with execrations and blows; and, in their fury, would doubtleſs have afforded him no more quarter than the Thracian women did Orpheus, if Deaan Manang, notwithſtanding his own agitation, had not made uſe of all his authority to ſave him.

In order to free himſelf from the perſecution of this prieſt, he removed with his family 70 or 80 miles up into the country; but he was ſoon followed by Father Stephen and another miſſionary, with their attendants. The chief, Manang, ſtill received them civilly; but he entreated them no longer to inſiſt on the converſion of him and his people, as it was impoſſible to oblige them to quit the cuſtoms and manners of their anceſtors. The only reply which Father Stephen made to this entreaty, was by tearing off the *oli*, and the amulets and charms which the chief wore as ſacred badges of his own religion; and, throwing them into the fire, he declared war againſt him and his nation. This violence inſtantly coſt him and his followers their lives: they were all maſſacred by order of Manang, who vowed the deſtruction of all the French in the iſland; in which intention he proceeded in a manner that has been related by an eye-witneſs, who was afterwards provincial commiſſary of artillery, in a narrative publiſhed at Lyons in 1722, entitled *Voyage de Madagaſcar*. "Our yoke (ſays the Abbé Rochon) was become odious and inſupportable. Hiſtorians, for the honour of civilized nations, ſhould bury in oblivion the afflicting narratives of the atrocities exerciſed on theſe people, whom we are pleaſed to call barbarous, treacherous, and deceitful, becauſe they have revolted againſt European adventurers, whoſe leaſt crime is that of violating the ſacred rites of hoſpitality."

It was about the year 1672 that the French were totally driven from the iſland of Madagaſcar; and no conſiderable attempts were made to form freſh eſtabliſhments there till within theſe few years, by M. de Modave, and by Count Benyowſki; neither of which was attended with ſucceſs, for reaſons given by the Abbé, but which we have not room to detail.

MADDER. See Rubia. M. Macquer obſerves, that the Hollanders are obliged to the refugees from Flanders for the knowledge of manufacturing the root of madder; and that they generally cultivate it in freſh lands which have not been ploughed. The commodity, when manufactured, is diſtinguiſhed into different kinds, as grape-madder, bunch-madder, &c. The grape-madder is the heart of the root; the other, beſides the heart, conſiſts alſo of the bark and ſmall fibres proceeding from the principal root. For that kind called *grape-madder*, the fineſt roots are picked out, the bark ſeparated at the mill, and the inſide root kept moiſt in caſks for three or four years, which makes it more fit for dyeing than otherwiſe it would be. Unleſs madder be kept cloſe in this manner, it is apt to ſpoil, and loſes its bright colour in a great meaſure. It is yellow at firſt, but grows red and darker with age. It ſhould be choſen of a fine ſaffron colour, in very hard lumps, and of a ſtrong though not diſagreeable ſmell.

The madder uſed for dyeing cottons in the Eaſt Indies, is in ſome reſpects different from that of Europe. On the coaſt of Coromandel it has the name of *chat*, and grows wild on the coaſt of Malabar. The cultivated kind is imported from Vaour and Tuccorin, but the moſt eſteemed is the Perſian chat called alſo *dumas*. Another plant, called *raye de chaye*, or

colour-root, is alſo gathered on the coaſt of Coromandel; but this, though ſuppoſed to be a ſpecies of madder, is a kind of *galium flore albo*, which, however, gives a tolerably good colour to cotton. Another ſpecies of madder, called *chiveboya* and *chine bazala*, is cultivated at Kunder in the neighbourhood of Smyrna, and ſome other countries of Turkey in Aſia. It is more eſteemed than the beſt Zealand madder imported into theſe parts by the Dutch; and experiments have ſhown that it is ſuperior to any other kind as a dyeing ingredient. The modern Greeks call this kind of madder *lizari*, and the Arabs *fonoy*. The fine colour of theſe madders, however, is by our author attributed to their being dried in the air, and not in ſtoves. Another kind of madder is produced in Canada, where it is called *tyſſa-voyana*; its qualities are nearly the ſame with the European kind.

The root of madder impregnates water with a dull red colour, and ſpirit of wine with a deep bright red. This root, when eaten by animals along with their food, tinges their urine, and their moſt ſolid bones, of a deep red. Wool previouſly boiled in a ſolution of alum and tartar, receives from a hot decoction of madder and tartar a very durable but not a very beautiful red colour. Mr. Margraaf (Berlin Mem. 1771) ſhows how a very durable lake of a fine red colour, fit for the purpoſes of painting, may be obtained from madder. This proceſs is as follows: Take two ounces of the pureſt Roman alum, and diſſolve it in three French quarts of diſtilled water that has boiled, and in a clean glazed pot. Set the pot on the fire; and when the water begins to boil, withdraw it, and add two ounces of the beſt Dutch madder. Boil the mixture once or twice; then remove it from the fire, and filter it through a double filter of paper not coloured. Let the liquor thus filtrated ſtand a night to ſettle, and pour off the clear liquor into the glazed pot previouſly well cleaned. Make the liquor hot, and add to it gradually a clear ſolution of ſalt of tartar in water, till all the madder is precipitated. Filtrate the mixture; and upon the red precipitate which remains upon the filter pour boiling diſtilled water, till the water no longer acquires a ſaline taſte. The red lake is then to be gently dried. No other water, neither rain nor river water, produces ſo good a colour as that which has been diſtilled, and the quantity required of this is conſiderable. The colour of the above precipitate is deep; but if two parts of madder be uſed to one part of alum, the colour will be ſtill deeper: one part of madder and four parts of alum produce a beautiful roſe colour.

MADEIRAS, a cluſter of iſlands ſituated in the Atlantic ocean in W. lon. 16°, and between 32° and 33° N. lat.—The largeſt of them, called *Madeira*, from which the reſt take their name, is about 55 Engliſh miles long, and 10 miles broad; and was firſt diſcovered on the 2d of July, in the year 1419, by Joao Gonzales Zarco, there being no hiſtorical foundation for the fabulous report of its diſcovery by one Machin an Engliſhman. It is divided into two capitanias, named *Funchal* and *Maxico*, from the towns of thoſe names. The former contains two judicatures, viz. Funchal and Calhetta; the latter being a town with the title of a county, belonging to the family of Caſtello Melhor. The ſecond capitania likewiſe comprehends two judicatures, viz. Maxico (read Maſhico) and San Vicente.

Funchal is the only cidade or city in this iſland, which has alſo ſeven villas or towns; of which there are four, Calhetta, Camara de Lobos, Ribeira Braba, and Ponta de Sol in the capitania of Funchal, which is divided into 26 pariſhes. The other three are in the capitania of Maxico, which conſiſts of 17 pariſhes; theſe towns are called *Maxico*, *San Vicente*, and *Santa Cruz*.

The governor is at the head of all the civil and military departments of this iſland, of Porto-Santo, the Salvages, and the Ilhas Deſartas; which laſt only contain the temporary huts of ſome fiſhermen, who reſort thither in purſuit of their buſineſs.

The law-department is under the corregidor, who is appointed by the king of Portugal, commonly ſent from Liſbon, and holds his place during the king's pleaſure. All cauſes come to him from inferior courts by appeal. Each judicature has a ſenate; and a *Juiz* or judge, whom they chooſe, preſides over them. At Funchal he is called *Juiz da Fora*; and in the abſence, or after the death of the corregidor, acts as his deputy. The foreign merchants elect their own judges, called the *Providor*, who is at the ſame time collector of the king's cuſtoms and revenues, which amount in all to about 2,000l. ſterling. For the greateſt part of this ſum is applied towards the ſalaries of civil and military officers, the pay of troops, and the maintenance of public buildings. This revenue ariſes, firſt from the tenth of all the produce of this iſland belonging to the king, by virtue of his office as grand maſter of the order of Chriſt; ſecondly, from ten per cent. duties laid on all imports, proviſions excepted; and laſtly, from the eleven per cent. charged on all exports.

The iſland has but one company of regular ſoldiers of 100 men: the reſt of the military force is a militia conſiſting of 3000 men, divided into companies, each commanded by a captain, who has one lieutenant under him and one enſign. There is no pay given to either the private men or the officers of this militia; and yet their places are much ſought after, on account of the rank which they communicate. Theſe troops are embodied once a year, and exerciſed once a month. All the military are commanded by the *Serjeante Mór*. The governor has two *Capitanos de Sal* about him, who do duty as aides decamp.

The ſecular prieſts on the iſland are about 1200, many of whom are employed as private tutors. Since the expulſion of the Jeſuits, no regular public ſchool is to be found here; unleſs we except a ſeminary, where a prieſt, appointed for that purpoſe, inſtructs and educates ten ſtudents at the king's expence. Theſe wear a red cloak over the uſual black gowns worn by ordinary ſtudents. All thoſe who intend to go into orders, are obliged to qualify themſelves by ſtudying in the univerſity of Coimbra, lately re-eſtabliſhed in Portugal. There is alſo a dean and chapter at Madeira, with a biſhop at their head, whoſe income is conſiderably greater than the governor's; it conſiſts of 110 pipes of wine, and of 40 muys of wheat, each containing 24 buſhels; which amounts in common years to 3000l. ſterling. Here are likewiſe 60 or 70 Franciſcan friars, in four monaſteries, one of which is at Funchal. About 300 nuns live on the iſland, in four convents, of the order of Merci, Santa Clara, Incarnacao, and Bom Jeſus. Thoſe of the laſt mentioned inſtitution may marry whenever they chooſe, and leave their monaſtery.

In the year 1768, the inhabitants living in the 43 pariſhes of Madeira, amounted to 63,913, of whom there were 31,341 males and 32,572 females. But in that year 5243 perſons died, and no more than 2198 children were born; ſo that the number of the dead exceeded that of the born by 3045. It is highly probable that ſome epidemical diſtemper carried off ſo diſproportionate a number in that year, as the iſland would ſhortly be entirely depopulated if the mortality were always equal to this. Another circumſtance concurs to ſtrengthen this ſuppoſition, namely, the excellence of the climate. The weather is in general mild and temperate: in ſummer, the heat is very moderate on the higher parts of the iſland, whither the better ſort of people retire for that ſeaſon; and in the winter the ſnow remains there for ſeveral days, whilſt it is never known to continue above a day or two in the lower parts.

The common people of this iſland are of a tawny colour, and well ſhaped; though they have large feet, owing perhaps to the efforts they are obliged to make in climbing the craggy paths of this mountainous country. Their faces are oblong, their eyes dark; their black hair naturally falls in ringlets, and begins to criſp in ſome individuals, which may perhaps be owing to intermarriages with negroes; in general, they are hard-featured, but not diſagreeable. Their women are too frequently ill-favoured, and want the florid complexion which, when united to a pleaſing aſſemblage of regular features, gives our northern fair-ones the ſuperiority over all their ſex. They are ſmall, have prominent cheek-bones, large feet, an ungraceful gait, and the colour of the darkeſt brunette. The juſt proportion of the body, the fine form of their hands, and their large lively eyes, ſeem in ſome meaſure to compenſate for thoſe defects. The labouring men, in ſummer, wear linen trowſers, a coarſe ſhirt, a large hat, and boots; ſome have a ſhort jacket made of cloth, and a long cloak, which they ſometimes carry over their arm. The women wear a petticoat, and a ſhort corſelet or jacket, cloſely fitting their ſhapes, which is a ſimple and often not an inelegant dreſs. They have alſo a ſhort but wide cloak; and thoſe that are unmarried tie their hair on the crown of their head, on which they wear no covering.

The country people are exceedingly ſober and frugal; their diet in general conſiſting of bread and onions, or other roots, and little animal food. However, they avoid eating tripe, or any offals, becauſe it is proverbially ſaid of a very poor man, "He is reduced to eat tripe." Their common drink is water, or an infuſion of the remaining rind or ſkin of the grape (after it has paſſed through the wine-preſs), which when fermented acquires ſome tartneſs and acidity, but cannot be kept very long. The wine for which the iſland is ſo famous, and which their own hands prepare, ſeldom if ever regales them.

Their principal occupation is the planting and raiſing of vines; but as that branch of agriculture requires little attendance during the greateſt part of the year, they naturally incline to idleneſs. The warmth of the climate, which renders great proviſion againſt the inclemencies of weather unneceſſary, and the eaſe with which the cravings of appetite are ſatisfied, muſt tend to indolence, wherever the regulations of the legiſlature do not counteract it, by endeavouring, with the proſpect of increaſing happineſs, to infuſe the ſpirit of induſtry. It ſeems the Portugueſe government does not purſue the proper methods againſt this dangerous lethargy of the ſtate. They have lately ordered the plantation of olive-trees here, on ſuch ſpots as are too dry and barren to bear vines; but they have not thought of giving temporary aſſiſtance to the labourers, and have offered no premium by which theſe might be induced to conquer their reluctance to innovations and averſion to labour.

The vineyards are held only on an annual tenure, and the farmer reaps but four tenths of the produce, ſince four other tenths are paid in kind to the owner of the land, one tenth to the king, and one to the clergy. Such ſmall profits, joined to the thought of toiling merely for the advantage of others, if improvements were attempted, entirely preclude the hopes of a future increaſe. Oppreſſed as they are, they have however preſerved a high degree of cheerfulneſs and contentment; their labours are commonly alleviated with ſongs, and in the evening they aſſemble from different cottages to dance to the drowſy muſic of a guitar.

The inhabitants of the towns are more ill-favoured than the country-people, and often pale and lean. The men wear French clothes, commonly black, which do not ſeem to fit them, and have been in faſhion in the polite world about half a century ago. Their ladies are delicate, and have agreeable features: but the characteriſtic jealouſy of the men ſtill locks them up, and deprives them of a happineſs which the country-women, amidſt all their diſtreſſes, enjoy. Many of the better people are a ſort of *petite nobleſſe*, which we would call *gentry*, whoſe genealogical pride makes them unſociable and ignorant, and cauſes a ridiculous affectation of gravity. The landed property is in the hands of a few ancient families, who live at Funchal, and in the various towns on the iſland.

Madeira conſiſts of one large mountain, whoſe branches riſe every where from the ſea towards the centre of the iſland, converging to the ſummit, in the midſt of which is a depreſſion or excavation, called the *Val* by the inhabitants, always covered with a freſh and delicate herbage. The ſtones on the iſland ſeem to have been in the fire, are full of holes, and of a blackiſh colour; in ſhort, the greater part of them are lava. A few of them are of the kind which the Derbyſhire miners call *dunſtone*. The ſoil of the whole iſland is a tarras mixed with ſome particles of clay, lime, and ſand, and has much the ſame appearance as ſome earths on the iſle of Aſcenſion. From this circumſtance, and from the excavation of the ſummit of the mountain, it is probable, that in ſome remote period a volcano has produced the lava and the ochreous particles, and that the Val was formerly its crater.

Many brooks and ſmall rivulets deſcend from the ſummits in deep chaſms or glens, which ſeparate the various parts of the iſland. The beds of the brooks are in ſome places covered with ſtones of all ſizes, carried down from the higher parts by the violence of winter-rains or floods of melted ſnow. The water is conducted by wears and channels in the vineyards, where each proprietor has the uſe of it for a certain time; ſome being allowed to keep a conſtant ſupply of it, ſome to uſe it thrice, others twice, and others only once a week. As the heat of the climate renders this ſupply of water to the vineyards abſolutely neceſſary, it is not without great expence that a new vineyard can be planted; for the maintenance of which, the owners muſt purchaſe water at a high price, from thoſe who are conſtantly ſupplied, and are thus enabled to ſpare ſome of it.

Wherever a level piece of ground can be contrived in the higher hills, the natives make plantations of eddoes encloſed by a kind of dike to cauſe a ſtagnation, as that plant ſucceeds beſt in ſwampy ground. Its leaves ſerve as food for hogs, and the country-people uſe the roots for their own nouriſhment.

The ſweet potatoe is planted for the ſame purpoſe, and makes a principal article of diet; together with cheſnuts, which grow in extenſive woods, on the higher parts of the iſland, where the vine will not thrive. Wheat and barley are likewiſe ſown, eſpecially in ſpots where the vines are decaying through age, or where they are newly planted. But the crops do not produce above three months proviſions; and the inhabitants are therefore obliged to have recourſe to other food, beſides importing conſiderable quantities of corn from North America in exchange for wine. The want of manure, and the inactivity of the people, are in ſome meaſure the cauſes of this diſadvantage; but ſuppoſing huſbandry to be carried to its perfection here, they could not raiſe corn ſufficient for their conſumption. They make their threſhing-floors of a circular form, in a corner of a field, which is cleared and beaten ſolid for the purpoſe. The ſheaves are laid round about it; and a ſquare board, ſtuck full of ſharp flints below, is dragged over them by a pair of oxen, the driver getting on it to increaſe its weight. This machine cuts the ſtraw as if it had been chopped, and frees the grain from the huſk, from which it is afterwards ſeparated.

The great produce of Madeira is the wine, from which it has acquired fame and ſupport. Where the ſoil, expoſure,

and ſupply of water, will admit of it, the vine is cultivated. One or more walks, about a yard or two wide, interſect each vineyard, and are included by ſtone walls two feet high. Along theſe walks, which are arched over with laths about ſeven feet high, they erect wooden pillars at regular diſtances, to ſupport a lattice-work of bamboos, which ſlopes down from both ſides of the walk, till it is only a foot and a half or two feet high, in which elevation it extends over the whole vineyard. The vines are in this manner ſupported from the ground, and the people have room to root out the weeds which ſpring up between them. In the ſeaſon of the vintage, they creep under this lattice-work, cut off the grapes, and lay them into baſkets; ſome bunches of theſe grapes weigh ſix pounds and upwards. This method of keeping the ground clean and moiſt, and ripening the grapes in the ſhade, contributes to give the Madeira wines that excellent flavour and body for which they are remarkable. The owners of vineyards are however obliged to allot a certain ſpot of ground for the growth of bamboos; for the lattice-work cannot be made without them; and it is ſaid ſome vineyards lie quite neglected for want of this uſeful reed.

The wines are not all of equal goodneſs, and conſequently of different prices. The beſt, made of a vine imported from Candia by order of the Infante of Portugal, Don Henry, is called *Madeira Malmſey*, a pipe of which cannot be bought on the ſpot for leſs than 40 or 42l. ſterling. It is an exceeding rich ſweet wine, and is only made in a ſmall quantity. The next ſort is a dry wine, ſuch as is exported for the London market, at 30 or 31l. ſterling the pipe. Inferior ſorts for the Eaſt India, Weſt India, and North American markets ſell at 28, 25, and 20l. ſterling. About 30,000 pipes, upon a mean, are made every year, each containing 110 gallons. About 13,000 pipes of the better ſorts are exported; and all the reſt is made into brandy for the Brazils, converted into vinegar, or conſumed at home.

The incloſures of the vineyards conſiſt of walls, and hedges of prickly pear, pomegranates, myrtles, brambles, and wild roſes. The gardens produce peaches, apricots, quinces, apples, pears, walnuts, cheſnuts, and many other European fruits; together with now and then ſome tropical plants, ſuch as bananas, goavas, and pine-apples.

All the common domeſtic animals of Europe are likewiſe found at Madeira; and their mutton and beef, though ſmall, is very well taſted. Their horſes are ſmall, but ſure-footed; and with great agility climb the difficult paths, which are the only means of communication in the country. They have no wheel-carriages of any kind; but in the town they uſe a ſort of drays or ſledges, formed of two pieces of plank joined by croſs pieces, which make an acute angle before: theſe are drawn by oxen, and are uſed to tranſport caſks of wine, and other heavy goods, to and from the warehouſes.

The animals of the feathered tribe, which live wild here, are more numerous than the wild quadrupeds; there being only the common grey rabbit here, as a repreſentative of the laſt-mentioned claſs. Tame birds, ſuch as turkeys, geeſe, ducks, and hens, are very rare, which is perhaps owing to the ſcarcity of corn.

There are no ſnakes whatſoever in Madeira; but all the houſes, vineyards, and gardens ſwarm with lizards. The friars of one of the convents complained to Mr. Forſter, that theſe vermin deſtroyed the fruit in their garden; they had therefore placed a braſs kettle on the ground to catch them, as they are conſtantly running about in queſt of food. In this manner they daily caught hundreds, which could not get out on account of the ſmooth ſides of the kettle, but were forced to periſh.

The ſhores of Madeira, and of the neighbouring ſalvages and deſertas, are not without fiſh; but as they are not in plenty enough for the rigid obſervance of Lent, pickled herrings are brought from Gottenburg in Engliſh bottoms, and ſalted cod from New York and other American ports, to ſupply the deficiency.

MADIAN, (anc. geog.) a town of Arabia Petræa, near the Arnan; ſo called from one of the ſons of Abraham by Ketura, in ruins in Jerome's time. Jerome mentions another MADIAN, or MIDIAN, beyond Arabia in the deſert, to the ſouth of the Red Sea: and hence *Madianæi*, and *Madianitæi*, the people; and *Madianæa Regio*, the country.

MADNESS, a moſt dreadful kind of delirium, without fever. See MEDICINE.

MADOX (Dr. ISAAC), an ingenious and worthy prelate, born of obſcure parents about the year 1696, who placed him apprentice to a paſtry-cook; but not reliſhing this employment, and having an inclination to learning, he was put to ſchool by ſome friends, and completed his ſtudies at Aberdeen. He entered into orders; and having the good fortune to be made chaplain to Dr. Bradford biſhop of Chicheſter, he married his niece, a very ſenſible and worthy lady. From this time his preferment may be dated; he was made king's chaplain, clerk of the cloſet to queen Caroline, and about the year 1736 biſhop of St. Aſaph; from whence, in 1743, he was tranſlated to Worceſter. He was an excellent preacher, and a great promoter of public charities; particularly the Worceſter infirmary, and the hoſpital for inoculating the ſmall-pox at London: his ſermon in favour of this latter inſtitution, preached in 1752, was much admired, and contributed greatly to extend the practice of inoculation. He publiſhed ſome other ſingle ſermons, and a Defence of the Doctrine and Diſcipline of the Church of England, in anſwer to Mr. Neale's Hiſtory of the Puritans.—He died in 1759.

MADRAS. See St. GEORGE.

MADRE DE POPA, a town and convent of South America, in Terra Firma, ſeated on the river Grande. It is almoſt as much reſorted to by pilgrims of America as Loretto is in Europe; and the image of the Virgin Mary is ſaid to have done many miracles in favour of the ſea-faring people. W. lon. 76. 0. N. lat. 11. 0.

MADREPORA, in natural hiſtory, the name of a genus of ſubmarine ſubſtances; the characters of which are, that they are almoſt of a ſtony hardneſs, reſembling the corals, and are uſually divided into branches, and pervious by many holes or cavities, which are frequently of a ſtellar figure.

In the Linnæan ſyſtem, this is a genus of lithophyta: The animal that inhabits it is the Meduſa; it comprehends 39 ſpecies. According to Donati, the madrepora is like the coral as to its hardneſs, which is equal to bone or marble; the colour is white when poliſhed; its ſurface is lightly wrinkled, and the wrinkles run lengthwiſe of the branches; in the centre there is a ſort of cylinder, which is often pierced through its whole length by two or three holes. From this cylinder are detached about 17 laminæ, which run to the circumference in ſtraight lines; and are tranſverſely interſected by other laminæ, forming many irregular cavities; the cellules, which are compoſed of theſe laminæ ranged into a circle, are the habitations of little polypes, which are extremely tender animals, generally tranſparent, and variegated with beautiful colours. M. de Peyſſonel obſerves, that thoſe writers who only conſidered the figures of ſubmarine ſubſtances, denominated that claſs of them which ſeemed pierced with holes, *pora*; and thoſe the holes of which were large they called *madrepora*. He defines them to be all thoſe marine bodies which are of a ſtony ſubſtance, without either bark or cruſt, and which have

but one apparent opening at each extremity, furniſhed with rays that proceed from the centre to the circumference. He obſerves that the body of the animal of the madrepora, whoſe fleſh is ſo ſoft that it divides upon the gentleſt touch, fills the centre: the head is placed in the middle, and ſurrounded by ſeveral feet or claws, which fill the intervals of the partitions obſerved in this ſubſtance, and are at pleaſure brought to its head, and are furniſhed with yellow papillæ. He diſcovered that its head or centre was lifted up occaſionally above the ſurface, and often contracted and dilated itſelf like the pupil of the eye: he ſaw all its claws moved, as well as its head or centre. When the animals of the madrepora are deſtroyed, its extremities become white. In the madrepora, he ſays, the animal occupies the extremity; and the ſubſtance is of a ſtony but more looſe texture than the coral. This is formed, like other ſubſtances of the ſame nature, of a liquor which the animal diſcharges; and he farther adds, that there are ſome ſpecies of the polype of the madrepora which are produced ſingly, and others in cluſters.

MADRID, a town of New Caſtile in Spain, and capital of the whole kingdom, though it never had the title of a *city*, is ſituated in W. lon. 3. 5. N. lat. 40. 26. It ſtands in the centre of a large plain, ſurrounded with mountains, and in the very heart of Spain, on the banks of the little river Manzanares, which is always very low and ſhallow, except when it is ſwelled by the melting of the ſnow on the mountains. The city is in general well laid out; the ſtreets are very handſome; and the houſes are fair and lofty, but built of brick, with lattice-windows, excepting thoſe of the rich, who have glaſs in their windows; only, during the ſummer heats, they uſe gauze, or ſome ſuch thin ſtuff, inſtead of it, to let in the freſh air. There are two ſtately bridges here over the Manzanares, a great many magnificent churches, convents, hoſpitals, and palaces. The royal palace, which ſtands on the weſt ſide of the town, on an eminence, is ſpacious and magnificent, conſiſting of three courts, and commanding a fine proſpect. At the eaſt end of the town is the prado, or pardo; which is a delightful plain, planted with regular rows of poplar trees, and watered with a great many fountains; where the nobility and gentry take the air on horſeback, or in their coaches, and the common people on foot, or divert themſelves with a variety of ſports and exerciſes. Almoſt all the ſtreets of Madrid are ſtraight, wide, clean, and well paved. The largeſt and moſt frequented are, the ſtreet of Alcala, that of Atocha, that of Toledo, and the *Calle grande* or great ſtreet. Madrid has alſo ſeveral ſquares, which in general are not very regular. The principal are thoſe of San Joachim, Sol, Laſganitas, San Domingo, La Cevado, and the Plaza Mayor. The latter eſpecially deſerves notice for its ſpaciouſneſs and regularity, and the elegant and lofty houſes it contains. It is fifteen hundred and thirty-ſix feet in circuit. The houſes, of which there are 136, are of five ſtories, ornamented with balconies; the firſt of which, ſupported by pillars, form a piazza round the ſquare, where the inhabitants may walk under cover. In the middle of the ſquare a market is kept.—The ſtreets and ſquares of Madrid, except the Plaza Mayor which has been juſt deſcribed, are ornamented with fountains in a very ill taſte. Thoſe moſt to be diſtinguiſhed in this particular are the fountain of the ſmall irregular ſquare called *Plaza di Antonio Martin*, and that of the ſquare named *Puerta del Sol*. The others are not more magnificent, though leſs ridiculous. The water of all theſe fountains is excellent; and the air of Madrid, though the weather be variable and uncertain, is extremely pure. It was this purity of the air and excellent quality of the water which induced Philip II. and his ſucceſſors to fix their reſidence in this city. It is alſo well ſupplied with proviſions of all kinds at reaſonable rates; and the court, with the reſort and reſidence of the quality, and the high colleges and offices that are kept here, occaſion a briſk trade and circulation of money.

The ſacred edifices in this city have nothing remarkable in their architecture: thoſe of St. Paſqual, St Iſabella, and the Carmelites, contain highly valuable collections of pictures, which may be ſeen with admiration even after the paintings of the Eſcurial and the new palace. The church of St. Iſidro, which heretofore belonged to the Jeſuits, has a portal which has eſcaped the contagion of the age in which it was built. There is another church much more modern, which on account of its maſs has a venerable appearance, but which true taſte may juſtly diſavow: it is that of St. Saleſas, or the Viſitation, founded by Ferdinand VI. and the queen Barbara his wife.—The convent of St. Francis has already been ſome years building, and there are hopes that it will become one of the fineſt productions of architecture in the capital.—Beſides a variety of charitable foundations, there are here three confraternities, the revenues of which are appropriated to the ſuccour of the wretched; and an inſtitution ſimilar to the *Mont de Pieté* in Paris, the principal object of which is to advance money to the neceſſitous.

The city of Madrid contains 15 gates, 18 pariſhes, 35 convents of monks, and 31 of nuns; 39 colleges, hoſpitals, or houſes of charity; 7398 dwelling-houſes, and about 140,000 inhabitants. The Lombard traveller, Father Caimo, tells us, that 50,000 ſheep and 12,000 oxen are annually conſumed there; to which his editor has added a ludicrous eſtimate of the onions and leeks devoured there, which he ſays amount to 97000000000000000000000000000045. But this writer (M. Bourgoanne obſerves) would not at preſent have any reaſon to complain of the diſagreeable ſmells of the ſtreets, nor would he find all the perfumes of Arabia neceſſary to defend himſelf from them. By the vigilance of the modern police, for which (M. Bourgoanne informs us) it is indebted to the count D'Aranda, it is rendered one of the cleaneſt cities in Europe.

There are four academies in Madrid: The firſt is the Spaniſh academy founded in 1714, in imitation of the French academy, and conſiſting of 24 members, including the preſident. Its device is a crucible on burning coals, with the motto *limpia, fixa, y da eſplendor*; "it purifies, fixes, and gives luſtre." Its firſt object was the compilation of a dictionary of the Spaniſh language, which was publiſhed in ſix volumes folio, and of which a new edition, with great additions, has been lately put to the preſs. The ſame academy is alſo employed on a ſuperb edition of Don Quixotte, adorned with elegant engravings far ſuperior to the laſt, and collated with all the former editions. The ſecond is the academy of hiſtory; which owes its origin to a ſociety of individuals, the object of whoſe meetings was to preſerve and illuſtrate the hiſtorical monuments of the kingdom of Spain. Their labours met the approbation of Philip V. who in 1738 confirmed their ſtatutes by a royal cedula. This academy conſiſts of 24 members, including the preſident, ſecretary, and cenſor. Its device is a river at its ſource; and the motto, *In patriam populumque fluit*. The other two academies are, the academy of the fine arts, painting, ſculpture, and architecture; and the academy of medicine. The latter is held in no great eſteem.

The environs of Madrid contain ſeveral royal ſeats; among which are El Buen Retiro, Caſa del Campo, Florida, Le Pardo, Sarſuela, and St. Ildefonſo; but the moſt magnificent not only in this country but perhaps in the whole world is the Eſcurial, which takes its name from a ſmall village, near which it ſtands, about 22 miles north-weſt from Madrid. See ESCURIAL. Another royal palace, greatly admired, particularly for its delicious gardens and ſurpriſing water-works, is Aranjuez, which is ſituated on the Tagus, about 30 miles ſouth of Madrid.

MADRIGAL, a ſhort amorous poem, compoſed of a number of free and unequal verſes, neither confined to the regularity of a ſonnet, nor to the point of an epigram; but only conſiſting of ſome tender and delicate thought, expreſſed with a beautiful, noble, and elegant ſimplicity. Menage derives the word from *mandra*, which, in Latin and Greek, ſignifies "a ſheep-fold;" imagining it to have been originally a kind of paſtoral or ſhepherd's ſong; whence the Italians formed their *madrigale*, and we *madrigal*. Others rather chooſe to derive it from the word *madrugar*, which in the Spaniſh language ſignifies "to riſe in the morning;" the *madrigales* being formerly ſung early in the morning by thoſe who had a mind to ſerenade their miſtreſſes.

MADURA, a province of Aſia, in the peninſula on this ſide the Ganges; bounded on the eaſt by Tanjour and Marava, on the ſouth-eaſt by the ſea, on the weſt by the Balagate mountains, which ſeparate it from Malabar, and on the north by Viſapour and Carnate. The inhabitants are Gentoos, and of a thieviſh diſpoſition. The commodities are rice, elephants teeth, and cotton-cloth; of which laſt a great deal is made here, and very fine. The Dutch have a pearl-fiſhery, which brings them in a large ſum annually.

MÆANDER (anc. geog.), a celebrated river of Aſia Minor, riſing near Celænæ. It flows through Caria and Ionia into the Ægean ſea between Miletus and Priene, after it has been increaſed by the waters of the Marſyas, Lycus, Eudon, Lethæus, &c. It is celebrated among the poets for its windings, which amount to not leſs than 600, and from which all obliquities have received the name of *mæanders*. It forms in its courſe, according to the obſervation of ſome travellers, the Greek letters ε ζ ξ ς and ω; and from its windings Dædalus is ſaid to have had the firſt idea of his famous labyrinth.

MÆATÆ, anciently a people of Britain, near Severus's wall, inhabiting the diſtrict now called *Lauderdale*, in Scotland.

MÆCENAS (Caius Cilnius), the great friend and counſellor of Auguſtus Cæſar, was himſelf a very polite ſcholar, but is chiefly memorable for having been the patron and protector of men of letters. He was deſcended from a moſt ancient and illuſtrious origin, even from the kings of Hetruria, as Horace often tells us; but his immediate forefathers were only of the equeſtrian order. He is ſuppoſed to have been born at Rome, becauſe his family lived there; but in what year antiquity does not tell us. It ſays as little about his education; but we know it muſt have been of the moſt liberal kind, and perfectly agreeable to the dignity and ſplendour of his birth, ſince he excelled in every thing that related to arms, politics, and letters. How Mæcenas ſpent his younger years is alſo unknown to us, any farther than by effects; there being no mention made of him by any writer before the death of Julius Cæſar, which happened in the year of Rome 709. Then Octavius Cæſar, who was afterwards called *Auguſtus*, went to Rome, to take poſſeſſion of his uncle's inheritance; and then Mæcenas became firſt publicly known, though he appears to have been Auguſtus's intimate friend, and as it ſhould ſeem guardian, from his childhood. From that time he accompanied him through all his fortunes, and was his counſellor and adviſer upon all occaſions; ſo that Pedo Albinovanus juſtly called him *Cæſaris dextram*, "Cæſar's right-hand."

In A. R. 710, the year that Cicero was killed and Ovid born, Mæcenas diſtinguiſhed himſelf by his courage and military ſkill at the battle of Modena, where the conſuls Hirtius and Panſa were ſlain in fighting againſt Antony; as he did afterwards at Philippi. After this laſt battle began the memorable friendſhip between Mæcenas and Horace. Horace, as Suetonius relates, was a tribune in the army of Brutus and Caſſius, and upon the defeat of thoſe generals made a priſoner of war. Mæcenas, finding him an accompliſhed man, became immediately his friend and protector; and afterwards recommended him to Auguſtus, who reſtored to him his eſtate with no ſmall additions. In the mean time, though Mæcenas behaved himſelf well as a ſoldier in theſe and other battles, yet his principal province was that of a miniſter and counſellor. He was the adviſer, the manager, the negotiator, in every thing that related to civil affairs. When the league was made at Brunduſium between Antony and Auguſtus, Mæcenas was ſent to act on the part of Auguſtus. This we learn from Horace in his journey to Brunduſium:

Huc venturus erat Mæcenas optimus, atque
Cocceius, miſſi magnis de rebus uterque
Legati, averſos ſoliti compenere amicos. Sat. v. l. 1.

And afterwards, when this league was near breaking, through the ſuſpicions of each party, Mæcenas was ſent to Antony to ratify it anew.

In the year 717, when Auguſtus and Agrippa went to Sicily to fight Sextus Pompeius by ſea, Mæcenas went with them; but ſoon after returned, to appeaſe ſome commotions which were riſing at Rome: for though he uſually attended Auguſtus in all his military expeditions, yet, whenever there was any thing to be done at Rome either with the ſenate or people, he was always diſpatched thither for that purpoſe.

Upon the total defeat of Antony at Actium, Mæcenas returned to Rome, to take the government into his hands, till Auguſtus could ſettle ſome neceſſary affairs in Greece and Aſia. Agrippa ſoon followed Mæcenas; and when Auguſtus arrived, he placed theſe two great men and faithful adherents, the one over his civil the other over his military concerns. While Auguſtus was extinguiſhing the remains of the civil war in Aſia and Egypt, young Lepidus, the ſon of the triumvir, was forming a ſcheme to aſſaſſinate him at his return to Rome. This conſpiracy was diſcovered at once by the extraordinary vigilance of Mæcenas; who, as Velleius Paterculus ſays, "obſerving the raſh councils of the headſtrong youth with the ſame tranquillity and calmneſs as if nothing at all had been doing, inſtantly put him to death, without the leaſt noiſe and tumult; and by that means extinguiſhed another civil war in its very beginning."

The civil wars being now at an end, Auguſtus returned to Rome; and from this time Mæcenas indulged himſelf at vacant hours in literary amuſements, and the converſation of men of letters. In the year 734 Virgil died, and left Auguſtus and Mæcenas heirs to what he had. Mæcenas was exceſſively fond of this poet, who, of all the wits of the Auguſtan age, ſtood higheſt in his eſteem; and if the Georgics and the Æneid be owing to the good taſte and encouragement of this patron, as there is ſome reaſon to think, poſterity cannot commemorate him with too much gratitude. Horace may be ranked next to Virgil in Mæcenas's good graces: we have already mentioned how and at what time their friendſhip commenced. Propertius alſo acknowledges Mæcenas for his favourer and protector, lib. ii. eleg. 7. Nor muſt Varius be forgot, though we have nothing of his remaining; ſince we find him highly praiſed by both Virgil and Horace. He was a writer of tragedies; and Quintilian thinks he may be compared with any of the ancients. In a word, Mæcenas's houſe was a place of refuge and welcome to all the learned of his time; not only to Virgil, Horace, Propertius and Varius, but to Fundarius, whom Horace extols as an admirable writer of comedies; to Furius Ariſtius, a noble grammarian, and Horace's intimate friend; to Plotius Tucca, who aſſiſted Varius in correcting the Æneid after the death of Virgil; to Valgius, a poet and very learned man, who, as Pliny tells us, dedicated a book to Auguſtus, *De uſu herbarum*; to Aſinius Pollio, an excellent tragic writer; and to ſeveral

others, whom it would be tedious to mention. All theſe dedicated their works, or ſome part of them at leaſt, to Mæcenas, and celebrated his praiſes in them over and over: and we may obſerve farther, what Plutarch tells us, that even Auguſtus himſelf inſcribed his Commentaries to him and to Agrippa.

Mæcenas continued in Auguſtus's favour to the end of his life, but not uninterruptedly. Auguſtus had an intrigue with Mæcenas's wife: and though the miniſter bore this liberty of his maſter very patiently, yet there was a coldneſs on the part of Auguſtus, which, however, ſoon went off. Mæcenas died in the year 745; but at what age we cannot preciſely determine, though we know he muſt have been old. He muſt have been older than Auguſtus, becauſe he was a kind of tutor to him in his youth: and we find him often called *an old man* by Pædo Albinovanus, a cotemporary poet, whoſe elegy upon his dead patron is ſtill extant. He made Auguſtus his heir; and recommended his friend Horace to him in theſe memorable laſt words, "*Horatii Flacci, ut mei, memor eſto*," &c. Horace, however, did not probably ſurvive him long, as there is no elegy of his upon Mæcenas extant, nor any account of one having ever been written, which there certainly would have been had Horace ſurvived him any time. Nay, Father Sanadon, the French editor of Horace, will have it, that the poet died before his patron; and that theſe laſt words were found only in Mæcenas's will, which had not been altered.

Mæcenas is ſaid never to have enjoyed a good ſtate of health in any part of his life: and many ſingularities are related of his bodily conſtitution. Thus Pliny tells us, that he was always in a fever; and that, for three years before his death, he had not a moment's ſleep. Though he was certainly an extraordinary man, and poſſeſſed many admirable virtues and qualities, yet it is agreed on all hands that he was very luxurious and effeminate. "Mæcenas (ſays Velleius Paterculus) was of the equeſtrian order, but ſprung from a moſt illuſtrious origin. He was a man, who, when buſineſs required, was able to undergo any fatigue and watching; who conſulted properly upon all occaſions, and knew as well how to execute what he had conſulted; yet a man who in ſeaſons of leiſure was luxurious, ſoft, and effeminate, almoſt beyond a woman. He was no leſs dear to Cæſar than Agrippa, but diſtinguiſhed by him with fewer honours: for he always continued of the equeſtrian rank, in which he was born: not that he could not have been advanced upon the leaſt intimation, but he never ſolicited it."

But let moraliſts and politicians determine of Mæcenas as they pleaſe, the men of letters are under high obligations to celebrate his praiſes and revere his memory: for he countenanced, protected, and ſupported, as far as they wanted his ſupport, all the wits and learned men of his time; and that too, out of a pure and diſintereſted love of letters, when he had no little views of policy to ſerve by their means: whence it is no wonder that all the protectors and patrons of learning, ever ſince, have uſually been called *Mæcenases*.

MAELSTROM, a very dangerous whirlpool on the coaſt of Norway, in the 68th degree of latitude, in the province of Nordland, and the diſtrict of Lofoden, and near the iſland of Moſkoe, from whence it alſo takes the name of *Moſkoe-ſtrom*. Its violence and roarings exceed that of a cataract, being heard to a great diſtance, and without any intermiſſion, except a quarter every ſixth hour, that is, at the turn of high and low water, when its impetuoſity ſeems at a ſtand, which ſhort interval is the only time the fiſhermen can venture in: but this motion ſoon returns, and, however calm the ſea may be, gradually increaſes with ſuch a draught and vortex as abſorb whatever comes within their ſphere of action, and keep it under water for ſome hours, when the fragments, ſhivered by the rocks, appear again. This circumſtance, among others, makes ſtrongly againſt Kircher and others, who imagine that there is here an abyſs penetrating the globe, and iſſuing in ſome very remote parts, which Kircher is ſo particular as to aſſign, for he names the gulph of Bothnia. But after the moſt exact reſearches which the circumſtances will admit, this is but a conjecture without foundation; for this and three other vortices among the Ferroe iſlands, but ſmaller, have no other cauſe than the colliſion of waves riſing and falling, at the flux and reflux, againſt a ridge of rocks and ſhelves, which confine the water ſo that it precipitates itſelf like a cataract; and thus the higher the flood riſes, the deeper muſt the fall be; and the natural reſult of this is a whirlpool or vortex, the prodigious ſuction whereof is ſufficiently known by leſſer experiments. But what has been thus abſorbed, remains no longer at the bottom than the ebb laſts; for the ſuction then ceaſes, and the flood removes all attraction, and permits whatever had been ſunk to make its appearance again. Of the ſituation of this amazing Moſkoeſtrom we have the following account from Mr. Jonas Ramus: "The mountain of Helſeggen, in Lofoden, lies a league from the iſland Ver, and betwixt theſe two runs that large and dreadful ſtream called *Moſkoeſtrom*, from the iſland Moſkoe, which is in the middle of it, together with ſeveral circumjacent iſles, as Ambaaren, half a quarter of a league northward, Iſleſen, Hoeholm, Kieldholm, Suarven, and Buckholm. Moſkoe lies about half a quarter of a mile ſouth of the iſland of Ver, and betwixt them theſe ſmall iſlands, Otterholm, Flimen, Sandfleſen, Stockholm. Betwixt Lofoden and Moſkoe, the depth of the water is between 36 and 40 fathoms; but on the other ſide, towards Ver, the depth decreaſes ſo as not to afford a convenient paſſage for a veſſel, without the riſk of ſplitting on the rocks, which happens even in the calmeſt weather: when it is flood, the ſtream runs up the country between Lofoden and Moſkoe with a boiſterous rapidity; but the roar of its impetuous ebb to the ſea is ſcarce equalled by the loudeſt and moſt dreadful cataracts; the noiſe being heard ſeveral leagues off, and the vortices or pits are of ſuch an extent and depth, that, if a ſhip comes within its attraction, it is inevitably abſorbed and carried down to the bottom, and there beat to pieces againſt the rocks; and when the water relaxes, the fragments thereof are thrown up again. But theſe intervals of tranquillity are only at the turn of the ebb and flood, and calm weather; and laſt but a quarter of an hour, its violence gradually returning. When the ſtream is moſt boiſterous, and its fury heightened by a ſtorm, it is dangerous to come within a Norway mile of it; boats, ſhips, and yachts having been carried away, by not guarding againſt it before they were within its reach. It likewiſe happens frequently, that whales come too near the ſtream, and are overpowered by its violence; and then it is impoſſible to deſcribe their howlings and bellowings in their fruitleſs ſtruggles to diſengage themſelves. A bear once attempting to ſwim from Lofoden to Moſkoe, with a deſign of preying upon the ſheep at paſture in the iſland, afforded the like ſpectacle to the people; the ſtream caught him, and bore him down, whilſt he roared terribly, ſo as to be heard on ſhore. Large ſtocks of firs and pine-trees, after being abſorbed by the current, riſe again, broken and torn to ſuch a degree as if briſtles grew on them. This plainly ſhows the bottom to conſiſt of craggy rocks, among which they are whirled to and fro. This ſtream is regulated by the flux and reflux of the ſea; it being conſtantly high and low water every ſix hours. In the year 1645, early in the morning of Sexageſima Sunday, it raged with ſuch noiſe and impetuoſity, that on the iſland of Moſkoe the very ſtones of the houſes fell to the ground."

MÆMACTERIA, ſacrifices offered to Jupiter at Athens in the winter month Mæmacterion. The god ſurnamed Mæmactes was entreated to ſend mild and temperate weather, as he preſided over the ſeaſons, and was the god of the air.

MÆMACTERION was the fourth month of the Athenian year, containing twenty-nine days, and anſwering to the latter part of our September, and the beginning of October. It received its name from the feſtival *Mæmacteria*, which was obſerved about this time. This month was called by the Bœotians *Alalcomenius*.

MÆNA, in ichthyology. See SPARUS.

MÆNALUS (anc. geog.), a mountain of Arcadia ſacred to the god Pan, and greatly frequented by ſhepherds. It received its name from Mænalus a ſon of Lycaon. It was covered with pine-trees, whoſe echo and ſhade have been greatly celebrated by all the ancient poets.

MÆONIA, or MŒONIA, a country of Aſia Minor, and forming part of Lydia; namely, the neighbourhood of mount Tmolus, and the country watered by the Pactolus. The reſt on the ſea-coaſt was called Lydia. See LYDIA.

MÆONIDÆ, a name given to the Muſes, becauſe Homer, their greateſt and worthieſt favourite, was ſuppoſed to be a native of Mæonia.

MÆONIDES, a ſurname of Homer, becauſe, according to the opinion of ſome writers, he was born in Mæonia, or becauſe his father's name was Mæon.

MÆOTIS PALUS or LACUS, *Mæotica Palus*, or *Mæoticus Lacus* (anc. geog.), a large lake or part of the ſea between Europe and Aſia, at the north of the Euxine, to which it communicates by the Cimmerian Boſphorus. It was worſhipped as a deity by the Maſſagetæ. It extends about 390 miles from ſouth-weſt to north-eaſt, and is about 600 miles in circumference. Still called *Palus Mæotis*, reaching from Crim Tartary to the mouth of the Don.

MÆSTLIN (MICHAEL), in Latin *Mæſtlinus*, a celebrated aſtronomer of Germany, was born in the duchy of Wittemberg; but ſpent his youth in Italy, where he made a ſpeech in favour of Copernicus's ſyſtem, which brought Galileo over from Ariſtotle and Ptolemy, to whom he had been hitherto entirely devoted. He afterwards returned to Germany, and became profeſſor of mathematics at Tubingen; where, among his other ſcholars, he taught the great Kepler, who has praiſed ſeveral of his ingenious inventions, in his *Aſtronomia Optica*. Though Tycho Brahe did not aſſent to Mæſtlin's opinion, yet he allowed him to be an extraordinary perſon, deeply ſkilled in the ſcience of aſtronomy. Mæſtlin publiſhed many mathematical and aſtronomical works, and died in 1590.

MÆSTRICHT, an ancient large and ſtrong town of the Netherlands, ceded to the Dutch by the treaty of Munſter. The town-houſe and the other public buildings are handſome, and the place is about four miles in circumference, and ſtrongly fortified. It is governed jointly by the Dutch and the biſhop of Liege: however, it has a Dutch garriſon. The inhabitants are noted for making excellent fire-arms, and ſome ſay that in the arſenal there are arms ſufficient for a whole army. Both Papiſts and Proteſtants are allowed the free exerciſe of their religion, and the magiſtrates are compoſed of both. It is ſeated on the river Maeſe, which ſeparates it from Wyck, and with which it communicates by a handſome bridge. Mæſtricht revolted from the Spaniards in 1570, but was reduced in 1579. Louis XIV. became maſter of it in 1673; but it was reſtored to the States by the treaty of Nimeguen in 1678. E. lon. 5. 50. N. lat. 51. 5.

MAFFÆUS (VEGIO), a Latin poet, born in Lombardy in 1407, was greatly admired in his time. He wrote epigrams, and a humorous ſupplement to Virgil, which he called *The thirteenth book of the Æneid*: this was as humorouſly tranſlated into Engliſh a few years ſince by Mr. Ellis. Maffæus wrote alſo ſome proſe works. He was chancellor of Rome towards the end of the pontificate of Martin V., and died in 1458.

MAFFEI (SCIPIO), a celebrated Italian poet, born of an illuſtrious and ancient family at Verona, in 1675. After having finiſhed his ſtudies, he took arms, and diſtinguiſhed himſelf by his valour at the battle of Donawert; but he more particularly diſtinguiſhed himſelf by his love of learning, which made him undertake ſeveral voyages into France, England, and Germany. He converſed with the learned in all thoſe countries, and obtained their friendſhip and eſteem. He was a member of the academy of the Arcadia at Rome, an honorary foreign member of that of Inſcriptions at Paris, and died in 1755. He wrote many works in verſe and proſe, which are eſteemed: the moſt known of them are, 1. The tragedy of Merope, of which there are two French tranſlations in proſe. 2. Ceremony, a comedy. 3. A tranſlation, into Italian verſe, of the firſt book of Homer's Iliad. 4. Many other pieces of poetry, in a collection entitled *Rhyme and Proſe*, quarto. His principal works in proſe are, 1. *Verona illuſtrata*. 2. *Iſtoria diplomatica*. 3. *Scienza cavalleresca*; an excellent work, in which he attacks duelling. 4. An edition of *Theatro Italiano*. 5. An edition of Caſſiodorus on the Epiſtles, Acts of the Apoſtles, and Apocalypſe. 6. *Galliæ antiquitates quædam ſelectæ atque in plures epiſtolas diſtributæ*; and ſeveral other works.

MAGADA, in mythology, a title under which Venus was known and worſhipped in Lower Saxony; where this goddeſs had a famous temple, which was treated with reſpect even by the Huns and Vandals when they ravaged the country. It is ſaid to have been deſtroyed by Charlemagne.

MAGADOXO, the capital town of a kingdom of the ſame name, in Africa, and on the coaſt of Ajan. It is ſeated near the mouth of a river of the ſame name, defended by a citadel, and has a good harbour. The inhabitants are Mahometans. E. lon. 45. 15. N. lat. 3. 0.

MAGAS, MAGADIS, (from μαγαδιζειν "to ſing or play in uniſon or octave,") the name of a muſical inſtrument in uſe among the ancients. There were two kinds of *magades*: the one a ſtring inſtrument, formed of 20 chords arranged in pairs, and tuned to uniſon or octave, ſo that they yielded ten ſounds; the invention whereof is aſcribed by ſome to Sappho; by others, to the Lydians; and by ſome, to Timotheus of Miletus. The other was a kind of flute, which at the ſame time yielded very high and very low notes. The former kind was at leaſt much improved by Timotheus of Miletus, who is ſaid to have been impeached of a crime, becauſe by increaſing the number of chords he ſpoiled and diſcredited the ancient muſic.

MAGAZINE, a place in which ſtores are kept, of arms, ammunition, proviſions, &c. Every fortified town ought to be furniſhed with a large magazine, which ſhould contain ſtores of all kinds ſufficient to enable the garriſon and inhabitants to hold out a long ſiege; and in which ſmiths, carpenters, wheelwrights, &c. may be employed in making every thing belonging to the artillery; as carriages, waggons, &c.

Powder MAGAZINE, is that place where the powder is kept in very large quantities. Authors differ greatly both with regard to the ſituation and conſtruction; but all agree, that they ought to be arched and bomb-proof. In fortifications, they are frequently placed in the rampart; but of late they have been built in different parts of the town. The firſt powder-magazines were made with Gothic arches: but M. Vauban finding them too weak, conſtructed them in a ſemicircular form; whoſe dimenſions are 60 feet long within, 25 broad; the foundations are eight or nine feet thick, and eight feet

high from the foundation to the ſpring of the arch: the floor is two feet from the ground, which keeps it from dampneſs.

One of our engineers, of great experience, ſome time ſince had obſerved, that after the centres of ſemicircular arches are ſtruck, they ſettle at the crown and riſe up at the hanches, even with a ſtraight horizontal extrados, and ſtill much more ſo in powder-magazines, whoſe outſide at top is formed like the roof of a houſe, by two inclined planes joining in an angle over the top of the arch, to give a proper deſcent to the rain; which effects are exactly what might be expected agreeable to the true theory of arches. Now, as this ſhrinking of the arches muſt be attended with very ill conſequences, by breaking the texture of the cement after it has been in ſome degree dried, and alſo by opening the joints of the vouſſoirs at one end, ſo a remedy is provided for this inconvenience with regard to bridges, by the *arch of equilibration* in Mr. Hutton's book on bridges; but as the ill effect is much greater in powder-magazines, the ſame ingenious gentleman propoſed to find an arch of equilibration for them alſo, and to conſtruct it when the ſpan is 20 feet, the pitch or height 10 (which are the ſame dimenſions as the ſemicircle), the inclined exterior walls at top forming an angle of 113 degrees, and the height of their angular point above the top of the arch equal to ſeven feet. This very curious queſtion was anſwered in 1775 by the reverend Mr. Wildbore, to be found in Mr. Hutton's *Miſcellanea Mathematica*.

Artillery MAGAZINE. In a ſiege, the magazine is made about 25 or 30 yards behind the battery, towards the parallels, and at leaſt three feet under ground, to hold the powder, loaded ſhells, port-fires, &c. Its ſides and roof muſt be well ſecured with boards to prevent the earth from falling in: a door is made to it, and a double trench or paſſage is ſunk from the magazine to the battery, one to go in and the other to come out at, to prevent confuſion. Sometimes traverſes are made in the paſſages to prevent ricochet ſhot from plunging into them.

MAGAZINE, on ſhip-board, a cloſe room or ſtore-houſe, built in the fore or after part of the hold, to contain the gunpowder uſed in battle. This apartment is ſtrongly ſecured againſt fire, and no perſon is allowed to enter it with a lamp or candle; it is therefore lighted, as occaſion requires, by means of the candles or lamps in the *light-room* contiguous to it.

MAGAZINE *Air-Gun*. See AIR-*Gun*.

MAGAZINES *(Literary)*; a well known ſpecies of periodical publications, of which the firſt that appeared was *The Gentleman's*, ſet on foot by the inventor Mr. Edward Cave, in the year 1731: (ſee the article CAVE). This, as Dr. Kippis obſerves, (Biog. Brit. vol. iii. art. CAVE), "may be conſidered as ſomething of an epocha in the literary hiſtory of this country. The periodical performances before that time were almoſt wholly confined to political tranſactions, and to foreign and domeſtic occurrences; but the monthly magazines have opened a way for every kind of inquiry and information. The intelligence and diſcuſſion contained in them are very extenſive and various; and they have been the means of diffuſing a general habit of reading through the nation, which in a certain degree hath enlarged the public underſtanding. Many young authors, who have afterwards riſen to conſiderable eminence in the literary world, have here made their firſt attempts in compoſition. Here too are preſerved a multitude of curious and uſeful hints, obſervations, and facts, which otherwiſe might have never appeared; or, if they had appeared in a more evaneſcent form, would have incurred the danger of being loſt. If it were not an invidious taſk, the hiſtory of them would be no incurious or unentertaining ſubject. The magazines that unite utility with entertainment are undoubtedly preferable to thoſe *(if there have been any ſuch)* which have only a view to idle and frivolous amuſement. It may be obſerved, that two of them, *The Gentleman's* and *The London*, which laſt was begun the year after the former, have amidſt their numerous rivals preſerved their reputation to the preſent day. They have both of them, in general, joined inſtruction with pleaſure; and this likewiſe hath been the caſe with ſome others of a later origin." The original London Magazine, it is believed, has been diſcontinued for ſome years paſt.—The next oldeſt publication of this kind is that entitled *The Scots Magazine*; which was commenced at Edinburgh a few years poſterior to the appearance of the *Gentleman's* at London; which, like it, has ſurvived many rivals; and which ſtill ſubſiſts, deſervedly eſteemed for the chaſteneſs of its plan, and the accuracy of its information.

MAGDALEN (MARY). See MARY.

Religious of St. MAGDALEN, a denomination given to divers communities of nuns, conſiſting generally of penitent courtezans; ſometimes alſo called *Magdalanettes*. Such are thoſe at Metz, eſtabliſhed in 1452; thoſe at Paris, in 1492; thoſe at Naples, firſt eſtabliſhed in 1324, and endowed by queen Sancha, to ſerve as a retreat for public courtezans who ſhould betake themſelves to repentance; and thoſe of Rouen and Bourdeaux, which had their original among thoſe of Paris in 1618. In each of theſe monaſteries there are three kinds of perſons and congregations: the firſt conſiſt of thoſe who are admitted to make vows, and theſe bear the name of *St. Magdalen*; the congregation of St. Martha is the ſecond, and is compoſed of thoſe whom it is not judged proper to admit to vows; finally, the congregation of St. Lazarus is compoſed of ſuch as are detained there by force. The religious of St. Magdalen at Rome were eſtabliſhed by pope Leo X. Clement VIII. ſettled a revenue on them; and farther appointed, that the effects of all public proſtitutes, dying inteſtate, ſhould fall to them; and that the teſtaments of the reſt ſhould be invalid unleſs they bequeathed a portion of their effects, which was to be at leaſt a fifth part, to them.

MAGDALENA, one of the Marqueſas iſlands, about five leagues in circuit, and ſuppoſed to be in S. lat. 10. 25. W. lon. 138. 50. It was only ſeen at nine leagues diſtance by thoſe who diſcovered it.

MAGDALENE's CAVE, a cave of Germany, and in Carinthia, 10 miles eaſt of Gortz. It appears like a chaſm in a rock, and at the entrance torches are lighted to conduct travellers. It is divided into ſeveral apartments or halls, with a vaſt number of pillars formed by nature, which give it a beautiful appearance; they being as white as ſnow, and almoſt tranſparent. The bottom is of the ſame ſubſtance, inſomuch that a perſon may fancy himſelf to be walking among the ruins of an enchanted caſtle, ſurrounded with magnificent pillars, ſome entire and others broken.

MAGDEBURG, a duchy of Germany, in the circle of Lower Saxony; bounded on the north by the duchy of Mecklenburgh, on the ſouth and ſouth-weſt by the principality of Anhalt and Halberſtadt, on the eaſt by Upper Saxony with part of Brandenburg, and on the weſt by the duchy of Wolfenbuttle. The Saale circle, and that of Luxkenwalde, are ſeparated from the reſt, and ſurrounded on all ſides by a part of Upper Saxony. This country is, for the moſt part, level; but ſandy, marſhy, or overgrown with woods. There are ſalt ſprings in it ſo rich, that they are ſufficient to ſupply all Germany with that commodity. The Holz circle is the moſt fruitful part of it. In the Saale circle, where wood is ſcarce, there is pit-coal; and at Rothenburg is a copper-mine worked. The duchy is well watered, for the Elbe paſſes through it; and the Saale, Havel, Aller, Ohre, and Elſter, either riſe in or waſh ſome part of it in their courſe. The whole duchy,

exclusive of that part of the county of Mansfeldt which is connected with it, is said to contain 29 cities, six towns, about 420 villages, and 330,000 inhabitants. The states of the country consist of the clergy, the nobility, and deputies of the cities. Before it became subject to the electoral house of Brandenburg, frequent diets were held in it: but at present no diets are held, nor have the states the direction of the finances as formerly. Before the reformation, it was an archbishopric, subject in spirituals to the pope alone, and its prelate was primate of all Germany; but, embracing the reformation, it chose itself administrators, till the treaty of Munster in 1648, when it was given, together with the bishopric of Halberstadt, to the elector of Brandenburg, as an equivalent for the Hither Pomerania, granted by that treaty to the king of Sweden. Lutheranism is the predominant religion here; but Calvinists, Jews, and Roman Catholics are tolerated. Of the last there are five convents, who never embraced the reformation. All the Lutheran parishes, amounting to 314, are subject to 16 inspectors, under one general superintendant; only the clergy of the old town of Magdeburg are under the direction of their senior. The Jews have a synagogue at Halle. The manufactures of the duchy are cloth, stuffs, stockings, linen, oil-skins, leather, and parchment; of which, and grain of all sorts, large quantities are exported. The arms of it are, Party per pale, ruby, and pearl. The king of Prussia, as duke of Magdeburg, sits and votes between the elector of Bavaria, as duke of Bavaria, and the elector Palatine, as palsgrave of Lautern. Of the states of the circle of Lower Saxony he is the first. His matricular assessment for the duchy is 43 horse and 196 foot, or 1300 florins monthly; and to the chamber of Witzlar 343 florins and 40 kruitzers. For the civil government of the duchy there is a council of regency, with a war and demesne chamber; and for the ecclesiastical, a consistory, and general superintendant. The revenues of the duchy, arising from the salt-works, demesnes, and taxes, some of which are very heavy and oppressive, are said to amount to 800,000 rixdollars annually. With respect to salt, every housekeeper in the Prussian dominions is obliged to buy a certain quantity for himself and wife; and also for every child and servant, horse, cow, calf, and sheep, that he possesses. The principal places are Magdeburg, Halle, and Glauche.

MAGDEBURG, a city of Germany, in a duchy of the same name, of which it is not only the capital, but that of all Lower Saxony, and formerly even of all Germany. It stands on the Elbe, in E. lon. 12. 9. N. lat. 52. 16. It is a city of great trade, strongly fortified, and very ancient. Its name signifies the *maiden city*; which, some imagine, took its rise from the temple of Venus, which is said to have stood here anciently, and to have been destroyed by Charlemagne. The founder of the city is supposed to have been Otho I. or his empress Editha, daughter to Edmund the Saxon king of England. The same emperor founded a Benedictine convent here, which he afterwards converted into an archbishopric, of which the archbishop was a count-palatine, and had very great privileges, particularly that of wearing the archiepiscopal pallium, and having the cross borne before him, besides many others. The first tournament in Germany is said to have been appointed near this city by the emperor Henry the Fowler: but these pastimes were afterwards abolished, because they occasioned such envy and animosity among the nobility, that several of them killed one another upon the spot. The situation of the city is very convenient and pleasant, upon the banks of the Elbe, amidst spacious fruitful plains, and on the road betwixt High and Low Germany. It has been a great sufferer by fires and sieges; but by none so much as that in 1631, when the emperor's general, count Tilly, took it by storm, plundered and set it on fire, by which it was entirely reduced to ashes, except the cathedral, the convent of Our Lady, and a few cottages belonging to fishermen: of 40,000 burghers, not above 400 escaping. The soldiers spared neither age nor sex; but ripped up women with child, murdered sucking infants in sight of their parents, and ravished young women in the streets; to prevent which violation, many of them flung themselves into the Elbe, and others into the fire. The city is now populous, large, and well built, particularly the broad street and cathedral square. The principal buildings are, the king's palace, the governor's house, the armoury, guild-hall, and cathedral. The last is a superb structure in the antique taste, dedicated to St. Maurice, which has a fine organ, the master-pipe of which is so big, that a man can scarce clasp it with both arms; it also contains the tombs of the emperor Otho and the empress Editha; a fine marble statue of St. Maurice, a porphyry font, an altar in the choir of one stone of divers colours, curiously wrought, and many other curiosities. They show here a bedstead and table which belonged to Martin Luther when he was an Augustine friar in a cloister of this city before the reformation. Among the relics, they pretend to have the bason in which Pilate washed his hands after his condemnation of our Saviour; the lantern which Judas made use of when he apprehended him; and the ladder on which the cock crowed after St. Peter denied him. The chapter consists of a provost, 16 major and seven minor canons; besides which there are four other Lutheran collegiate foundations, and a Lutheran convent dedicated to our Lady, in which is a school or seminary. Here is also a gymnasium, with an academy, in which young gentlemen are instructed in the art of war. The canons of the chapter, which, except the change of religion, is upon the same footing as before the reformation, must make proof of their nobility. The prebends and dignities are all in the gift of the elector; and the revenue of the provost is computed at 12,000 crowns a year. Here is a great trade and a variety of manufactures. The chief are those of woollen cloths and stuffs, silks, cottons, linen, stockings, hats, gloves, tobacco, and snuff. The city was formerly one of the Hanse and Imperial towns. Editha, consort to Otho I. on whom it was conferred as a dowry, among many other privileges and advantages procured it the grant of a yearly fair. The bargravate of this city was anciently an office of great power, having the civil and criminal jurisdiction; the office of hereditary cup-bearer being annexed to it; and was long held as a fief of the archbishopric, but afterwards became an imperial fief, which was again conferred on the archbishopric by the elector of Saxony, upon certain conditions.

MAGDOLUM, or MAGDALUM, (anc. geog.), a town of the Lower Egypt, 12 miles to the south of Pelusium (Herodotus, Antonine), which doubtless is the Migdol or Magdol of Jeremiah.—Another MAGDALUM, or MIGDOL, denoting literally "a tower or place of strength," near the Red Sea, (Moses); far to the south of the former.

MAGELLAN (FERDINAND), a celebrated Portuguese mariner in the 16th century. Being dissatisfied with the king of Portugal, he went into the service of the emperor Charles V. and sailed from Seville with five vessels in 1519, when he discovered and passed the strait to which he gave his own name, and sailed through the South Sea to the Ladrone islands, when, according to some authors, he was poisoned in 1520; though others say that he was killed in a mutiny of his people in the island of Mutan, on account of his severity. His voyage round the world was written by one on board, and has been frequently printed in English. His suddenly converting to the Christian religion people whose language was unknown to him, as his was to them, is an absurdity that discredits this work.

Straits of MAGELLAN, a narrow passage between the island of Terra del Fuego and the southern extremity of the continent

of America. This paſſage was firſt diſcovered by Ferdinand Magellan, who ſailed through it into the South Sea, and from thence to the Eaſt Indies. Other navigators have paſſed the ſame way: but as theſe ſtraits are exceedingly difficult, and ſubject to ſtorms, it has been common to ſail by Cape Horn, rather than through the Straits of Magellan. See *Straits Le* MAIRE, and TERRA *del Fuego*.

MAGELLANIC-CLOUDS, whitiſh appearances like clouds, ſeen in the heavens towards the ſouth pole, and having the ſame apparent motion as the ſtars. They are three in number, two of them near each other. The largeſt lies far from the ſouth pole; but the other two are not many degrees more remote from it than the neareſt conſpicuous ſtar, that is, about 11 degrees. Mr. Boyle conjectures, that if theſe clouds were ſeen through a good teleſcope, they would appear to be multitudes of ſmall ſtars, like the milky way.

MAGGI (JEROME), in Latin *Magius*, one of the moſt learned men of the 16th century, was born at Anghiari in Tuſcany. He applied himſelf to all the ſciences, and even to the art of war; and diſtinguiſhed himſelf ſo much in this laſt ſtudy, that the Venetians ſent him into the iſland of Cyprus in quality of judge of the admiralty. When the Turks beſieged Famaguſta, he performed all the ſervices that could be expected from the moſt excellent engineer: he invented mines and machines for throwing fire, by means of which he deſtroyed all the works of the beſiegers, and in an inſtant overthrew what had coſt the Turks infinite labour. But they had their revenge; for, taking the city in 1571, they plundered his library, carried him loaded with chains to Conſtantinople, and treated him in the moſt inhuman and barbarous manner. He nevertheleſs comforted himſelf from the example of Æſop, Menippus, Epictetus, and other learned men; and, after paſſing the whole day in the meaneſt drudgery, he ſpent the night in writing. He compoſed, by the help of his memory alone, treatiſes filled with quotations, which he dedicated to the Imperial and French ambaſſadors. Theſe miniſters, moved by compaſſion for this learned man, reſolved to purchaſe him: but while they were treating for his ranſom, Maggi found means to make his eſcape, and to get to the Imperial ambaſſador's houſe; when the grand vizir being enraged at his flight, and remembering the great miſchief he had done the Turks during the ſiege of Famaguſta, ſent to have him ſeized, and cauſed him to be ſtrangled in priſon in 1572. His principal works are, 1. A treatiſe on the bells of the ancients. 2. On the deſtruction of the world by fire. 3. Commentaries on Æmilius Probus's lives of illuſtrious men. 4. Commentaries on the Inſtitutes. Theſe works are written in elegant Latin. He alſo wrote a treatiſe on fortification in Italian, and a book on the ſituation of ancient Tuſcany. He ought not to be confounded with his brother *Bartholomew Maggi*, a phyſician at Bologna, who wrote a treatiſe of gun-ſhot wounds; nor with *Vincent Maggi*, a native of Breſſe, and a celebrated profeſſor of humanity at Ferrare in Padua, who was the author of ſeveral works.

MAGGOT, the common name of the fly-worm bred in fleſh, from the egg of the great blue fleſh-fly. Notwithſtanding the diſtaſte for this animal, its figure and ſtructure of parts are greatly worth attending to, and may ſerve as a general hiſtory of the claſs of worms produced from the eggs of flies. This animal is white and fleſhy: its body is compoſed of a number of rings, like the bodies of caterpillars and other ſimilar inſects; and is capable, at the pleaſure of the animal, of aſſuming different figures; being at times more or leſs extended in length, and conſequently more or leſs thick.

Notwithſtanding that this animal has no legs, it is able to move itſelf very ſwiftly; and in its firſt attempt to move its body, is extended to its greateſt length, and aſſumes ſomething of the figure of a pointed cone. The pointed part of the cone is the head of the animal, and is not ſeparated from the next ring by any deeper furrow than the reſt of the rings are from one another. In ſome ſtates of the animal one may ſee two ſhort horns thruſt out from the head; but more generally two ſcaly hooks are obſervable: theſe are, however, ſometimes hid, and have each of them a caſe or ſheath, into which the animal can retract them at pleaſure. Theſe hooks are bent into an arch, the concavity of which is towards the plane on which the creature is placed; and they are thickeſt at their inſertion in the head, and thence diminiſh gradually till they terminate in a fine ſharp point.

Theſe two hooks are placed in a parallel direction, and can never come together, and therefore cannot ſerve in the place of teeth for grinding the food; but merely to pull and ſever it in pieces, that it may be of a proper ſize for the mouth of the creature. Beſides theſe hooks the maggot has a kind of dart, which is about a third part of their length, and is placed at an equal diſtance between them. This alſo is brown and ſcaly like them; it is quite ſtraight, and terminates in a fine point. The hooks have as it were two ſcaly thorns at their points; and this dart ſeems intended, by reiterated ſtrokes, to divide and break the pieces of fleſh theſe have ſeparated from the reſt into ſmaller parts. Immediately below the apertures for the egreſs of the hooks, is placed the mouth of the animal; the creature does not ſhow this little opening unleſs preſſed: but if the preſſure is properly managed, it will ſufficiently open it, and there may be diſcovered within it a ſmall protuberance, which may very naturally be ſuppoſed either the tongue or the ſucker of the animal. The hooks in theſe creatures not only ſupply the place of teeth, but alſo of legs: ſince it is by faſtening theſe hooks into the ſubſtance it is placed on, and then drawing up its body to it, that it pulls itſelf along

The back of this creature lowers itſelf by degrees as it approaches the extremity of the belly; and near the place where the back begins to lower itſelf, are placed the creature's two principal organs of reſpiration. One may perceive there two ſmall roundiſh brown ſpots: they are very eaſily diſtinguiſhable by the naked eye, becauſe the reſt of the body of the creature is white; but if we take in the aſſiſtance of glaſſes, each of theſe ſpots appears to be a brown circular eminence raiſed a little above the reſt of the body. On each of theſe ſpots one may alſo diſcover three oblong oval cavities, ſomething of the ſhape of button-holes; theſe are ſituated in a parallel direction to one another, and their length nearly in a perpendicular direction to that of the body of the animal. Theſe apertures are ſo many ſtigmata or air-holes; openings deſtined to admit the air neceſſary to the life of the animal. It has ſix of theſe ſtigmata, three in each ſide of its body.

The great tranſparency of the body of this animal gives us an opportunity alſo to diſtinguiſh that it has on each ſide a large white veſſel running the whole length of the body. It is eaſy to follow the courſe of theſe veſſels through their whole length, but they are moſt diſtinct of all towards its hinder part; and they are always ſeen to terminate each in the brown ſpot above mentioned: this leaves us no room to doubt that they are the two principal tracheæ.

The ramifications of the two great tracheæ are very beautifully ſeen in this creature, eſpecially on its belly: and it is remarkable, that no veſſel analogous to the great artery in the caterpillar claſs can be diſcovered in theſe; though, if there were any ſuch, their great tranſparence muſt needs make them very eaſily diſtinguiſhable; nor could its dilatations and contractions, if ſo conſiderable as in that claſs of animals, be leſs ſo. See ERUCA.

Malpighi imagined, that this artery in the caterpillar claſs was a ſeries of hearts; in its place, however, there may be

ſeen in theſe animals a true heart. It is eaſy to obſerve in theſe creatures, about the fourth ring of their body, a ſmall fleſhy part, which has alternate contractions and dilatations; and is not only diſcoverable in the body by means of its tranſparence, but, on making a proper ſection of them in the ſecond, third, and fourth, will be thrown out of the body of the creature, and continue its beats for ſome time afterwards.

MAGI, or MAGIANS, an ancient religious ſect in Perſia, and other eaſtern countries, who maintained that there were two principles, one the cauſe of all good, the other the cauſe of all evil: and, abominating the adoration of images, they worſhipped God only by fire; which they looked upon as the brighteſt and moſt glorious ſymbol of Oroſmades, or the good God; as darkneſs is the trueſt ſymbol of Arimanius, or the evil god. This religion was reformed by Zoroaſter, who maintained that there was one ſupreme independent being; and under him two principles or angels, one the angel of goodneſs and light, and the other of evil and darkneſs: that there is a perpetual ſtruggle between them, which ſhall laſt to the end of the world; that then the angel of darkneſs and his diſciples ſhall go into a world of their own, where they ſhall be puniſhed in everlaſting darkneſs; and the angel of light and his diſciples ſhall alſo go into a world of their own, where they ſhall be rewarded in everlaſting light. The prieſts of the magi were the moſt ſkilful mathematicians and philoſophers of the ages in which they lived, inſomuch that a learned man and a magian became equivalent terms. The vulgar looked on their knowledge as ſupernatural; and hence thoſe who practiſed wicked and miſchievous arts, taking upon themſelves the name of *magians*, drew on it that ill ſignification which the word magician now bears among us. This ſect ſtill ſubſiſts in Perſia under the denomination of *gaurs*, where they watch the ſacred fire with the greateſt care, and never ſuffer it to be extinguiſhed.

MAGIC, MAGIA, Μαγεια, in its ancient ſenſe, the ſcience or diſcipline and doctrine of the magi, or wiſe men of Perſia. See MAGI. The origin of magic and the magi is aſcribed to Zoroaſter. Salmaſius derives the very name from Zoroaſter, who, he ſays, was ſurnamed *Mog*, whence Magus. Others, inſtead of making him the author of the Perſian philoſophy, make him only the reſtorer and improver thereof; alleging, that many of the Perſian rites in uſe among the magi were borrowed from the Zabii among the Chaldeans, who agreed in many things with the magi of the Perſians; whence ſome make the name *magus* common both to the Chaldeans and Perſians. Thus Plutarch mentions, that Zoroaſter inſtituted magi among the Chaldeans, in imitation whereof the Perſians had theirs too.

MAGIC, in a more modern ſenſe, is a ſcience which teaches to perform wonderful and ſurpriſing effects. The word *magic* originally carried with it a very innocent, nay, laudable meaning; being uſed purely to ſignify the ſtudy of wiſdom, and the more ſublime parts of knowledge; but in regard the ancient magi engaged themſelves in aſtrology, divination, ſorcery, &c. the term *magic* in time became odious, and was only uſed to ſignify an unlawful and diabolical kind of ſcience, depending on the aſſiſtance of the devil and departed ſouls.

If any wonder how ſo vain and deceitful a ſcience ſhould gain ſo much credit and authority over men's minds, Pliny gives the reaſon of it. It is, ſays he, becauſe it has poſſeſſed itſelf of three ſciences of the moſt eſteem among men; taking from each all that is great and marvellous in it. Nobody doubts but it had its firſt origin in medicine; and that it inſinuated itſelf into the minds of the people, under pretence of affording extraordinary remedies. To theſe fine promiſes it added every thing in religion that is pompous and ſplendid, and that appears calculated to blind and captivate mankind. Laſtly, it mingled judicial aſtrology with the reſt; perſuading people, curious of futurity, that it ſaw every thing to come in the heavens. Agrippa divides magic into three kinds; natural, celeſtial, and ceremonial or ſuperſtitious.

Natural MAGIC is no more than the application of natural active cauſes to paſſive ſubjects; by means whereof many ſurpriſing, but yet natural, effects are produced. In this way many of our experiments in natural philoſophy, eſpecially thoſe of electricity, optics, and magnetiſm, have a kind of magical appearance, and among the ignorant and credulous might eaſily paſs for miracles. Such, without doubt, have been ſome of thoſe miracles wrought by ancient magicians, whoſe knowledge of the various powers of nature, there is reaſon to believe, was much greater than modern vanity will ſometimes allow. Baptiſta Porta has a treatiſe of natural magic, or of ſecrets for performing very extraordinary things by natural cauſes. The natural magic of the Chaldeans was nothing but the knowledge of the powers of ſimples and minerals. The magic which they called *theurgia* conſiſted wholly in the knowledge of the ceremonies to be obſerved in the worſhip of the gods, in order to be acceptable. By virtue of theſe ceremonies they believed they could converſe with ſpiritual beings, and cure diſeaſes.

Celeſtial MAGIC, borders nearly on judiciary aſtrology: it attributes to ſpirits a kind of rule or dominion over the planets, and to planets a dominion over men; and on thoſe principles builds a ridiculous kind of ſyſtem. See ASTROLOGY.

Superſtitious or *Goetic* MAGIC, conſiſts in the invocation of devils. This ſpecies of magic, there is every reaſon to believe, had its origin in Egypt, the native country of paganiſm. The firſt magicians mentioned in hiſtory were Egyptians; and that people ſo famed for early wiſdom believed not only in the exiſtence of dæmons, the great agents in magic (ſee DÆMON), but alſo that different orders of thoſe ſpirits preſided over the elements of earth, air, fire, and water, as well as over the perſons and affairs of men. Hence they aſcribed every diſeaſe with which they were afflicted to the immediate agency of ſome evil dæmon. When any perſon was ſeized with a fever, for inſtance, they did not think it neceſſary to ſearch for any natural cauſe of the diſeaſe; it was immediately attributed to ſome dæmon which had taken poſſeſſion of the body of the patient, and which could not be ejected but by charms and incantations.

Theſe ſuperſtitious notions, which had ſpread from Egypt over all the Eaſt, the Jews imbibed during their captivity in Babylon. Hence we find them in the writings of the New Teſtament attributing almoſt every diſeaſe to which they were incident to the immediate agency of devils (ſee POSSESSION). Many of the ſame impious ſuperſtitions were brought from Egypt and Chaldea by Pythagoras, and tranſmitted by him and his followers to the Platoniſts in Greece. This is apparent from the writers of the life of Pythagoras. Jamblichus, ſpeaking of the followers of that philoſopher, ſays expreſsly, that they cured certain diſeaſes by incantations; and Porphyry adds, that they cured diſeaſes both of the mind and of the body by ſongs and incantations. This was exactly the practice of the Egyptian prieſts, who were all ſuppoſed to keep up a conſtant intercourſe with dæmons, and to have the power of controuling them by magical charms and ſacred ſongs. Agreeably to this practice of his maſters, we are told that Pythagoras directed certain diſeaſes of the mind, doubtleſs thoſe which he attributed to the agency of dæmons, to be cured partly by *incantations*, partly by *magical hymns*, and partly by *muſic*—και τας ψυχας δε νοσουντας παρεμυθειτο τους μεν επωδαις και μαγειαις τους δε μουσικη.

The revival of learning, and the ſucceſs with which the laws of nature have been inveſtigated, have long ago baniſhed this

ſpecies of magic from all the enlightened nations of Europe. Among ourſelves, none but perſons groſsly illiterate pay the leaſt regard to magical charms; nor are they any where abroad more prevalent than among the inhabitants of Lapland and Iceland. Theſe people, indeed, place an abſolute confidence in the effects of certain idle words and actions; and ignorant ſailors from other parts of the world are deceived by their aſſertions and their ceremonies. The famous *magical drum* of the Laplanders is ſtill in conſtant uſe in that nation; and Scheffer, in his Hiſtory of Lapland, has given an account of its ſtructure.

This inſtrument is made of beech, pine, or fir, ſplit in the middle, and hollowed on the flat ſide where the drum is to be made. The hollow is of an oval figure; and is covered with a ſkin clean dreſſed, and painted with figures of various kinds, ſuch as ſtars, ſuns and moons, animals and plants, even countries, lakes and rivers; and of later days, ſince the preaching of Chriſtianity among them, the acts and ſufferings of our Saviour and his apoſtles are often added among the reſt. All theſe figures are ſeparated by lines into three regions or cluters.

There is, beſides theſe parts of the drum, an index and a hammer. The index is a bundle of braſs or iron rings, the biggeſt of which has a hole in its middle, and the ſmaller ones are hung to it. The hammer or drumſtick is made of the horn of a rein-deer; and with this they beat the drum ſo as to make theſe rings move, they being laid on the top for that purpoſe. In the motion of theſe rings about the pictures figured on the drum, they fancy to themſelves ſome prediction in regard to the things they inquire about.

What they principally inquire into by this inſtrument, are three things. 1. What ſacrifices will prove moſt acceptable to their gods. 2. What ſucceſs they ſhall have in their ſeveral occupations, as hunting, fiſhing, curing of diſeaſes, and the like; and, 3. What is doing in places remote from them. On theſe ſeveral occaſions they uſe ſeveral peculiar ceremonies, and place themſelves in various odd poſtures as they beat the drum; which influences the rings to the one or the other ſide, and to come nearer to the one or the other ſet of figures. And when they have done this, they have a method of calculating a diſcovery, which they keep as a great ſecret, but which ſeems merely the buſineſs of the imagination in the diviner or magician.

MAGIC *Square*, a ſquare figure, formed of a ſeries of numbers in mathematical proportion; ſo diſpoſed in parallel and equal ranks, as that the ſums of each row, taken either perpendicularly, horizontally, or diagonally, are equal.

Let the ſeveral numbers which compoſe any ſquare number (for inſtance, 1, 2, 3, 4, 5, &c. to 25 incluſive, the ſquare number) be diſpoſed, in their natural order, after each other in a ſquare figure of 25 cells, each in its cell; if now you change the order of theſe numbers, and diſpoſe them in the cells in ſuch manner as that the five numbers which fill an horizontal rank of cells, being added together, ſhall make the ſame ſum with the five numbers in any other rank of cells, whether horizontal or vertical, and even the ſame number with the five in each of the two diagonal ranks; this diſpoſition of numbers is called a *magic ſquare*, in oppoſition to the former diſpoſition, which is called a *natural ſquare*. See the figures following:

Natural ſquare.

1	2	3	4	5
6	7	8	9	10
11	12	13	14	15
16	17	18	19	20
21	22	23	24	25

Magic ſquare.

16	14	8	2	25
3	22	20	11	9
15	6	4	23	17
24	18	12	10	1
7	5	21	19	13

One would imagine that theſe magic ſquares had that name given them in regard this property of all their ranks, which, taken any way, make always the ſame ſum, appeared extremely ſurpriſing, eſpecially in certain ignorant ages, when mathematics paſſed for magic; but there is a great deal of reaſon to ſuſpect, that theſe ſquares merited their name ſtill farther by the ſuperſtitious operations they were employed in, as the conſtruction of taliſmans, &c. for, according to the childiſh philoſophy of thoſe days, which attributed virtues to numbers, what virtues might not be expected from numbers ſo wonderful?

However, what was at firſt the vain practice of makers of taliſmans and conjurers, has ſince become the ſubject of a ſerious reſearch among mathematicians; not that they imagine it will lead them to any thing of ſolid uſe or advantage. Magic ſquares ſavour too much of their original to be of much uſe, but only as it is a kind of play, where the difficulty makes the merit, and it may chance to produce ſome new views of numbers, which mathematicians will not loſe the occaſion of.

Eman Moſchopulus, a Greek author of no great antiquity, is the firſt that appears to have ſpoken of magic ſquares: and by the age wherein he lived, there is reaſon to imagine he did not look on them merely as a mathematician. However, he has left us ſome rules for their conſtruction. In the treatiſe of Cor. Agrippa, ſo much accuſed of magic, we find the ſquares of ſeven numbers, *viz.* from three to nine incluſive, diſpoſed magically; and it muſt not be ſuppoſed that thoſe ſeven numbers were preferred to all the other without ſome very good reaſon: in effect, it is becauſe their ſquares, according to the ſyſtem of Agrippa and his followers, are planetary. The ſquare of 3, for inſtance, belongs to Saturn; that of 4 to Jupiter; that of 5 to Mars; that of 6 to the Sun; that of 7 to Venus; that of 8 to Mercury; that of 9 to the Moon. M. Bachet applied himſelf to the ſtudy of magic ſquares, on the hint he had taken from the planetary ſquares of Agrippa, as being unacquainted with the work of Moſchopulus, which is only in manuſcript in the French king's library; and, without the aſſiſtance of any author, he found out a new method for thoſe ſquares whoſe root is uneven, for inſtance 25, 49, &c. but he could not make any thing of thoſe whoſe root is even.

After him came M. Frenicle, who took the ſame ſubject in hand. A certain great Algebraiſt was of opinion, that whereas the 16 numbers which compoſe the ſquare might be diſpoſed 20922789888000 different ways in a natural ſquare (as from the rules of combination it is certain they may), they could not be diſpoſed in a magic ſquare above 16 different ways; but M. Frenicle ſhowed, that they might be thus diſpoſed 878 different ways: whence it appears how much his method exceeds the former, which only yielded the 55th part of magic ſquares of that of M. Frenicle.

To this inquiry he thought fit to add a difficulty that had not yet been conſidered: the magic ſquare of 7, for inſtance, being conſtructed, and its 49 cells filled, if the two horizontal ranks of cells, and, at the ſame time, the two vertical ones, the moſt remote from the middle, be retrenched; that is, if the whole border or circumference of the ſquare be taken away, there will remain a ſquare whoſe root will be 5, and which will only conſiſt of 25 cells. Now it is not at all ſurpriſing that the ſquare ſhould be no longer magical, becauſe the ranks of the large ones were not intended to make the ſame ſum, excepting when taken entire with all the ſeven numbers that fill their ſeven cells; ſo that being mutilated each of two cells, and having loſt two of their numbers, it may be well expected that their remainders will not any longer make the ſame ſum. But M. Frenicle would not be ſatisfied, unleſs when the cir-

cumference or border of the magic ſquare was taken away, and even any circumference at pleaſure, or, in fine, ſeveral circumferences at once, the remaining ſquare was ſtill magical: which laſt condition, no doubt, made theſe ſquares vaſtly more magical than ever.

Again, he inverted that condition, and required that any circumference taken at pleaſure, or even ſeveral circumferences, ſhould be inſeparable from the ſquare; that is, that it ſhould ceaſe to be magical when they were removed, and yet continue magical after the removal of any of the reſt. M. Frenicle, however, gives no general demonſtration of his methods, and frequently ſeems to have no other guide but chance. It is true his book was not publiſhed by himſelf, nor did it appear till after his death, *viz.* in 1693.

In 1703, M. Poignard, canon of Bruſſels, publiſhed a treatiſe of ſublime magic ſquares. Before him there had been no magic ſquares made but for ſerieſes of natural numbers that formed a ſquare; but M. Poignard made two very conſiderable improvements. 1. Inſtead of taking all the numbers that fill a ſquare, for inſtance the 36 ſucceſſive numbers, which would fill all the cells of a natural ſquare, whoſe ſide is 6, he only takes as many ſucceſſive numbers as there are units in the ſide of the ſquare, which, in this caſe, are ſix; and theſe ſix numbers alone he diſpoſes in ſuch manner in the 36 cells that none of them are repeated twice in the ſame rank, whether it be horizontal, vertical, or diagonal; whence it follows, that all the ranks, taken all the ways poſſible, muſt always make the ſame ſum, which M. Poignard calls repeated progreſſion. 2. Inſtead of being confined to take theſe numbers according to the ſeries and ſucceſſion of the natural numbers, that is, in an arithmetical progreſſion, he takes them likewiſe in a geometrical progreſſion, and even in an harmonical progreſſion. But with theſe two laſt progreſſions the magic muſt neceſſarily be different to what it was: in the ſquares filled with numbers in geometrical progreſſion, it conſiſts in this, that the products of all the ranks are equal; and in the harmonical progreſſion, the numbers of all the ranks continually follow that progreſſion: he makes ſquares of each of theſe three progreſſions repeated.

This book of M. Poignard gave occaſion to M. de la Hire to turn his thoughts the ſame way, which he did with ſuch ſucceſs, that he ſeems to have well nigh completed the theory of magic ſquares. He firſt conſiders uneven ſquares: all his predeceſſors on the ſubject having found the conſtruction of even ones by much the moſt difficult; for which reaſon M. de la Hire reſerves thoſe for the laſt. This exceſs of difficulty may ariſe partly from hence, that the numbers are taken in arithmetical progreſſion. Now in that progreſſion, if the number of terms be uneven, that in the middle has ſome properties which may be of ſervice; for inſtance, being multiplied by the number of terms in the progreſſion, the product is equal to the ſum of all the terms.

M. de la Hire propoſes a general method for uneven ſquares, which has ſome ſimilitude with the theory of compound motions, ſo uſeful and fertile in mechanics. As that conſiſts in decompounding motions, and reſolving them into others more ſimple; ſo does M. de la Hire's method conſiſt in reſolving the ſquare that is to be conſtructed into two ſimple and primitive ſquares. It muſt be owned, however, it is not quite ſo eaſy to conceive thoſe two ſimple and primitive ſquares in the compound or perfect ſquare, as in an oblique motion to imagine a parallel and perpendicular one.

Suppoſe a ſquare of cells, whoſe root is uneven, for inſtance 7; and that its 49 cells are to be filled magically with numbers, for inſtance the firſt 7. M. de la Hire, on the one ſide, takes the firſt 7 numbers, beginning with unity, and ending with the root 7; and on the other 7, and all its multiples to 49, excluſively; and as theſe only make ſix numbers, he adds 0, which makes this an arithmetical progreſſion of 7 terms as well as the other; 0. 7. 14. 21. 28. 35. 42. This done, with the firſt progreſſion repeated, he fills the ſquare of the root 7 magically: in order to this, he writes in the firſt 7 cells of the firſt horizontal rank the ſeven numbers propoſed in what order he pleaſes, for that is abſolutely indifferent; and it is proper to obſerve here, that thoſe ſeven numbers may be ranged in 5040 different manners in the ſame rank. The order in which they are placed in the firſt horizontal rank, be it what it will, is that which determines their order in all the reſt. For the ſecond horizontal rank, he places in its firſt cell, either the third, the fourth, the fifth, or the ſixth number, from the firſt number of the firſt rank; and after that writes the ſix others in order as they follow. For the third horizontal rank, he obſerves the ſame method with regard to the ſecond that he obſerved in the ſecond with regard to the firſt, and ſo of the reſt. For inſtance, ſuppoſe the firſt horizontal rank filled with the ſeven numbers in their natural order, 1, 2, 3, 4, 5, 6, 7; the ſecond horizontal rank may either commence with 3, with 4, with 5, or with 6: but in this inſtance it commences with three; the third rank therefore muſt commence with 5, the fourth with 7, the fifth with 2, the ſixth with 4, and the ſeventh with 6. The commencement of the ranks which follow the firſt being thus determined, the other numbers, as we have already obſerved, muſt be written down in the order wherein they ſtand in the firſt, going on to 5, 6, and 7, and returning to 1, 2, &c. till every number in the firſt rank be found in every rank underneath, according to the order arbitrarily pitched upon at firſt. By this means it is evident, that no number whatever can be repeated twice in the ſame rank; and by conſequence, that the ſeven numbers 1, 2, 3, 4, 5, 6, 7, being in each rank, muſt of neceſſity make the ſame ſum.

1	2	3	4	5	6	7
3	4	5	6	7	1	2
5	6	7	1	2	3	4
7	1	2	3	4	5	6
2	3	4	5	6	7	1
4	5	6	7	1	2	3
6	7	1	2	3	4	5

It appears, from this example, that the arrangement of the numbers in the firſt rank being choſen at pleaſure, the other ranks may be continued in four different manners: and ſince the firſt rank may have 5040 different arrangements, there are no leſs than 20160 different manners of conſtructing the magic ſquare of ſeven numbers repeated.

1	2	3	4	5	6	7
2	3	4	5	6	7	1
3	7	5	6	7	1	2
4	6	6	7	1	2	3
5	5	7	1	2	3	4
6	4	1	2	3	4	5
7	3	2	3	4	5	6

1	2	3	4	5	6	7
7	1	2	3	4	5	6
6	7	1	2	3	4	5
5	6	7	1	2	3	4
4	5	6	7	1	2	3
3	4	5	6	7	1	2
2	3	4	5	6	7	1

The order of the numbers in the firſt rank being determined; if in beginning with the ſecond rank, the ſecond number 2, or the laſt number 7, ſhould be pitched upon, in one of thoſe caſes and repeated; and in the other caſe, the other diagonal would be falſe unleſs the number repeated ſeven times ſhould happen to be 4; for four times ſeven is equal to the ſum of 1, 2, 3, 4, 5, 6, 7: and in general, in every ſquare conſiſting of an unequal number of terms, in arithmetical progreſſion, one of the diagonals would be falſe according to thoſe two conſtructions, unleſs the term always repeated in that diagonal were the middle term of the progreſſion. It is not, however,

at all neceſſary to take the terms in an arithmetical progreſſion; for, according to this method, one may conſtruct a magic ſquare of any numbers at pleaſure, whether they be according to any certain progreſſion or not. If they be in an arithmetical progreſſion, it will be proper, out of the general method, to except thoſe two conſtructions which produce a continual repetition of the ſame term in one of the two diagonals, and only to take in the caſe wherein that repetition would prevent the diagonal from being juſt; which caſe being abſolutely diſregarded when we computed that the ſquare of 7 might have 20,160 different conſtructions, it is evident that by taking that caſe in it muſt have vaſtly more.

To begin the ſecond rank with any other number beſides the ſecond and the laſt, muſt not, however, be looked on as an univerſal rule: it holds good for the ſquare of 7; but if the ſquare of 9, for inſtance, were to be conſtructed, and the fourth figure of the firſt horizontal rank were pitched on for the firſt of the ſecond, the conſequence would be, that the fifth and eighth horizontal ranks would likewiſe commence with the ſame number, which would therefore be repeated three times in the ſame vertical rank, and occaſion other repetitions in all the reſt. The general rule, therefore, muſt be conceived thus: Let the number in the firſt rank pitched on, for the commencement of the ſecond, have ſuch an exponent of its quota; that is, let the order of its place be ſuch, as that if an unit be taken from it, the remainder will not be any juſt quota part of the root of the ſquare; that is, cannot divide it equally. If, for example, in the ſquare of 7, the third number of the firſt horizontal rank be pitched on for the firſt of the ſecond, ſuch conſtruction will be juſt; becauſe, the exponent of the place of that number, viz. 3, ſubtracting 1, that is, 2, cannot divide 7. Thus alſo might the fourth number of the ſame firſt rank be choſen, becauſe 4—1, viz. 3, cannot divide 7; and, for the ſame reaſon, the fifth or ſixth number might be taken: but in the ſquare of 9, the fourth number of the firſt rank muſt not be taken, becauſe 4—1, viz. 3, does divide 9. The reaſon of this rule will appear very evidently, by conſidering in what manner the returns of the ſame numbers do or do not happen, taking them always in the ſame manner in any given ſeries. And hence it follows, that the fewer diviſions the root of any ſquare to be conſtructed has, the more different manners of conſtructing it there are; and that the prime numbers, i. e. thoſe which have no diviſions, as 5, 7, 11, 13, &c. are thoſe whoſe ſquares will admit of the moſt variations in proportion to their quantities.

The ſquares conſtructed according to this method have ſome particular properties not required in the problem; for the numbers that compoſe any rank parallel to one of the two diagonals, are ranged in the ſame order with the numbers that compoſe the diagonal to which they are parallel. And as any rank parallel to a diagonal muſt neceſſarily be ſhorter, and have fewer cells than the diagonal itſelf, by adding to it the correſpondent parallel, which has the number of cells by which the other falls ſhort of the diagonal, the numbers of thoſe two parallels, placed as it were end to end, ſtill follow the ſame order with thoſe of the diagonal: beſides that their ſums are likewiſe equal; ſo that they are magical on another account. Inſtead of the ſquares, which we have hitherto formed by horizontal ranks, one might alſo form them by vertical ones; the caſe is the ſame in both.

First Primitive.

1	2	3	4	5	6	7
3	4	5	6	7	1	2
5	6	7	1	2	3	4
7	1	2	3	4	5	6
2	3	4	5	6	7	1
4	5	6	7	1	2	3
6	2	1	2	3	4	5

All we have hitherto ſaid regards only the firſt primitive ſquare, whoſe numbers, in the propoſed example, were 1, 2, 3, 4, 5, 6, 7; here ſtill remains the ſecond primitive, whoſe numbers are 0, 7, 14, 21, 28, 35, 42. M. de la Hire proceeds in the ſame manner here as in the former; and this may likewiſe be conſtructed in 20,160 different manners, as containing the ſame number of terms with the firſt. Its conſtruction being made, and of conſequence all its ranks making the ſame ſum, it is evident, that if we bring the two into one, by adding together the numbers of the two correſponding cells of the two ſquares, that is, the two numbers of the firſt of each, the two numbers of the ſecond, of the third, &c. and diſpoſe them in the 49 correſponding cells of a third ſquare, it will likewiſe be magical in regard to its rank, formed by the addition of equal ſums to equal ſums, which muſt of neceſſity be equal among themſelves. All that remains in doubt is, whether or no, by the addition of the correſponding cells of the two firſt ſquares, all the cells of the third will be filled in ſuch manner as that each not only contains one of the numbers of the progreſſion from 1 to 49, but alſo that this number be different from any of the reſt, which is the end and deſign of the whole operation.

Second Primitive.

0	7	14	21	28	35	42
21	28	35	42	0	7	14
42	0	7	14	21	28	35
14	21	28	35	42	0	7
35	42	0	7	14	21	28
7	14	21	28	35	42	0
28	35	42	0	7	14	21

As to this, it muſt be obſerved, that if in the conſtruction of the ſecond primitive ſquare care has been taken, in the commencement of the ſecond horizontal rank, to obſerve an order with regard to the firſt different from what was obſerved in the conſtruction of the firſt ſquare; for inſtance, if the ſecond rank of the firſt ſquare began with the third term of the firſt rank, and the ſecond rank of the ſecond ſquare commence with the fourth of the firſt rank, as in the example it actually does; each number of the firſt ſquare may be combined once, and only once, by addition with all the numbers of the ſecond. And as the numbers of the firſt are here 1, 2, 3, 4, 5, 6, 7, and thoſe of the ſecond, 0, 7, 14, 21, 28, 35, 42, by combining them in this manner we have all the numbers in the progreſſion from 1 to 49, without having any of them repeated; which is the perfect magic ſquare propoſed.

Perfect Square.

1	9	17	25	33	41	49
24	32	40	48	7	8	16
47	6	14	15	23	31	39
21	22	41	38	46	25	13
37	47	4	12	20	28	29
11	19	27	35	36	46	3
34	42	43	2	10	18	26

The neceſſity of conſtructing the two primitive ſquares in a different manner, does not at all hinder but that each of the 20,160 conſtructions of the one may be combined with all the 20,160 conſtructions of the other: of conſequence, therefore, 20,160 multiplied by itſelf, which makes 406,425,600, is the number of different conſtructions that may be made of the perfect ſquare, which here conſiſts of the 49 numbers of the natural progreſſion. But as we have already obſerved, that a primitive ſquare of ſeven numbers repeated may have above 20,160 ſeveral conſtructions, the number 406,425,600 muſt come vaſtly ſhort of expreſſing all the poſſible conſtructions of a perfect magic ſquare of the 49 firſt numbers.

As to the even ſquares, he conſtructs them like the uneven ones, by two primitive ſquares; but the conſtruction of primitives is different in general, and may be ſo a great number of ways: and thoſe general differences admit of a great number of particular variations, which give as many different conſtructions of the ſame even ſquare. It ſcarce ſeems poſſible to determine exactly, either how many general differences there may be between the conſtruction of the primitive ſquares of an even ſquare and an uneven one, nor how many particular

variations each general difference may admit of; and, of conſequence, we are ſtill far from being able to determine the number of different conſtructions of all thoſe that may be made by the primitive ſquares.

The ingenious Dr. Franklin ſeems to have carried this curious ſpeculation farther than any of his predeceſſors in the ſame way. He has conſtructed not only a magic ſquare of ſquares, but likewiſe a magic circle of circles, of which we ſhall give ſome account for the amuſement of our readers. The magic ſquare of ſquares is formed by dividing the great ſquare, as in Plate :6. fig. 1. The great ſquare is divided into 256 ſmall ſquares, in which all the numbers from 1 to 256 are placed in 16 columns, which may be taken either horizontally or vertically. The properties are as follow:

1. The ſum of the 16 numbers in each column, vertical and horizontal, is 2056.

2. Every half column, vertical and horizontal, makes 1028, or half of 2056.

3. Half a diagonal aſcending added to half a diagonal deſcending, makes 2056; taking theſe half diagonals from the ends of any ſide of the ſquare to the middle thereof; and ſo reckoning them either upward or downward, or ſidewiſe from left to right hand, or from right to left.

4. The ſame, with all the parallels to the half diagonals, as many as can be drawn in the great ſquare: for any two of them being directed upward and downward, from the place where they begin to that where they end, their ſums will make 2056. The ſame downward and upward in like manner: or all the ſame if taken ſidewiſe to the middle, and back to the ſame ſide again. N. B. One ſet of theſe half diagonals and their parallels is drawn in the ſame ſquare upward and downward. Another ſuch ſet may be drawn from any of the other three ſides.

5. The four corner numbers in the great ſquare, added to the four central numbers therein, make 1028; equal to the half ſum of any vertical or horizontal column which contains 16 numbers; and equal to half a diagonal or its parallel.

6. If a ſquare hole (equal in breadth to four of the little ſquares) be cut in a paper, through which any of the 16 little ſquares in the great ſquare may be ſeen, and the paper be laid on the great ſquare, the ſum of all the 16 numbers, ſeen through the hole, is equal to the ſum of the 16 numbers in any horizontal or vertical column, viz. to 2056.

The *magic circle of circles* (fig. 2.) is compoſed of a ſeries of numbers from 12 to 75 incluſive, divided into eight concentric circular ſpaces, and ranged in eight radii of numbers, with the number 12 in the centre; which number, like the centre, is common to all theſe circular ſpaces, and to all the radii.

The numbers are ſo placed, that the ſum of all thoſe in either of the concentric circular ſpaces above mentioned, together with the central number 12, make 360; equal to the number of degrees in a circle.

The numbers in each radius alſo, together with the central number 12, make juſt 360

The numbers in half of any of the above circular ſpaces, taken either above or below the double horizontal line, with half the central number 12, make 180; equal to the number of degrees in a ſemicircle.

If any four adjoining numbers be taken, as if in a ſquare, in the radial diviſions of theſe circular ſpaces, the ſum of theſe, with half the central number, make 180.

There are, moreover, included, four ſets of other circular ſpaces, bounded by circles which are eccentric with reſpect to the common centre; each of theſe ſets containing five ſpaces. The centres of the circles which bound them are at A, B, C, and D. The ſet, whoſe centre is at A, is bounded by dotted lines; the ſet, whoſe centre is at C, is bounded by lines of ſhort unconnected ſtrokes; and the ſet round D is bounded by lines of unconnected longer ſtrokes, to diſtinguiſh them from one another. In drawing this figure by hand, the ſet of concentric circles ſhould be drawn with black ink, and the four different ſets of eccentric circles with four kinds of ink of different colours; as blue, red, yellow, and green, for diſtinguiſhing them readily from one another. Theſe ſets of eccentric circular ſpaces interſect thoſe of the concentric, and each other; and yet the numbers contained in each of the eccentric ſpaces, taken all around through any of the 20 which are eccentric, make the ſame ſum as thoſe in the concentric, namely 360, when the central number 12 is added. Their halves alſo, taken above or below the double horizontal line, with half the central number, make 180.

Obſerve, that there is not one of the numbers but what belongs at leaſt to two of the circular ſpaces, ſome to three, ſome to four, ſome to five; and yet they are all ſo placed as never to break the required number 360 in any of the 28 circular ſpaces within the primitive circle.

To bring theſe matters in view, all the numbers as above mentioned are taken out, and placed in ſeparate columns as they ſtand around both the concentric and eccentric circular ſpaces, always beginning with the outermoſt and ending with the innermoſt of each ſet, and alſo the numbers as they ſtand in the eight radii, from the circumference to the centre; the common central number 12 being placed the loweſt in each column.

1. In the eight concentric circular ſpaces.

14	72	23	65	21	67	12	74
25	63	16	70	18	65	27	61
30	56	39	49	37	51	28	58
41	47	32	54	34	52	43	45
46	40	55	33	53	35	44	42
57	31	48	38	50	36	59	29
62	24	71	17	69	19	60	26
73	15	64	22	66	20	75	13
12	12	12	12	12	12	12	12
360	360	360	360	360	360	360	360

2. In the eight radii.

14	25	30	41	46	57	62	73
72	63	56	47	40	31	24	15
23	16	39	32	55	48	71	64
65	70	49	54	33	38	17	22
31	18	37	34	53	50	69	66
67	68	51	52	35	36	19	20
12	27	28	43	44	59	60	75
74	61	58	45	42	29	26	13
12	12	12	12	12	12	12	12
360	360	360	360	360	360	360	360

3. In the five eccentric circular ſpaces which centre is at A.

14	72	23	85	21
63	16	70	18	68
39	49	37	51	28
54	34	52	43	45
33	53	35	44	42
48	38	50	30	59
24	71	17	69	19
73	15	64	22	66
12	12	12	12	12
360	360	360	360	360

4. In the five eccentric circular ſpaces whoſe centre is at B.	30	56	39	49	37
	47	32	54	34	52
	55	33	53	35	44
	38	50	36	59	29
	17	69	19	60	26
	64	22	66	20	75
	72	23	65	21	67
	25	63	16	70	18
	12	12	12	12	12
	360	360	360	360	360
5. In the five eccentric circular ſpaces whoſe centre is at C.	46	40	55	33	53
	31	48	38	50	36
	71	17	69	19	60
	22	66	20	75	13
	65	21	67	12	74
	16	70	18	68	27
	56	39	49	37	51
	41	47	32	54	34
	12	12	12	12	12
	360	360	360	360	360
6. In the five eccentric circular ſpaces whoſe centre is at D.	62	24	71	17	69
	15	64	22	66	20
	23	65	21	67	12
	70	18	68	27	61
	49	37	51	28	58
	32	54	34	52	43
	40	55	33	53	35
	57	31	48	38	50
	12	12	12	12	12
	360	360	360	360	360

If, now, we take any four numbers, as in a ſquare form, either from N° 1. N° 2. (as we ſuppoſe from N° 1.) as in the margin, and add half the central number 12 to them, the ſum will be 180; equal to half the numbers in any circular ſpace taken above or below the double horizontal line, and equal to the number of degrees in a ſemicircle. Thus, 14, 72, 25, 63, and 6, make 180.

14	72
25	63
6	

MAGIC *Lantern*. See DIOPTRICS.

MAGICIAN, one who practiſes magic, or hath the power of doing wonderful feats by the agency of ſpirits. Among the eaſtern nations it ſeems to have been formerly common for the princes to have magicians about their court to confer with upon extraordinary occaſions. And concerning theſe there hath been much diſputation: ſome ſuppoſing that their power was only feigned, and that they were no other than impoſtors who impoſed on the credulity of their ſovereigns; while others have thought that they really had ſome unknown connection or correſpondence with evil ſpirits, and could by their means accompliſh what otherwiſe would have been impoſſible for men. See the article MAGIC.

MAGINDANAO, or MINDANAO. See MINDANAO.

MAGISTERY, in chemiſtry, a name given to almoſt all precipitates. Thus, *magiſtery* and *precipitate* are ſynonymous: but chemiſts chiefly uſe *precipitates* as a general term, and apply that of *magiſtery* to ſome particular precipitates only which are uſed in medicine and in the arts. Such are, the magiſteries of biſmuth, coal, crabs eyes, ſulphur, &c. See CHEMISTRY.

MAGISTRATE, any public officer to whom the executive power of the law is committed either wholly or in part.

MAGLIABECHI (ANTONY), a perſon of great learning, and remarkable for an amazing memory, was born at Florence in 1633. His father died when he was only ſeven years old. His mother had him taught grammar and drawing, and then put him apprentice to one of the beſt goldſmiths in Florence. When he was about 16 years old, his paſſion for learning began to ſhow itſelf; and he laid out all his money in buying books. Becoming acquainted with Michael Ermini, librarian to the cardinal de Medicis, he ſoon perfected himſelf by his aſſiſtance in the Latin tongue, and in a little time became maſter of the Hebrew. His name ſoon became famous among the learned. A prodigious memory was his diſtinguiſhing talent; and he retained not only the ſenſe of what he had read, but frequently all the words, and the very manner of ſpelling. It is ſaid that a gentleman, to make trial of the force of his memory, lent him a manuſcript he was going to print. Some time after it was returned, the gentleman, coming to him with a melancholy countenance, pretended it was loſt, and requeſted Magliabechi to recollect what he remembered of it; upon which he wrote the whole, without miſſing a word. He generally ſhut himſelf up the whole day, and opened his doors in the evening to the men of letters who came to converſe with him. His attention was ſo abſorbed by his ſtudies, that he often forgot the moſt urgent wants of nature. Coſmo III. grand duke of Florence, made him his librarian; but he ſtill continued negligent in his dreſs, and ſimple in his manners. An old cloak ſerved him for a morning-gown in the day and for bed-clothes at night. The duke, however, provided for him a commodious apartment in his palace, which he was with difficulty perſuaded to take poſſeſſion of; but which he quitted four months after, and returned to his houſe. He was remarkable for his extraordinary modeſty, his ſincerity, and his beneficence, which his friends often experienced in their wants. He was a patron of men of learning; and had the higheſt pleaſure in aſſiſting them with his advice and information, and in furniſhing them with books and manuſcripts. He had the utmoſt averſion at any thing that looked like conſtraint; and therefore the grand duke always diſpenſed with his perſonal attendance, and ſent him his orders in writing. Though he lived a moſt ſedentary life, he reached the 81ſt year of his age; and died in the midſt of the public applauſe, after enjoying, during the latter part of his life, ſuch affluence as few have ever procured by their learning. By his will, he left a very fine library to the public, with a fund for its ſupport.

MAGLOIRE (ST.), a native of Wales in Great Britain, and couſin-german to St. Sampſon and St. Mallo. He embraced a monaſtic life, and went into France, where he was made abbot of Dol, and after that a provincial biſhop in Brittany. He afterwards founded a monaſtery in the iſland of Jerſey, where he died on the 14th of October 575, about the age of 80. His remains were tranſported to the ſuburbs of St. Jacques, and depoſited in a monaſtery of Benedictines, which was ceded to the fathers of the oratory in 1628. It is now the ſeminary of St. Magloire, celebrated on account of the learned men whom it has produced. This ſaint cultivated poetry with conſiderable ſucceſs: the hymn which is ſung at the feaſt of All Saints was compoſed by him: *Cœlo quos eadem gloria conſecrat*, &c.

MAGNA ASSISA ELIGENDA, is a writ anciently directed to the ſheriff for ſummoning four lawful knights before the juſtices of aſſize, in order to chooſe twelve knights of the neighbourhood, &c. to paſs upon the great aſſize between ſuch a perſon plaintiff and ſuch a one defendant.

MAGNA CHARTA. See CHARTA.

MAGNANIMITY, denotes greatneſs of mind, particularly in circumſtances of trial and adverſity.—It is the good ſenſe of pride, and the nobleſt way of acquiring applauſe. It renders the ſoul ſuperior to the trouble, diſorder, and emotion which the appearance of great danger might excite; and it is by this quality that heroes maintain their tranquillity, and preſerve the free uſe of their reaſon in the moſt ſurpriſing and dreadful accidents. It admires the ſame quality in its enemy; and

fame, glory, conqueſts, deſire of opportunities to pardon and oblige their oppoſers, are what glow in the minds of the brave. Magnanimity and courage are inſeparable.

1. The inhabitants of Privernum being ſubdued and taken priſoners after a revolt, one of them being aſked by a Roman ſenator, who was for putting them all to death, what puniſhment he and his fellow captives deſerved? anſwered with great intrepidity, "We deſerve that puniſhment which is due to men who are jealous of their liberty, and think themſelves worthy of it." Plautinus perceiving that his anſwer exaſperated ſome of the ſenators, endeavoured to prevent the ill effects of it, by putting a milder queſtion to the priſoner: "How would you behave (ſays he) if Rome ſhould pardon you?" "Our conduct (replied the generous captive) depends upon yours. If the peace you grant be an honourable one, you may depend on a conſtant fidelity on our parts: if the terms of it be hard and diſhonourable, lay no ſtreſs on our adherence to you." Some of the judges conſtrued theſe words as menaces; but the wiſer part finding in them a great deal of magnanimity, cried out, that a nation whoſe only deſire was liberty, and their only fear that of loſing it, was worthy to become Roman. Accordingly, a decree paſſed in favour of the priſoners, and Privernum was declared a municipium. Thus the bold ſincerity of one man ſaved his country, and gained it the privilege of being incorporated into the Roman ſtate.

2. Subrius Flavius, the Roman tribune, being impeached for having conſpired againſt the life of the emperor Nero, not only owned the charge, but gloried in it. Upon the emperor's aſking him what provocation he had given him to plot his death? "Becauſe I abhorred thee (ſaid Flavius), though there was not in the whole army one more zealouſly attached to thee than I, ſo long as thou didſt merit affection; but I began to hate thee when thou becameſt the murderer of thy mother, the murderer of thy brother and wife, a charioteer, a comedian, an incendiary, and a tyrant." Tacitus tells us, that the whole conſpiracy afforded nothing which proved ſo bitter and pungent to Nero as this reproach. He ordered Flavius to be immediately put to death, which he ſuffered with amazing intrepidity. When the executioner deſired him to ſtretch out his neck valiantly, "I wiſh (replied he) thou mayeſt ſtrike as valiantly."

3. When the Scythian ambaſſadors waited on Alexander the Great, they gazed attentively upon him for a long time without ſpeaking a word, being very probably ſurpriſed, as they formed a judgment of men from their air and ſtature, to find that his did not anſwer the high idea they entertained of him from his fame. At laſt, the oldeſt of the ambaſſadors (according to Q. Curtius) addreſſed him thus: "Had the gods given thee a body proportionable to thy ambition, the whole univerſe would have been too little for thee. With one hand thou wouldſt touch the eaſt, and with the other the weſt; and not ſatisfied with this, thou wouldſt follow the ſun, and know where he hides himſelf. But what have we to do with thee? We never ſet foot in thy country. May not thoſe who inhabit woods be allowed to live without knowing who thou art, and whence thou comeſt? We will neither command over, nor ſubmit to, any man. And that thou mayeſt be ſenſible what kind of people the Scythians are, know, that we received from heaven as a rich preſent, a yoke of oxen, a ploughſhare, a dart, a javelin, and a cup. Theſe we make uſe of, both with our friends and againſt our enemies. To our friends we give corn, which we procure by the labour of our oxen; with them we offer wine to the gods in our cup; and with regard to our enemies, we combat them at a diſtance with our arrows, and near at hand with our javelins. But thou, who boaſteſt thy coming to extirpate robbers, thou thyſelf art the greateſt robber upon earth. Thou haſt plundered all nations thou overcameſt: thou haſt poſſeſſed thyſelf of Lydia, invaded Syria, Perſia, and Bactriana; thou art forming a deſign to march as far as India; and now thou comeſt hither to ſeize upon our herds of cattle. The great poſſeſſions thou haſt, only make thee covet more eagerly what thou haſt not. If thou art a god, thou oughteſt to do good to mortals, and not deprive them of their poſſeſſions. If thou art a mere man, reflect always on what thou art. They whom thou ſhalt not moleſt will be thy true friends, the ſtrongeſt friendſhips being contracted between equals; and they are eſteemed equals who have not tried their ſtrength againſt each other: but do not imagine that thoſe whom thou conquereſt can love thee."

4. Richard I. king of England, having inveſted the caſtle of Chalus, was ſhot in the ſhoulder with an arrow; an unſkilful ſurgeon endeavouring to extract the weapon, mangled the fleſh in ſuch a manner that a gangrene enſued. The caſtle being taken, and perceiving he ſhould not live, he ordered Bertram de Gourdon, who had ſhot the arrow, to be brought into his preſence. Bertram being come, "What harm (ſaid the king) did ever I do thee, that thou ſhouldſt kill me?" The other replied with great magnanimity and courage, "You killed with your own hand my father and two of my brothers, and you likewiſe deſigned to have killed me. You may now ſatiate your revenge. I ſhould cheerfully ſuffer all the torments that can be inflicted, were I ſure of having delivered the world of a tyrant who filled it with blood and carnage." This bold and ſpirited anſwer ſtruck Richard with remorſe. He ordered the priſoner to be preſented with one hundred ſhillings, and ſet at liberty; but Maccardec, one of the king's friends, like a true ruffian, ordered him to be flayed alive.

5. The following modern inſtance is extracted from a late French work entitled, *Ecole hiſtorique & morale du ſoldat*, &c. A mine, underneath one of the outworks of a citadel, was entruſted to the charge of a ſerjeant and a few ſoldiers of the Piedmonteſe guards. Several companies of the enemy's troops had made themſelves maſters of this work; and the loſs of the place would probably ſoon have followed had they maintained their poſt in it. The mine was charged, and a ſingle ſpark would blow them all into the air. The ſerjeant, with the greateſt coolneſs, ordered the ſoldiers to retire, deſiring them to requeſt the king to take care of his wife and children; ſtruck fire, ſet a match to the train, and ſacrificed himſelf for his country.

MAGNESA, or MAGNESIA, (anc. geog.) a town or a diſtrict of Theſſaly, at the foot of mount Pelius, called by Philip, the ſon of Demetrius, one of the three keys of Greece, (Pauſanias.)

MAGNESIA, or MAGNESIA ALBA, in mineralogy and chemiſtry, a kind of earth only diſcovered ſince the beginning of this century. It firſt began to be known at Rome by the name of the *Count de Palma's powder*, which a canon there offered as a general remedy for all diſorders. It was by many conſidered as a calcareous earth; but F. Hoffman ſhowed it to be eſſentially diſtinct. The ſame was afterwards done by Dr. Black of Edinburgh and M. Margraaf of Berlin, though unknown to each other at the time. When pure, it is extremely white, looſe, and light; the ſpecific gravity about 2.330. It is one of the moſt infuſible ſubſtances in nature; neither melting, nor even hardening nor contracting, in the focus of the moſt powerful burning-glaſs. An experiment was made on ſome of this earth in the ſummer of 1782 by M. Magellan, with Mr. Parker's burning-glaſs; the effects of which are more powerful than thoſe of any other, though its diameter is only 32 inches. The event ſeemed at firſt to be unfavourable to the concluſion above mentioned; for a cubic inch of magneſia, a quarter of an inch each ſide, being put into its focus, was hardened, and reduced to leſs than a third part of its

bulk each way, viz. from .25 of an inch to .08. On applying a ſimilar cube of magneſia, however, from Mr. Henry's manufacture at Mancheſter, it neither became harder nor ſenſibly diminiſhed in ſize. Bergman informs us, that magneſia, unleſs precipitated by the volatile alkali, or that by the neat alkaliſed tartar, always contains ſome ſiliceous or calcareous earth. Almoſt the ſame thing happens when it is ſeparated by calcination from the remaining lixiviations of the nitrous and marine acids; in which caſe, by ſuch a violent fire, it adheres together, and even ſhows a tendency to vitrify.

Notwithſtanding this extreme refractorineſs of magneſia by itſelf, it melts eaſily with borax, though ſcarce affected by alkalies or the calces of lead; when mixed with other earths it produces hard maſſes of various kinds; when mixed with calcareous, argillaceous, or ſiliceous earths, it melts in the fire; and if four times its weight of green glaſs be added to it, the maſs forms a kind of porcelaine ſo hard as to ſtrike fire with ſteel. But neither an equal part of the above earths, nor of ponderous earth, glaſs of lead, vegetable alkali, or vitriolated tartar, added ſeparately to magneſia, will melt in the fire: however, when mixed with common argillaceous earth, it melts into a hard maſs. Magneſia differs from calcareous earth in having a much ſmaller attraction for fixed air. In this reſpect it is inferior even to fixed alkaline ſalts; ſo that it will not render any of theſe cauſtic, though it will do ſo to the volatile alkali. It alſo parts very readily with its own fixed air by mere heat; and it was by making experiments on this ſubſtance that Dr. Black made his firſt diſcoveries concerning fixed air. In its calcined ſtate, however, it does not ſhow any of the cauſticity of lime, but may be ſafely taken internally; and is even preferred by ſome to that which contains fixed air. In this ſtate it is much leſs ſoluble than when combined with fixed air, and does not effervеſce with any acid. When mixed with water, a very ſmall degree of heat is excited, and in about 79 2 times its weight of water it totally diſſolves. It diſſolves alſo very readily in aerial acid, by which means it is frequently united with freſh water. For the ſame reaſon, when we mix a ſolution of perfectly mild alkali, either fixed or volatile, with a ſolution of magneſia, no precipitation follows; becauſe the great quantity of fixed air extricated by the union of the acid and alkali, inſtantly diſſolves the precipitate as faſt as it is formed. But if we put this mixture over the fire, it will grow thick, and coagulate as ſoon as it is heated to a certain degree; becauſe the magneſia is unable to retain, in any conſiderable heat, as much fixed air as is neceſſary for its ſolution.

On putting magneſia into water, and afterwards drying it, it is found to retain $\frac{15}{100}$ of its weight of aqueous fluid; but when fully ſaturated with aerial acid, it will abſorb and retain $\frac{66}{100}$ of the ſame. When fully ſaturated with aerial acid, it is more ſoluble in cold than in hot water; becauſe the heat of the latter diſſipates part of the fixed air, as was obſerved concerning the alkaline ſalts.

Magneſia, when combined with different acids, forms ſalts exceedingly different from thoſe produced by calcareous earth under ſimilar circumſtances. See CHEMISTRY. It is uſually prepared either from the bittern of ſea-ſalt, or from the ſalt prepared from that liquid under the name of Epſom ſalt. The magneſia prepared directly from the bittern, however, is by no means equal in purity to that produced from the finer kinds of Epſom ſalt. Hence, in order to have pure magneſia, Bergman gives the following directions: "Let Epſom ſalt, in well-formed cryſtals, be diſſolved in diſtilled water; and from this the magneſia is to be precipitated by mild volatile alkali. Some of this earth that remains ſuſpended in the ſolution, by means of aerial acid, may be eaſily precipitated by a ſimple ebullition. An hundred pounds of this magneſia, when rightly prepared, contains near 25 parts of fixed air, 30 of water, and 45 of pure earth. Its ſpecific gravity is then 2.155. This method of preparation may anſwer very well for having a very pure magneſia; but when it is required to have it very light and ſpongy which, by thoſe who uſe it, is looked upon to be the only criterion of its goodneſs, we muſt uſe the following method:

Take any quantity of Epſom ſalt, diſſolve it in boiling water, and filter the ſolution. Diſſolve alſo half the quantity of good pearl-aſh, and filter this ſolution. Both of theſe ſolutions ought to be ſomewhat diluted; and it will be proper to uſe twice the quantity of water which would fairly diſſolve the ſalts. Mix the two ſolutions when nearly cold, and ſtir them very well together. Let the mixture ſtand for ſome hours, until the precipitate has fallen to the bottom in form of a coarſe gritty powder. Put the whole then into a clean copper kettle, under which a moderate fire is made. Stir the matter inceſſantly with a large wooden ſpatula, to prevent the powder from ſticking to the bottom. As the mixture heats, the powder begins to loſe its ſandy appearance, and to increaſe greatly in quantity; ſo that, though at firſt the mixture was quite thin, with only a ſmall portion of ſandy matter amongſt it, before it has attained the boiling heat it will be ſo thick that it can ſcarce be ſtirred. When the grittineſs is quite gone, the matter muſt be put upon a filtering cloth, and warm water poured upon it till it runs inſipid. The magneſia is then to be put upon chalk ſtones, which will abſorb the greateſt part of the moiſture; and it may at laſt be fully dried in a ſtove.

Magneſia alba is a good abſorbent; and undoubtedly to be preferred to crab's eyes, on account of its purgative quality when united with an acid, which the other has not. It has been eſteemed hurtful in bilious habits where there is a diſpoſition in the ſtomach contrary to acidity. This, however, according to Mr. Henry, is doubtful: and where putrid bile is to be corrected, he thinks good purpoſes may be anſwered by taking magneſia with an acid in a ſtate of effervеſcence; as the fixed air, thus extricated, will correct the putridity of the contents of the inteſtines, while they are at the ſame time evacuated downwards. He is alſo of opinion, that in cutaneous diſeaſes it may enter the circulation in form of a neutral ſalt, and, by acting as a diaphoretic and diuretic, prove an excellent alterative.

For ſome medical purpoſes, magneſia is uſed in a calcined ſtate; in which caſe it is deprived of its fixed air, and then it proves nearly as aperient as a double quantity of magneſia in its uncalcined ſtate. Mr. Henry is of opinion, that it may be uſeful in diſtenſions of the bowels ariſing from flatus; that it may be ſucceſsfully employed as a cathartic with patients labouring under the ſtone, who are uſing the lixivium ſaponaceum; and that, joined with warm aromatics, it may be of ſervice in correcting the great flatulency which ſo much afflicts people of a gouty diſpoſition. From ſeveral experiments made by the ſame author, it alſo appears that magneſia has a conſiderable antiſeptic power. The like virtue he aſcribes to all kinds of teſtaceous powders: whence he concludes, that medicines of this kind are by no means improper in fevers of a putreſcent type; that where bile is ſuſpected to be the cauſe of any putrid diſeaſe, thoſe antiſeptics ſhould be preſcribed which particularly impede its corruption; that, as calcined magneſia is a more powerful antiſeptic than moſt other abſorbents, it merits a preference to theſe; and that where an acid cacochymy prevails, magneſia or other abſorbents, taken immediately before or after meal-time, may, by increaſing the putrefactive fermentation of animal food, be of very great ſervice. He hath alſo found, that magneſia hath a power of promoting the ſolution of reſinous gums in water; and thus we have an elegant and eaſy method of preparing aqueous tinctures from theſe ſubſtances. Such tinctures, however, are

calculated only for extemporaneous prescription, as most of them depositate a sediment when they have been kept a week or two.

Black MAGNESIA. See MANGANESE.

MAGNESIA, (anc. geog.) a maritime district of Thessaly, lying between the south part of the Sinus Thermaicus and the Pegasæus to the south, and to the east of the Pelasgiotis. *Magnetes*, the people. *Magnesius* and *Magnessus*, the epithet; (Horace).

MAGNESIA, a town of Asia Minor on the Mæander, about 15 miles from Ephesus. Themistocles died there: it was one of the three towns given him by Artaxerxes, with these words, "to furnish his table with bread." It is also celebrated for a battle which was fought there, 190 years before the Christian æra, between the Romans and Antiochus king of Syria. The forces of Antiochus amounted to 70,000 men according to Appian, or 70,000 foot and 12,000 horse according to Livy, which has been exaggerated by Florus to 300,000 men; the Roman army consisted of about 28 or 30,000 men, 2000 of which were employed in guarding the camp. The Syrians lost 50,000 foot and 4000 horse; and the Romans only 300 killed, with 25 horse. It was founded by a colony from Magnesia in Thessaly; and was commonly called *Magnesia ad Mæandrum*, to distinguish it from another called *Magnesia ad Sipylum* in Lydia, at the foot of mount Sipylus.

MAGNESIA *ad Sipylum*, anciently *Tantalis*, the residence of Tantalus, and capital of Mæonia, where now stands the lake Sale. A town of Lydia, at the foot of mount Sipylus, to the east of Hermus; adjudged free under the Romans. It was destroyed by an earthquake in the reign of Tiberius.

MAGNET *(Magnes)*, the LOADSTONE: a sort of ferruginous stone, in weight and colour resembling iron ore, though somewhat harder and more heavy; endowed with various extraordinary properties, attractive, directive, inclinatory, &c. See MAGNETISM. The magnet is also called *Lapis Heracleus*, from Heraclea, a city of Magnesia, a part of the ancient Lydia, where it is said to have been first found, and from which it is usually supposed to have taken its name. Though others derive the word from a shepherd named *Magnes*, who first discovered it with the iron of his crook on mount Ida. It is also called *lapis nauticus*, by reason of its use in navigation; and *siderites*, from its attracting iron, which the Greeks call σιδηρος.

The magnet is usually found in iron mines, and sometimes in very large pieces half-magnet half-iron. Its colour is different according to the different countries it is brought from. Norman observes, that the best are those brought from China and Bengal, which are of an irony or sanguine colour; those of Arabia are reddish; those of Macedonia blackish; and those of Hungary, Germany, England, &c. the colour of unwrought iron. Neither its figure nor bulk is determinate: it is found of all forms and sizes.

The ancients reckoned five kinds of magnets, different in colour and virtue: the Ethiopic, Magnesian, Bœotic, Alexandrian, and Natolian. They also took it to be male and female: but the chief use they made of it was in medicine; especially for the cure of burns and defluxions on the eyes.—The moderns, more happy, employ it to conduct them in their voyages. See NAVIGATION.

The most distinguishing properties of the magnet are, that it attracts iron, and that it points to the poles of the world; and in other circumstances also dips or inclines to a point beneath the horizon, directly under the pole; and that it communicates these properties, by touch, to iron. On which foundation are built the mariner's needles, both horizontal and inclinatory.

Attractive Power of the MAGNET was known to the ancients; and is mentioned even by Plato and Euripides, who call it the *Herculean stone*, because it commands iron, which subdues every thing else: but the knowledge of its directive power, whereby it disposes its poles along the meridian of every place, and occasions needles, pieces of iron, &c. touched with it, to point nearly north and south, is of a much later date; though the exact time of its discovery, and the discoverer himself, are yet in the dark. The first tidings we hear of it is in 1260, when Marco Polo the Venetian is said by some to have introduced the mariner's compass: though not as an invention of his own, but as derived from the Chinese, who are said to have had the use of it long before; though some imagine that the Chinese rather borrowed it from the Europeans. Flavio de Gioia, a Neapolitan, who lived in the 13th century, is the person usually supposed to have the best title to the discovery: and yet Sir G. Wheeler mentions, that he had seen a book of astronomy much older, which supposed the use of the needle; though not as applied to the uses of navigation, but of astronomy. And in Guyot de Provins, an old French poet, who wrote about the year 1180, there is an express mention made of the loadstone and the compass; and their use in navigation obliquely hinted at.

The Variation of the MAGNET, or its declination from the pole, was first discovered by Seb. Cabot, a Venetian, in 1500; and the variation of that variation by Mr. Gellibrand, an Englishman, about the year 1625. See VARIATION. Lastly, the dip or inclination of the needle, when at liberty to play vertically, to a point beneath the horizon, was first discovered by another of our countrymen, Mr. R. Norman, about the year 1576. See the article *Dipping*-NEEDLE.

MAGNETICAL NEEDLE. See *Magnetical* NEEDLE.

MAGNETISM,

THE power by which the loadstone is influenced, manifesting itself by certain attractive and directive virtues, and which may be understood from the following phenomena afterwards mentioned, which are common to all magnetical bodies.

CHAP. I. *Phenomena and Laws of Magnetism.*

§ 1. *Phenomena of the Magnet.*

1. A MAGNET, whether natural or artificial, attracts iron, and all substances which contain it in its metallic state. A pure calx of iron is but little attracted; but if the calx be heated strongly in conjunction with charcoal dust, it will then be attracted, though it has not regained its metallic splendour, and is quite destitute of malleability. The semimetal called *nickel*, and perhaps some others, are attracted by the magnet, though freed from iron as much as possible. From some accounts it has been suspected that brass was in a small degree affected by the magnet, and even that all very minute bodies are somewhat under its influence; but this seems not yet to be sufficiently ascertained.

2. If a magnet be suspended by a thread, nicely placed on a pivot, or set to float in a bason of water, it will turn one

and conſtantly the ſame ſide nearly towards the north pole of the earth, the other of courſe turning towards the ſouth. Hence theſe parts of the magnet have been called its poles, taking the deſignations of north and ſouth from thoſe parts of the world towards which they turn. This property is called the *polarity* of the magnet; and when it is in the act of turning itſelf into this poſition, it is ſaid to *traverſe*. A plane drawn perpendicular to the horizon through both poles of a magnet, after it has turned itſelf, is called the *magnetic meridian*; and the angle it makes with the meridian of the place is called the *declination* of the magnet or of the magnetic needle.

3. When either the north or the ſouth poles of two magnets are placed near to each other, they repel; but a north and a ſouth pole attract each other.

4. A magnet placed in ſuch a manner as to be entirely at liberty, inclines one of its poles to the horizon, and of courſe elevates the other above it. This property is called the *inclination* or *dipping* of the magnet; and is moſt conſpicuous in artificial magnets or needles, which may be accurately balanced before the magnetic virtue is imparted to them.

5. By proper management any magnet may be made to communicate its virtue to a piece of ſteel or iron, which virtue it will retain for a longer or ſhorter time according to circumſtances.

§ 2. *Of the different Subſtances attracted by the Magnet.*

It has already been ſaid, that iron is the only ſubſtance which the magnet particularly attracts, and that too when in its metallic ſtate. Nevertheleſs this metal is ſo univerſally diffuſed, that there are few ſubſtances which do not contain a ſufficient quantity of it to be in ſome degree affected by the magnet. Iron itſelf is attracted with different degrees of force according to the ſtate in which it is with regard to malleability. Even the pureſt calx or ſolution that can be made, is ſaid to be in ſome degree affected by the magnet; but of all ſubſtances ſoft iron is attracted with the greateſt force when clean and of an uniform texture. Hardened ſteel is attracted with much leſs force than iron; but the ſcales ſeparated from red hot iron, the fuſed globules from flint and ſteel, or the finery cinder, are attracted as much as iron itſelf. The black calx of iron is attracted but very weakly; and the red calx or ruſt ſo little, that it is generally ſaid to be quite inſenſible to the magnetic attraction: though this is not found to be ſtrictly true, even when the calx is prepared by fire, and purified in the moſt careful manner. Sometimes the ſcales and calx are capable of acquiring a polarity, though weakly. Ores of iron are attracted with greater or leſs force according to the ſtate of the metal in them, and according to the quantity of it they contain; though the attraction is always manifeſt even when they contain ſuch a ſmall quantity as ſcarcely to deſerve the name of ores. They are generally much more attracted after calcination than before; becauſe this operation communicates to them a portion of phlogiſton by which they approach to a metallic ſtate. Ores of lead, tin, and copper, are likewiſe attracted, as well as native cinnabar, on account of the quantity of iron they contain; and it is remarkable, that though pure lead in its metallic ſtate is not in the leaſt attracted, its calx is ſo in ſome degree. The calx of tin is alſo attracted, though in a ſtill ſmaller degree than that of lead. Zinc, biſmuth, and cobalt, but eſpecially the ores of theſe ſemimetals, are attracted; but not antimony, unleſs it be firſt expoſed to a gentle heat; and arſenic is not attracted at all. One kind of biſmuth is ſaid to be abſolutely repelled by the magnet. Almoſt all other minerals are attracted, at leaſt after having been expoſed to the action of fire. Calcareous earth is attracted leſs than any other kind, and the ſiliceous earth the moſt frequently. Sand, eſpecially the black kind, is generally attracted; and amber, as well as other combuſtible ſubſtances, has the ſame property after being burned. Almoſt every part of animal and vegetable bodies is affected by the magnet after being burned; but unburned animal or vegetable ſubſtances are very ſeldom if ever perceptibly attracted. It is alſo remarkable, that even ſoot, or the duſt which falls upon any thing left expoſed to the atmoſphere, is ſenſibly attracted. Colourleſs precious ſtones, as the diamond and cryſtals, are not attracted: neither the amethyſt, topaz, chalcedony, or ſuch as are deprived of their colour by fire; but all others, as the ruby, chryſolite, and tourmalin, are attracted. The emerald, and particularly the garnet, are not only attracted, but frequently acquire an evident polarity. The opal is attracted but weakly.

The attraction of ſo many different ſubſtances ſhows the univerſal diffuſion of iron throughout almoſt all terreſtrial ſubſtances: for to this we are with the greateſt probability to aſcribe the attraction of ſo many ſubſtances by the magnet. How ſmall a quantity of iron indeed will give a ſubſtance this property, is evident from the following experiment related by Mr. Cavallo: Having choſen a piece of Turkey-ſtone which weighed above an ounce, I examined it by a very ſenſible magnet needle, but did not find that it was affected in the leaſt. A piece of ſteel was then weighed with a pair of ſcales, which would turn with the 20th part of a grain, and one end of it drawn over the ſtone in various directions. After this operation the ſteel was again weighed, and found to have loſt no perceptible part of its weight; yet the Turkey-ſtone, which had acquired only this very ſmall quantity of ſteel, now affected the magnetic needle very ſenſibly." In making his obſervations on this experiment, he propoſes the magnet as a teſt of iron in different ſubſtances, being capable of detecting a ſmaller quantity than any method that chemiſtry can yet afford.

Our author has been at conſiderable pains to inveſtigate the magnetic properties of braſs and other metals; having made many experiments upon the ſubject, of which the following are the reſults: 1. Hammered braſs is much more generally attracted by the magnet than other kinds; and ſuch as is not influenced in this manner acquires the property by being hammered. 2. A piece of braſs rendered magnetic by hammering, loſes the property on being made red hot ſo as to become ſoftened; by a ſecond hammering it becomes again magnetic; and thus may be made to loſe its property and recover it alternately. 3. Suſpecting that the magnetic property might be occaſioned by a ſmall quantity of iron abraded from the hammer, the pieces of braſs were beat between two pieces of card-paper; notwithſtanding which precaution, it acquired the magnetic property as before. 4. Sometimes an evident degree of magnetiſm was communicated by two or three ſtrokes, and with the card-paper not above 30 ſtrokes were given to make the braſs ſenſibly magnetic. 5. A piece of braſs was hardened by beating it between two large flints, uſing one for the hammer and the other for the anvil; but ſtill it acquired a magnetic property, though leſs than with the iron hammer, which might be explained by the roughneſs of the flints, and their not coming into contact ſufficiently with the metal. Neither of the flints was found to have acquired the ſmalleſt degree of magnetic power, either before or after the experiment. 6. By melting the braſs in a crucible, it was found to have entirely loſt its magnetiſm. 7. A piece of braſs deprived of its magnetic property by fire, regained it after a few ſtrokes of the hammer, though laid between two pieces of copper. 8. Moſt of the pieces of braſs tried by our author became magnetic by hammering; but ſome, though rendered equally hard with the reſt, did not affect the needle in the leaſt; but theſe could not originally be diſtinguiſhed

from ſuch as are capable of becoming magnetic. 9. As, notwithſtanding the precautions made uſe of in the above experiments to prevent the iron of the hammer from being in any manner of way communicated to the braſs, an objection might ariſe, that ſome quantity of the calx might be diffuſed through the metal, and acquire phlogiſton by hammering, he tried the following experiment, which ſeemed deciſive. A piece of braſs, which would acquire no magnetiſm by hammering, was put upon an anvil with a conſiderable quantity of crocus martis, which had no effect upon the needle. It was then hammered for a long time, turning it frequently, ſo that the crocus was beat into the ſubſtance of the braſs, and gave it a red colour: nevertheleſs, it affected the needle in this ſtate no more than before. 10. A hole of about an eighth part of an inch in length, and little more than one 50th of an inch in diameter, was drilled in a piece of braſs which could not be rendered magnetic by hammering; after which the hole was filled with crocus martis, and hammered as before, but ſtill it ſhowed no ſigns of magnetiſm *. 11. On making this piece of braſs, containing the crocus, red hot, it then affected the needle, but only in that place where the crocus was. 12. On repeating this experiment with black calx of iron inſtead of crocus martis, the braſs was weakly attracted in that place where the calx was, and this attraction was neither augmented nor diminiſhed by calcination. 13. On mixing a ſmall quantity of iron with four times its weight of braſs which could not be made magnetic by hammering, the whole was rendered powerfully magnetic: but on again mixing this compound with 50 times its weight of the ſame braſs, the attraction became ſo weak as to be ſcarcely perceptible; and was neither augmented by hammering nor diminiſhed by ſoftening. 14. On repeating moſt of his experiments, by letting the pieces of braſs float upon quickſilver in the manner hereafter deſcribed, he found that very few of them were not affected; and even the indifference of any of them did not ſeem to be very well aſcertained; though theſe did not acquire any additional magnetiſm by hammering.

From all theſe experiments Mr. Cavallo draws the following concluſions: 1. Moſt braſs becomes magnetic by hammering, and loſes that property by annealing or ſoftening in the fire; or at leaſt its magnetiſm is ſo far weakened by it, as afterwards to be only diſcovered when floating on quickſilver. 2. The acquired magnetiſm is not owing to particles of iron naturally or artificially mixed with the braſs. 3. The pieces of braſs which have that property retain it without any diminution after a great number of repeated trials; but he found no method of giving magnetiſm to braſs which had it not naturally. 4. A large piece of braſs has generally a ſtronger magnetic power than a ſmall one; and the flat ſurface draws the needle more powerfully than the edge or corner. 5. If only one end of a piece of braſs be hammered, then that end alone will diſturb the magnetic needle. 6. The magnetic power which braſs acquires by hammering has a certain limit, beyond which it cannot be increaſed by farther hammering. This limit is different in different pieces of braſs, according to their thickneſs or quality. 7. In the courſe of his experiments, the following circumſtance was twice obſerved: A piece of braſs which had the property of becoming magnetic by hammering, and of loſing that property by annealing, loſt its magnetic power entirely by being left in the fire till partially melted, but recovered it again on being fully ſo. 8. A long continuance in a ſtrong fire, which alters the texture of the metal, making it what ſome workmen call *rotten*, generally deſtroys the magnetic property alſo; whence this property ſeems to be owing to ſome particular configuration of its parts. 9. When braſs is uſed in magnetical inſtruments, it ought either to be left entirely ſoft, or choſen of ſuch a ſort as will not become magnetic by hammering. 10. There are few ſubſtances in nature, which, when floated upon quick-ſilver, are not affected in ſome degree by the magnet.

Our author next proceeded to try the magnetic power of other metals, particularly the component parts of braſs, &c. copper, and zinc. With the former the reſult was doubtful; and though pieces of hammered copper would ſometimes attract the needle, yet the attraction was always exceedingly weak. Zinc had no effect, either in its natural ſtate, or hammered as much as it could bear without breaking. A mixture of it with tin had no effect. The ſame was obſerved of a piece of a broken reflector of a teleſcope made of tin and copper; a mixture of tin, zinc, and copper; a piece of ſilver, whether ſoft or hammered; a piece of pure gold, whether ſoft or hammered; a mixture of gold and ſilver, both hard and ſoft; and another mixture of much ſilver, a little copper, and a ſtill leſs quantity of gold.

The magnetic property of nickel has been mentioned by ſeveral authors; but Mr. Cavallo ſays he has found ſome pieces which did not affect the needle in the leaſt. "It is probable (ſays he) that theſe pieces were not pure nickel, and perhaps ſome cobalt was contained in them: but I ſee no reaſon why the nickel, when alloyed with a little cobalt, ſhould ſhow no attraction towards the magnet, if that property did really and eſſentially belong to it." Our author, laſtly, made ſeveral experiments upon platina; the magnetic properties of which were found to be very ſimilar to thoſe of braſs; the native grains becoming magnetic by hammering, and loſing that property by heat; but the precipitate from aqua-regia, fuſed in a violent fire, or rather concreted together by this means, ſhowed no ſign of attraction whatever.

§ 3. *Of the Attraction of the Magnet towards Iron in its various States of Exiſtence.*

I. The firſt experiment which naturally occurs on this ſubject is, Whether mere heat can make any change in the magnetic properties of iron without deſtroying its texture, or diminiſhing the power of the magnet to which it is applied. Kircher ſays, that he tried this experiment, and found that a piece of iron heated to ſuch a degree as to be ſcarcely diſcernible from a burning coal, was in that ſtate as powerfully attracted as if it had been cold. Mr. Cavallo found the effect directly the reverſe; for, having heated a piece of ſteel red hot, and in that ſtate preſented it to the magnet, ſo as to touch it repeatedly in various places, not the leaſt ſign of attraction could be perceived. In this experiment, the redneſs of the iron could plainly be perceived in day-light; and our author acknowledges, that iron, though its redneſs be perceptible in the dark, will ſtill be attracted by the magnet. The reſult was the ſame on repeating the experiment a number of times over; but the attraction became as ſtrong as ever a little after the redneſs ceaſed in the dark. The attraction ſeemed to begin ſooner in ſteel than in iron. Our author does not pretend to ſay, that by heating iron to a red, or even to a white heat, the attraction of the magnet for it is abſolutely annihilated; but it certainly was ſo far diminiſhed that it did not affect the magnetic needle.

II. It was now tried what would be the effect of decompoſing iron; and with this view an earthen veſſel, containing

* Theſe two experiments ſeem inconſiſtent with our author's aſſertion, that calces of iron are *always* affected in ſome degree by the magnet.

about two ounces of iron-filings, was placed near the ſouth end of the needle of the compaſs, by which the latter was drawn a little out of its direction. On adding ſome water, and then vitriolic acid, the attraction ſeemed to be increaſed, and the needle came nearer the veſſel. This ſuperior attraction continued till the effervеſcence began to ceaſe; and at laſt it was found to be inferior to what it had been originally. To obviate ſome objections which might ariſe from the motion of the iron-filings, the experiment was repeated with ſteel-wire twiſted in various directions, ſo as to preſent a large ſurface to the acid; and being placed at a proper diſtance from the needle, it attracted it out of its direction from 281° to 280°. After adding the diluted vitriolic acid, a ſtrong effervеſcence enſued, and the needle was moved to 279° 4′; five minutes after that it ſtood at 279° 35′; and in five minutes more at 279° 30′; ſeeming even to come ſomewhat nearer in a little time after: but as it then appeared to have gained its maximum of attraction, the pot was removed, and the needle went back to its original ſtation of 281°.

On repeating this experiment with different acids, it was found that the vitriolic increaſed the attraction more than either the nitrous or marine. With the former of theſe the maximum of attraction was ſooner gained and ſooner loſt than with the reſt; and with marine acid the attraction was weakeſt of all; which, however, our author imputes to his not being able to raiſe a ſufficient effervеſcence with this acid.

III. The degree of magnetic attraction depends upon the ſtrength of the magnet itſelf, the weight and ſhape of the iron preſented to it, the magnetic or unmagnetic ſtate of the body, and the diſtance between them. A piece of clean and ſoft iron is more powerfully attracted than any other ferruginous ſubſtance of the ſame ſize and ſhape. Steel is attracted leſs powerfully. The attraction is ſtrongeſt at the poles, diminiſhing according to the diſtance from them, and entirely ceaſing at the equator or middle point betwixt the poles. It is ſtrongeſt near the ſurface of the magnet, diminiſhing as we recede from it; but the proportion in which this diminution takes place has not been exactly determined. M. Muſchenbroeck made the following experiments in order to determine this point:

1. A cylindrical magnet, two inches long, and weighing 16 drams, was ſuſpended by an accurate balance above a cylinder of iron exactly of the ſame ſhape and dimenſions, and the degree of attraction betwixt the two meaſured by weights put into the oppoſite ſcale; the magnet being ſucceſſively placed at different diſtances from the iron. The reſults were as follow:

Diſtance in inches	Attraction in grains.
6	3
5	3½
4	4½
3	6
2	9
1	18
0	57

2. A ſpherical magnet of the ſame diameter with the cylindrical one, but of greater ſtrength, was affixed to one of the ſcales of the balance, and the cylindrical magnet uſed in the former experiment placed upon the table with its ſouth pole upwards, facing the north pole of the ſpherical magnet; when the attractions were found as follow:

Diſtance in inches.	Attraction in grains.
6	21
5	27
4	34
3	44
2	64
1	100
0	260

3. Changing the cylindrical magnet for the iron cylinder above mentioned, the reſult was as follows:

Diſtance in inches.	Attraction in grains.
6	7
5	9½
4	15
3	25
2	45
1	92
0	340

IV. Uſing a globe of iron of the ſame diameter with the magnet inſtead of the cylinder, the reſults were:

Diſtance in inches.	Attraction in grains.
8	1
7	2
6	3¼
5	6
4	9
3	16
2	30
1	64
0	290

In the experiments with the cylinder, it was found that the magnet attracted a ſhorter cylinder with leſs force, but in the ſame proportion.—From the others, it appears, that one magnet attracts another with leſs force than a piece of iron, but that the attraction begins from a greater diſtance; whence it muſt follow a different law of decreaſe.

IV. The attraction between the magnet and a piece of iron is ſubject to variation from the mere ſhape of the latter, there being a limit in the weight and ſhape of the iron, in which it will attract it more forcibly than any other; but this can only be determined by actual experiment.

V. It has already been obſerved, that magnetic attraction takes place only between the oppoſite poles of two magnets: however, it frequently happens, that though the north pole of one magnet be preſented to the north pole of another, they ſhow neither attraction nor repulſion; but that, when placed very near each other, they will attract. This is explained by our author in the following manner: "When a piece of iron, or any other ſubſtance that contains iron, is brought within a certain diſtance of a magnet, it becomes itſelf a magnet, having the poles, the attractive power, and, in ſhort, every property of a real magnet. That part of it which is neareſt to the magnet acquires a contrary polarity; but it often happens that one of the magnets being more powerful than the other, will change the pole of that other magnet in the ſame manner as it gives magnetiſm to any other piece of iron which is expoſed to its influence; and then an attraction will take place between two poles apparently of the ſame names; though, in fact, it is an attraction between poles of different names, becauſe one of them has actually been changed. Thus, ſuppoſe that a powerful magnet has been placed with its north pole very near the north pole of a weak magnet, it will be found, that, inſtead of repelling, they will attract each other, becauſe that part of the weak magnet which before was a north pole, has been changed into a ſouth pole by the action of the ſtrong magnet."

VI. Neither the attraction nor the repulſion of magnetiſm is ſenſibly affected by the interpoſition of bodies of any ſort, excepting iron or ferruginous ſubſtances in general. Thus, ſuppoſe that, when a magnet is placed at an inch diſtance from a piece of iron, an ounce, or any determinate weight, is required to move it; the ſame will be required, though a plate of metal, glaſs, or any other ſubſtance excepting iron, be interpoſed. Neither the abſence nor preſence of air has any effect upon it.

VII. By heat the power of a magnet is weakened; and when it arrives at that degree of heat called a white heat, it is entirely deſtroyed. On the other hand, the attraction is increaſed conſiderably by adding more and more weight to the magnet: for thus it will be found, that the magnet will keep ſuſpended this day a little more weight than it did the day before; which additional weight being added to it on the following day, or ſome day after, it will be able to ſuſpend a weight ſtill greater, and ſo on as far as a certain limit. On the other hand, by an improper ſituation, or by diminiſhing the quantity of iron appended to it, the power will decreaſe very conſiderably.

VIII. The magnetic attraction is communicable to any given piece of ſteel only in a certain degree; and therefore if a magnet is ſtrong enough to give the maximum of attraction to the piece, it cannot be afterwards rendered more powerful by applying another magnet, however ſtrong. Thus, indeed, the ſteel may be made ſtronger for a few minutes; but this overplus of attraction begins to go off as ſoon as the ſtrong magnet is withdrawn; and the power, continuing gradually to diminiſh, ſettles in a ſhort time at that degree which is its limit ever after.

IX. Some have aſſerted, that in the northern parts of the world the north pole of the magnet is ſtronger than the ſouth pole, and that in the ſouthern parts the contrary takes place: others are of a quite contrary opinion, affirming, that in the northern regions the ſouth pole is ſtronger than the north one: but neither of theſe opinions has yet been ſufficiently confirmed by experience.

X. If a piece of iron be held to one of the poles of a magnet, the attractive power of the other pole will thus be augmented: hence we may underſtand why a magnet will lift a greater weight from a piece of iron than from wood or any other ſubſtance, viz. that the iron appended to the magnet becomes itſelf a magnet while it remains in that ſituation; and thus, having two poles, the iron which is placed near the one increaſes the attractive power of the other which adheres to the magnet, and enables it to ſuſtain a greater weight than it would otherwiſe do.

XI. Soft iron acquires the magnetic power by being appended to a magnet; but it laſts only while the iron remains in that ſituation, vaniſhing as ſoon as the magnet and iron are ſeparated from each other. With hard iron, but eſpecially ſteel, the caſe is quite different; and the harder the iron or ſteel is, the more permanent is the magnetiſm which it acquires; though in proportion to this ſame hardneſs it is difficult to impregnate it with the virtue.

XII. The ſmalleſt natural magnets generally poſſeſs the greateſt proportion of attractive power; ſo that there have frequently been ſeen magnets not weighing more than 20 or 30 grains, which would take up 40 or 50 times their own weight; but the greateſt proportion of attractive power perhaps ever known, belonged to the magnet worn by ſir Iſaac Newton in his ring. It weighed only three grains, and was able to take up 746 grains, or nearly 250 times its own weight; and Mr. Cavallo has ſeen one which could not weigh more than ſix or ſeven grains, and yet was capable of lifting 300. A ſemicircular ſteel magnet made by Mr. Canton, weighing one ounce and 13 penny-weights, took up 90 ounces: but magnets of above two pounds ſeldom lift more than five or ſix times their own weight, or indeed ſeldom ſo much. It frequently happens that a piece cut off from a large natural magnet will lift more than the ſtone itſelf did when whole; which is to be attributed to the heterogeneous nature of the ſtone itſelf; for, if part of it be impure, it is plain that this can do nothing elſe than obſtruct the virtue of the remainder, which conſequently muſt act more powerfully when the obſtruction is removed.

XIII. As the two magnetic poles taken together are capable of lifting a much greater weight than a ſingle one, and as they are generally ſituated in oppoſite parts of its ſurface, it has been cuſtomary to adapt two broad pieces of ſoft iron to them, letting the pieces project on one ſide of the magnet; becauſe, in that caſe, the pieces themſelves being rendered magnetic, another piece of iron could be conveniently adapted to their projections ſo as to let both poles act in concert. Theſe pieces of iron are generally held faſt upon the magnet by means of a braſs or ſilver box; in which caſe the magnet is ſaid to be *armed*, and the pieces of iron are called its *armature*. For the ſame purpoſe, and to avoid the armature, artificial magnets have been commonly made in the ſhape of a horſe-ſhoe, having their poles in the two extremities. This is by far the beſt ſhape for magnets; and the horſe-ſhoe ones are always more powerful than ſtraight magnetic bars.

§ 4. *Of the Polarity of the Magnet.*

THOUGH, properly ſpeaking, no magnet can have more than two poles, viz. a north and a ſouth one, yet it frequently happens that both the natural and artificial kind are divided as it were into ſeveral magnets; each of which having likewiſe a north and ſouth pole, the whole appears to have a number of poles, ſome of one denomination and ſome of the other.—This plurality of poles ariſes ſometimes from the ſhape, but more commonly from the heterogeneous nature, of the magnet itſelf: and with reſpect to thoſe which have more than two poles, the following laws have been obſerved: 1. That the parts adjacent to one pole are endowed with a contrary polarity. 2. That the poles of one denomination are not always equal in number, but that they never differ by more than one: thus, if the magnet has four ſouth poles, it will either have three, four, or five, north poles. Good and properly ſhaped magnets, however, have only two poles directly oppoſite to one another; though, in truth, it is always one half, or at leaſt a great part of the magnet, that poſſeſſes one kind of polarity, the other having the contrary kind; the two points, which we call the *poles*, being only thoſe where the attractive virtue is ſtrongeſt. Thoſe two points, in good magnets, are joined by a line paſſing through the centre, which line is called the *axis* of the magnet; and a circle whoſe plane is perpendicular to the axis, encompaſſing the middle of the magnet, is called its *equator*; and to complete the ſuppoſed ſimilarity between the terraqueous globe and magnetical bodies, the latter have frequently been formed of a ſpherical ſhape, with the poles and equator marked upon their ſurface; in which caſe they have got the name of *terrellas* or ſmall earths. On breaking a magnet into two or three parts, each one becomes a perfect magnet, though they have not always an equal number of poles of the ſame denomination. The poles of the broken pieces generally anſwer to thoſe of the whole magnet which were neareſt them, though this does not always hold good.

A magnet with two poles will very readily place itſelf in the magnetic meridian, if ſuſpended by a fine thread, or otherwiſe left at liberty to turn; but when there are more than two poles, it may happen that their oppoſite tendencies will counteract each other in ſuch a manner that the magnet cannot

traverſe; though it will ſtill attract and repel as though it had only two. Thus, ſuppoſe that an oblong magnet has a north polarity at both ends, and a ſouth polarity in the middle; if the north poles are both equally ſtrong, then it is plain that neither of them can point towards that quarter in preference to the other; but if a magnet of this kind be broken in the middle, the two parts will traverſe very readily. It very ſeldom happens, however, that both poles are equally ſtrong; in which caſe one of them will always get the better of the other, and the magnet will traverſe notwithſtanding its having more than two poles. The polarity of the magnet is its moſt valuable property, as upon it depends the conſtruction of the magnetic needle or mariner's compaſs, ſo uſeful in navigation: for an account of which, ſee the article COMPASS, and NEEDLE.

For the variation of the needle, or its declination from the true north and ſouth direction, ſee the article VARIATION.

An account of the inclination or dipping of the magnetic needle is given under the article DIPPING *Needle*.

The directive or polar power of a magnet extends farther than its attractive power: thus, if a magnet, freely ſuſpended, be placed in the neighbourhood of another, it will be found that they can affect each other's direction when their attraction towards iron or towards each other cannot be perceived. This may be eaſily tried by placing one of them in a ſcale of a balance, and the other at a diſtance below it.

CHAP. II. *Theory of Magnetiſm.*

THE phenomena of magnetiſm, like thoſe of electricity, depend on a cauſe ſo little ſubject to the inveſtigation of our ſenſes, that any regular and well ſupported theory can as yet ſcarcely be expected. The ſubject indeed is ſtill more difficult than that of electricity; for in the latter the fluid is often made viſible and otherwiſe perceptible by our ſenſes; but no experiment could ever render the cauſe of magnetiſm perceptible otherwiſe than by its effects. The idea of its being occaſioned by a fluid entering in at one pole and paſſing out at another, took its riſe, and became pretty general, from the following experiment: Having put a ſmall artificial magnet among ſome iron-filings laid upon a piece of paper, give the table a few gentle knocks with your hand, ſo as to ſhake the filings a little, and they will diſpoſe of themſelves as repreſented in fig. 1. where AB and CD, fig. 1. pl. 12. repreſent the two poles of the magnet, and the dotted lines the diſpoſition of the filings. But Mr. Cavallo obſerves, that this experiment cannot be any proof of the fluid's circulation; "becauſe, if the fluid, of whatever nature it may be, did really circulate from one pole to the other, and had any action on the filings, theſe would be all driven towards that pole to which the fluid directed its courſe. The true cauſe of the diſpoſition of the filings is their becoming actually magnetic, and their two extremities being poſſeſſed of contrary polarities. Now, when there are many particles of iron near the magnet, thoſe which touch its ſurface are rendered magnetic; conſequently they attract other particles; and theſe being alſo rendered magnetic, attract others, and ſo on, forming ſtrings of ſmall magnets, which gradually increaſe in power as they recede from the magnet. As each of theſe particles has two magnetic poles, by a little conſideration it will appear, that the fartheſt ends of theſe ſtrings or lines which proceed from the parts adjacent to one of the poles of the magnet, for inſtance the north, are likewiſe poſſeſſed of the north polarity; and the fartheſt extremities of thoſe which proceed from the parts adjacent to the ſouth pole of the magnet, are poſſeſſed of the ſouth polarity: hence, when they come ſufficiently near, they attract the extremities of the former ſtrings, and conſequently form the curves delineated on the figure. The ſhaking of the table in this experiment ſerves to ſtir the filings, by making them jump up a little way, and thus place themſelves in the proportion; otherwiſe the action of the magnet will not have power ſufficient to diſpoſe properly thoſe particles which ſtand at a conſiderable diſtance."

The late diſcoveries in electricity have naturally ſuggeſted another theory; viz. that the magnetic phenomena may be occaſioned by a fluid analogous to the electric, or perhaps by the very ſame: and with a view to inveſtigate this theory, the phenomena of magnetiſm and electricity have been accurately compared with each other, and the analogy between them carefully marked. This analogy is found to conſiſt principally in the following particulars:

1. Electricity is of two kinds, poſitive and negative, each of which repels its own kind, and attracts the oppoſite. In magnetics, the north and ſouth poles do the ſame; each being repulſive of its own kind of magnetiſm, and attracting the oppoſite.

2. In electricity, whenever a body in its natural ſtate is brought near an electrified one, it becomes itſelf electrified, and poſſeſſed of the contrary electricity; after which an attraction takes place. In like manner, when a piece of iron or ſteel is brought within the influence of a magnet, it becomes itſelf poſſeſſed of a magnetiſm contrary to that which the magnet poſſeſſes, and is of courſe attracted.

3. One ſort of electricity cannot be produced without the other, neither is it poſſible to produce one kind of magnetiſm without the other alſo.

4. The electric power may be retained by certain ſubſtances, as amber, glaſs, &c. but eaſily pervades other ſubſtances, which are therefore called *conductors*. Magnetiſm has a ſimilar conductor in ſoft iron; for by means of it the virtue may be extended farther than can be done without it; at the ſame time that the iron itſelf loſes all magnetic power the moment it is ſeparated from the magnet. Hardened iron, caſt-iron, and ſteel, perform a part analogous to that of electrics; for the virtue does not eaſily pervade them, but is retained, and may be communicated by them to other unmagnetic pieces, in like manner as the electric virtue may be communicated to bodies by means of an excited electric. With regard to other ſubſtances, they ſeem not to be properly conductors of magnetiſm, becauſe the fluid pervades them as though nothing were preſent, and they cannot tranſmit the virtue farther than it would go without them. With ſoft iron it is otherwiſe. Thus, if to one of the poles of a magnet we append a piece of iron of conſiderable length, the end fartheſt from the magnet will likewiſe attract iron with much more force than the magnet could do at that diſtance without it, while at the ſame time this attractive power is plainly that of the magnet itſelf, and not any way inherent in the iron, as it vaniſhes the moment we ſeparate them. If a piece of hard ſteel of an equal length with the iron be appended to the magnet by one of its ends, we ſhall find that the diſtant end will not manifeſt any attraction, and it will be a conſiderable time before the magnetic virtue can diffuſe itſelf for any diſtance along it; but when the ſeparation is made, the ſteel will be found to be magnetic, and will preſerve its virtue for a long time.

5. The electric virtue exerts itſelf moſt powerfully on points, which are found to carry it off or receive it in vaſt quantities. In like manner a magnet will hold a piece of iron more powerfully by a corner, or blunt point, than by a flat ſurface. On ſharp points, indeed, the magnet has but little hold, by reaſon of the deficiency of ſurface.

6. From ſome experiments in electricity, it appears poſſible to ſuperinduce the negative and poſitive electricities upon one another; and in magnetics it is poſſible to do the ſame. Thus, if we place a wire of ſome length upon a pivot, ſo that it can turn very eaſily, by touching both ends of it upon the

poles of a magnet it will acquire a polarity; one end being repelled by one pole and attracted by the other. If now we give the north end, for inſtance, a very ſlight touch with the north pole of the magnet, we ſhall find that it has a ſmall degree of ſouth magnetiſm ſuperinduced upon it, ſo that on approaching the ſouth pole of the magnet it will be repelled; but by approaching the magnet nearer, or holding the wire for a little from flying away, the ſouth magnetiſm of the wire will be entirely deſtroyed, and the north magnetiſm appear as before. This experiment is not very eaſily made: its ſucceſs depends on having the firſt magnetiſm as ſtrong and the ſecond as weak as poſſible.

Theſe are the moſt remarkable particulars in which magnetiſm and electricity are found to agree; but the differences between them are no leſs remarkable than thoſe particulars. The magnetic power affects none of our ſenſes, and moſt perceptibly at leaſt attracts only iron; while electricity attracts and repels bodies of every kind indiſcriminately. The electric virtue reſides on the ſurface, but that of the magnet pervades the whole ſubſtance. A magnet loſes nothing of its power by communicating its virtue to other bodies, but electricity always does: and, laſtly, the magnetic virtue is permanent; whereas that of electricity, without the greateſt care, is exceedingly periſhable, and capable of being diſſipated.

Notwithſtanding theſe diſagreements, however, the analogies betwixt magnetiſm and electricity are ſo great, that the hypotheſis of a magnetic as well as of an electric fluid has now gained general credit; and upon this hypotheſis profeſſor Æpinus has attempted to ſolve the phenomena of magnetiſm in the following manner:

1. This fluid is ſufficiently ſubtile to penetrate the ſubſtance of all terreſtrial bodies, and like the electric fluid is ſuppoſed to be repulſive of itſelf.

2. There is a mutual attraction between the magnetic fluid and iron, but an indifference betwixt it and all other bodies.

3. There is a great reſemblance betwixt ferruginous bodies and electrics, as the magnetic fluid paſſes with difficulty through the former.

4. Iron and all ferruginous ſubſtances contain a quantity of magnetic fluid equably diſperſed through their ſubſtance when thoſe bodies are not magnetic. In this ſtate they ſhow neither attraction nor repulſion, becauſe the repulſion between the particles of magnetic fluid is balanced by the attraction between the matter of thoſe bodies and the fluid; in which caſe, theſe bodies are ſaid to be in a natural ſtate: but when in a ferruginous body the quantity of magnetic fluid is driven to one, then the body becomes magnetic; one extremity of it being now overcharged with magnetic fluid and the other undercharged. Bodies thus conſtituted, viz. rendered magnetic, exert a repulſion between their overcharged extremities in virtue of the repulſion between the particles of that exceſs of magnetic fluid, which is more than overbalanced by the attraction of their matter. There is an attraction exerted between the overcharged extremity of one magnetic body and the undercharged extremity of the other, on account of the attraction between that fluid and the matter of the body: but to explain the repulſion which takes place betwixt their undercharged extremities, we muſt neither imagine that iron when deprived of the magnetic fluid is repulſive of itſelf, or that the undercharged extremities appear to repel each other only becauſe either of them attracts the oppoſite overcharged extremities.

A ferruginous body, therefore, according to this hypotheſis, is rendered magnetic by having the equable diffuſion of magnetic fluid through its ſubſtance diſturbed, ſo as to have an overplus of it in one or more parts, and a deficiency in others, its magnetiſm remaining as long as its impermeability prevents the reſtoration of the balance between the overcharged and undercharged parts. A piece of iron is rendered magnetic by the vicinity of a magnet; becauſe, when the overcharged part or pole of the magnet is preſented to it, the overplus of the magnetic fluid in that pole repels the fluid away from the neareſt extremity of the iron; which therefore becomes undercharged, or poſſeſſed of the contrary polarity; to the moſt remote part of the iron, which conſequently becomes overcharged, or poſſeſſed of the ſame polarity as the preſented pole of the magnet. When the piece of iron is rendered magnetic by preſenting it to the undercharged extremity or pole of the magnet, then the part of the iron which is neareſt to it becomes overcharged, &c. becauſe that part of the magnet, being deprived of its magnetic fluid, attracts the magnetic fluid of the iron to that extremity of the iron which lies neareſt to itſelf.

Hence, in order to give magnetiſm to a piece of ſteel, the ſtrength of the magnet employed muſt be ſuch as to overcome the reſiſtance which the ſubſtance of the ſteel makes againſt the free paſſage of the magnetic fluid: hence a piece of ſoft ſteel is rendered magnetic more eaſily than a hard one, and a ſtrong magnet will render magnetic ſuch bodies as a weak one cannot affect. When two magnets of equal power have their oppoſite poles preſented to each other, they mutually preſerve and ſtrengthen the powers of each other; but when poles of the ſame denomination are forced together, if the powers are equal, they mutually weaken each other; or if unequal, the weaker will have its poles altered, or perhaps its attractive power entirely deſtroyed in a ſhort time.

Before we make any remarks upon this hypotheſis, it will be neceſſary to take notice of another, which Mr. Cavallo conſiders as ſo well eſtabliſhed, "that there can hardly be a philoſopher ſceptical enough to doubt of its truth." This is, that the earth itſelf is a magnet; which poſition, he ſays, is proved almoſt to a demonſtration in the following manner:

1. Almoſt all the phenomena which may be exhibited with a common magnet may alſo be exhibited with the earth, as far as it can be tried. And,

2. Vaſt maſſes of iron or ferruginous matter actually magnetic are dug out of the earth almoſt in every part of it.

In ſupport of the above poſition, he adduces the phenomena of the compaſs, dipping-needle, and the magnetiſm (to be afterwards explained) which ſoft iron receives when properly ſituated. All theſe may be imitated by a common magnet or terrella. An objection, however, occurs, that the moſt remarkable phenomenon of all, viz. the attraction of iron, is wanting. No experiment has yet ſhown that this metal is attracted more powerfully near the poles than at the equator itſelf; yet this ought very notably to be the caſe in ſuch a large magnetic body. Our author indeed is of opinion, that if the experiment were tried with ſufficient accuracy, the weight of the iron would be augmented by proceeding a conſiderable way either ſouthward or northward. But beſides that this hypotheſis is as yet entirely unſupported by experiment, the difference he even ſuppoſes is quite trifling and inſignificant. The dipping of the needle may indeed ſhow that in this hemiſphere there is a ſuperiority of attraction between one end of the needle and the earth: but it remains to be proved whether this ſuperiority reſides in the needle or in the earth itſelf. The following conſideration indeed ſeems evidently to ſhow that the power, whatever it is, reſides in the needle itſelf; namely, that at the equator, the needle ought to remain in an eaſt and weſt direction, if ſo placed; becauſe of the equal attraction of the north and ſouth poles. Were the needle carried to the pole itſelf, we can only ſuppoſe that it would point perpendicularly downwards; in every other caſe, the attraction will not be perpendicular, but oblique: and ſuppoſing us to recede from the point of perpendicular attraction only a few miles, the obli-

quity would become ſo great, that no attraction or repulſion towards that point would be diſtinguiſhable from an horizontal direction. The inclination of the needle therefore ſhows, that it is not actuated by the influence of a diſtant point in the earth; but by ſome power in the atmoſphere immediately acting upon the needle, and directing its courſe either to the earth, or from it, in a certain poſition.

Thoſe who maintain the magnetiſm of the earth have been conſiderably embarraſſed with ſome of the natural phenomena. The variation of the compaſs firſt ſhowed that the needle was not influenced by thoſe points on which the earth turns round in its diurnal courſe: but this was eaſily ſolved by another hypotheſis, viz. that the earth had two magnetical poles by which the needle is influenced, and two others round which it turns on its axis. This hypotheſis was likewiſe embarraſſed by the continual ſhifting of the variation either to the eaſtward or weſtward. Hence another ſuppoſition was made by Dr. Halley; namely, that there is a large magnet encloſed within the body of the earth, which not being fixed to the external part, moved with reſpect to it, and of conſequence occaſioned the variation. This was likewiſe overthrown, by obſerving that the variation of the compaſs was irregular, and differed ſo much in different parts of the world, that it could not be owing to any regular cauſe diffuſed over the whole. Four magnetic poles were then ſuppoſed to lie within the earth, and to be moveable with reſpect to each other; and that therefore the variation, whoſe theory would now be very intricate, ought to be derived from all their actions conjointly: but, notwithſtanding all this complication of poles, it might ſtill be objected, that ſome kind of regularity, not obſerved in the variation of the magnetic compaſs, ought to have taken place. So that as yet there is no theory which ſeems to explain the variation with any kind of certainty.

The different hypotheſes on this ſubject are more fully conſidered under the article VARIATION: here we ſhall only obſerve, that with reſpect to the magnetiſm of the earth, the particulars already related ſeem to decide againſt its exiſtence. The moſt unequivocal proof we have of the exiſtence of magnetiſm is the attraction of iron; and this capital mark is deficient, or at leaſt has never been proved, in the earth. The poles of all the magnets, we know, are fixed and invariable; nor are we obliged to have recourſe to magnets within magnets, or other uncouth ſuppoſitions, to account for their phenomena: if the earth is a magnet, therefore, the magnetiſm it poſſeſſes muſt be of a kind ſo different from the property uſually diſtinguiſhed by that name, that we can in no reſpect determine them to be the ſame.

Mr. Cavallo is of opinion that "the magnetiſm of the earth ariſes from the magnetiſm of all the magnetic ſubſtances contained in it, and intermixed with other bodies; that the magnetic poles of the earth may be conſidered as the centres of the polarities of all the particular aggregates of the magnetic ſubſtances; and that thoſe principal poles muſt change place relatively to the ſurface of the earth, according as the particular aggregates of magnetic ſubſtances within the earth are in ſome manner or other altered, ſo as to have their power diminiſhed, increaſed, approached or removed from the principal poles." But this ſeems not by any means ſufficient to account for the phenomena. The magnetic needle is indeed affected by iron at a diſtance, but that diſtance is by no means conſiderable. A magnet or needle in a houſe in one ſtreet will not be affected by a ſmith's ſhop or iron warehouſe in another; and there is an undoubted certainty that the magnetic needle is affected on ſome parts of the ſea where no magnetic bodies can be preſent unleſs at a great diſtance on land, or below the unfathomable depths of the ocean. Beſides, let us imagine as many of theſe bodies as we pleaſe within the ſurface of the earth, they muſt be ſuppoſed, in order to account for the phenomena of the needle, to have their poles lying all nearly the ſame way; which can by no means be proved to be the caſe; not to mention that the attraction of iron would in ſome places be very perceptible, which has never yet been experienced in any part of the world.

Laſtly, the hypotheſis of the magnetiſm of the earth ſeems to be entirely overthrown by the following curious method of giving magnetiſm inſtantaneouſly to an iron-bar: Take a bar of ſoft iron two or three feet long, and between an half and two inches thick; which deſcription is very well anſwered by ſome kitchen pokers. Place it in the magnetical line, *i. e.* the poſture aſſumed by the dipping needle; or, if a needle of this kind is not at hand, place it ſtraight up in any degree of north or ſouth latitude beyond 40°, or horizontally if nearer to the equator. Preſent then a magnetic needle to various parts of the bar; and it will be found, that in this country the lower half of the bar will repel the north end of the needle, and the upper half attract it. In ſouth latitudes the caſe will be reverſed; for the lower end will attract the north pole of the needle, and the upper end repel it. If the bar be not very ſhort, its extremities will alſo attract ſmall bits of iron, as filings, &c. On turning it upſide down, the end which repelled the north pole of the needle before will now attract it; the reaſon of which is, that in the northern hemiſphere the end which is neareſt the earth always becomes a north pole, and in the ſouthern hemiſphere a ſouth one. Now it is plain, that, conſidering the diſtance of both poles of the earth from the iron-rod, any kind of poſture in which we can place it muſt make a difference ſo trifling, that we cannot ſuppoſe the one to influence it more than the other. The whole phenomenon ſhows that there is in the atmoſphere a current of fluid either going into the earth, or coming out from it, which influences iron when held in the direction in which itſelf moves. That it does not influence the metal when lying horizontally, may be owing to its want of ſufficient breadth to render the effect perceptible. The earth therefore is not a magnet, but is ſurrounded by a fluid whoſe motion is productive of magnetiſm in iron; and moſt probably, though it produces this as it were accidentally, will be found to anſwer much more important purpoſes in the economy of nature. The next queſtion then is with regard to the fluid itſelf: and this, from many articles in this work, will appear to be the ſame with that of electricity. Under the articles AURORA *Borealis*, EARTHQUAKE, ELECTRICITY, &c. it is ſhown, that the ſolar light, abſorbed by the equatorial regions of the earth, becomes ſubject to new laws of motion, acting in ſhort as if it were another fluid, in which ſtate we call it *electricity*, or the *electric fluid*. In this ſtate it paſſes through the ſubſtance of the earth from the equator towards the polar regions, getting out again in the vicinity of the poles, aſcending into the high atmoſpherical regions, and then returning to the equatorial parts from whence it came. On this ſuppoſition, which appears to be greatly confirmed by various natural phenomena, it is eaſy to ſee, why in the northern and ſouthern parts the direction of the currents iſſuing from the earth ſhould always become more and more perpendicular to the earth as we approach the poles, and on the contrary why their direction muſt be horizontal or nearly ſo in the equatorial parts. The diſcovery of this general cauſe, therefore, ſeems to be the neareſt approach we can as yet make to the knowledge of the origin of magnetical phenomena. In what manner *iron* more than other metals is influenced by this fluid, or why the direction of a current of electric matter, either to or from the earth, ſhould cauſe ſuch ſtrong attractions as magnetical bodies are ſometimes endowed with, we have as yet no data for underſtanding.

Æpinus's theory of an accumulation of the electric fluid in

one pole, and a deficiency of it in the other, ſeems not to be tenable in any reſpect. It is impoſſible to ſhow why the mere turning of a bar upſide down ſhould accumulate the fluid, unleſs it was a gravitating one in the end next the earth; and though we ſhould even make this extravagant ſuppoſition, it will be as difficult to account for the very ſame fluid being repelled by the earth in the ſouthern hemiſphere: for, if we account the north magnetiſm an accumulation, we muſt count the ſouth one a deficiency; or, if the ſouth magnetiſm is an accumulation, the oppoſite one muſt be a deficiency; and whichever ſuppoſition we adhere to, the difficulties are equally great and unſurmountable.

Chap. III. *Practice of Magnetiſm.*

THIS conſiſts in communicating the magnetic virtue from one body to another; making artificial magnets, compaſſes, dipping-needles, &c.; and inveſtigating the various phenomena reſulting from bodies placed in different ſituations.

§ 1. *To communicate Magnetiſm by the Loadſtone.*

Magnetism is communicated merely by preſenting a piece of iron or ſteel to one of the poles of a magnet or loadſtone, even without touching it; though a ſtrong and permanent power cannot be given without contact, or even ſtroking the one upon the other for a number of times. In this operation, that part of the ferruginous body which touches the pole of the magnet acquires the contrary magnetiſm; that is, if it touches the north pole, it will turn towards the ſouth, *et vice verſa*. The power acquired is ſtrongeſt when ſoft iron is applied, weaker with hardened iron, and weakeſt of all with hard ſteel: but the permanency of it follows juſt the reverſe of this rule; for ſteel or hardened iron will preſerve its virtue for many years, but ſoft iron loſes it the moment we withdraw the magnet. When we deſire a ſtrong and permanent virtue, therefore, it is beſt to uſe the hardeſt ſteel, and to impregnate it by means of one or more powerful magnets; taking care that the north pole of the magnet which gives the virtue be applied to that end of the ſteel which is to be made the ſouth pole. The ſame method may be employed in rendering a weak magnet more powerful than before, or in reſtoring the virtue to one which has loſt it.

The operation of communicating magnetiſm to pieces of ſteel or iron, is called *touching* them; and as this is of the utmoſt utility in navigation, for the purpoſe of giving polarity to needles, very conſiderable pains have been beſtowed upon the ſubject, in order to diſcover the methods of giving them the magnetic virtue in the moſt effectual and permanent manner.—When only one magnetic bar is to be made uſe of, one of its poles muſt be applied as repreſented fig. 2. pl. 12. where C D repreſents the needle or ſteel bar to be impregnated. The magnet A B is then to be drawn all along the ſurface of it, till it reaches the extremity D. The magnet being then removed, muſt be applied to the extremity C, and drawn over the needle as before. Thus the needle muſt be rubbed ſeveral times; by which means it will acquire a conſiderable degree of magnetiſm. In this method, that other extremity of the needle which the magnet touched laſt acquires the contrary magnetiſm; that is, if B be the north pole of the magnet, C will be the north pole, and D the ſouth of the needle. This method, however, is never found to be equally effectual with that in which two magnets, or both poles of one magnet, are made uſe of.

To communicate magnetiſm by means of two magnetic bars, place the bar or needle A B, fig. 3. upon a table; then ſet the two magnetic bars C D, E F, ſtraight upright upon it at a little diſtance equal on both ſides from the middle of the bar A B, and in ſuch a manner that the ſouth pole D of one of the bars may be neareſt to that end of the bar A B which is to become the north pole, &c. Theſe two bars muſt then be ſlid gradually towards one extremity of the bar, keeping them conſtantly at the ſame diſtance from each other; and when one of them, for inſtance C D, is arrived at A, then they muſt be ſlid the contrary way, till E F arrives at B; and thus the bar A B muſt be rubbed a greater or ſmaller number of times, till it will be found by trial to have acquired a conſiderable power. When the magnetic bars are powerful, and the bar A B of very good ſteel, and not very large, a dozen of ſtrokes are fully ſufficient; but when the bars are to be removed from the bar A B, care muſt be taken to bring them to the ſame ſituation where they were firſt placed; viz. at a little and equal diſtance from the middle of the bar A B, from whence they may be lifted up.

If it be required to communicate the greateſt magnetic power poſſible, we may proceed in the following manner: 1. The magnetic bars may be joined at top, as in fig. 4. interpoſing a piece of wood, or any other ſubſtance excepting iron; for thus the oppoſite poles being contiguous in the upper part, ſtrengthen each other, and of conſequence the lower ones are alſo ſtrengthened. 2. The bar to be rendered magnetic may be placed between the bars of ſoft iron, as ſhown in the ſame figure. 3. The magnetic bars may be inclined the contrary way, as recommended by Mr. Æpinus, making an angle of about 15 degrees with the bar A B. See fig. 5. In the ſame manner may a bar be rendered magnetic by an armed or horſe-ſhoe magnet. In any of the methods hitherto mentioned, however, the bar to be rendered magnetic muſt be ſtroked on every ſide; and to let the magnetic centre fall juſt in its middle, care muſt be taken to ſtroke one half of the bar juſt as much as the other. Whenever a ſteel bar, or, in general, any piece of ferruginous matter, is rendered magnetic by the application of two bars, or by the two poles of one magnet, the operation is called the *double touch*, but the ſingle touch when only one bar is applied.

Artificial magnets of a ſemicircular form, or ſhaped like a horſe-ſhoe, have the magnetiſm communicated to them in the ſame manner with thoſe which are ſtraight, only the magnetic bars uſed for this purpoſe muſt follow the curvature of the bar to be impregnated. Thus, ſuppoſe it is required to impregnate the crooked piece of ſteel A B C, fig. 6. lay it flat on a table, and to its extremities apply the magnets D F, E G, joining their extremities F G with the conductor or piece of ſoft iron F G. Apply then the magnetic bars H I to the middle of the piece A B C, and ſtroke it with them from end to end, following the direction of the bent ſteel, ſo that on one ſide of it the magnetic bars may ſtand as repreſented by the dotted lines L K. When the piece of ſteel has been thus rubbed a ſufficient number of times on one ſide, it is then to be turned, and rubbed in like manner on the other, until it has acquired a ſufficient degree of magnetiſm.

From conſidering that ſoft iron, or ſoft ſteel, acquires magnetiſm very eaſily, though it loſes it with equal facility, Mr. Cavallo was induced to ſuppoſe, that if magnetiſm were to be communicated to a piece of hard ſteel while ſoftened by heat, and the metal were then to be hardened by pouring cold water upon it while in the act of receiving the magnetiſm, it was poſſible the virtue might be moſt communicated to them in a very high degree, and might be fixed by means of the hardening of the ſteel. To determine this matter, ſix magnetic bars were placed in an oblong earthen veſſel, in ſuch a manner that the north poles of three of them might be oppoſite to the ſouth poles of the three others, forming two parcels of bars lying in the ſame direction, and about three inches aſunder, which was nearly the length of the ſteel bar intended to be rendered magnetic. The bar was made quite red hot, and in that ſtate was placed between the magnetic bars. Cold water was then imme-

diately poured upon it; by which it was hardened to ſuch a degree that the file could not touch it: but though it had thus received a conſiderable degree of magnetiſm, the power was not ſuperior to what might have been communicated in the ordinary way. On repeating the experiment with ſteel-bars of different ſizes, it was found that ſhort bars receive a proportionably greater degree of power than long ones, and that becauſe the latter cannot be ſufficiently penetrated by the magnetic power when the magnets are placed at their ends; and if a number of magnets be placed along the ſides, in order to communicate a greater degree of virtue, it frequently happens that the bar acquires a number of poles. Our author is nevertheleſs of opinion, that this method is of conſiderable uſe: though by it we cannot communicate any extraordinary degree of magnetiſm, it is yet very uſeful in conſtructing large artificial magnets. For thus they will acquire a conſiderable degree of power, without any additional trouble to the workman, and may then be fully impregnated in the uſual way; which cannot be done without a great deal of labour when the operation is begun upon bars which have no virtue at all.

§ 2. *To communicate the Magnetic Virtue without any Magnet either natural or artificial.*

THIS may be done with a ſoft iron-bar in the manner already related, viz. by turning it in a poſition perpendicular to the ſurface of the earth, or any other excepting a line directly perpendicular to the dipping-needle. The magnetiſm thus acquired, however, is always weak, and is inſtantaneouſly loſt; while a ſteel-bar will not receive any perceptible degree of magnetiſm by this method. But if an iron-bar be made red hot, and left to cool in the magnetic line, or if it be repeatedly ſtruck with a hammer while in that line, it will acquire a ſmall degree of permanent magnetiſm: though this alſo will ſoon vaniſh by leaving the bar in an improper poſition, or by inverting and ſtriking it again. The magnetiſm laſts longer in proportion to the hardneſs of the iron: but a longer time will be required to give it the degree of virtue it is capable of receiving by this method. If an iron bar be left for a long time in the direction of the magnetic line, or even in a perpendicular poſture, it will ſometimes acquire a great degree of power. Mr. Boyle makes mention of an iron-bar, ten feet long, which had acquired ſo much virtue by ſtanding in this poſture, that it exceeded a loadſtone of three pounds and a half weight, and would turn the needle at eight or ten feet diſtance. Even tongs, pokers, and other kitchen utenſils, by being often heated, and ſet to cool again in an erect poſture, are frequently obſerved to gain a magnetic virtue. Sometimes iron-bars, which were not capable of receiving permanent magnetiſm on account of their ſoftneſs, have, merely by expoſure to the atmoſphere for a great length of time, acquired a conſiderable degree of power; at the ſame time it has been remarked, that theſe bars became much harder by this expoſure; the cauſe of which has not yet been diſcovered.

Iron or ſteel acquires a very perceptible degree of magnetiſm by drilling, hammering, or other methods by which they are put into violent action. The cauſe of this magnetiſm Mr. Cavallo looks for in the earth itſelf, the changeable nature of the metal by heat or cold, and the vibratory motion into which its parts are accidentally put. "For the ſame reaſons (ſays he) it ſeems that magnetiſm, in certain caſes, is produced by electricity; the particulars obſerved concerning which are the following:—When the bar or needle is laid horizontally in the magnetic meridian, whichever way the ſhock of an electric jar or battery enters, the end of the needle which lies towards the north acquires the north polarity, viz. the power of turning towards the north when freely ſuſpended, the other end acquiring the ſouth polarity. If the bar before it receives the ſhock has ſome polarity, and is placed with its poles contrary to the uſual direction, then its original polarity is always diminiſhed, and ſometimes reverſed. When the needle is ſtruck ſtanding perpendicularly in this hemiſphere, the lower end becomes the north pole, even when it had ſome magnetiſm before, and receives the ſhock while ſtanding with its ſouth pole downwards. When all other circumſtances are alike, the degree of magnetiſm received ſeems to be the ſame, whether the needles are ſtruck while ſtanding horizontally in the magnetic meridian or perpendicular to the horizon. When a needle is placed in the magnetic equator, a ſhock through its length very ſeldom renders it magnetic; but if the ſhock be paſſed through its width, it acquires the virtue, the extremity which lay towards the weſt generally becoming the north pole. If a needle or bar ſtrongly magnetic, or a natural magnet, be ſtruck by the electric ſhock, its power is thereby diminiſhed. When the ſhock is too ſtrong, ſo that the needle is ther by rendered conſiderably hot, it acquires either no magnetiſm at all or a very ſmall degree of it. Hence a ſtroke of lightning often renders pieces of iron or ſteel magnetic, as well as thoſe bodies which naturally contain iron, as ſome bricks, &c.

There are various methods of communicating a permanent magnetiſm to ferruginous bodies, by means of a bar rendered magnetic by the earth; of which the moſt ſimple is that deſcribed by Mr. Marcel, whoſe experiments were made in the year 1726. Being employed in making ſome obſervations on the magnetic power which he found in great pieces of iron, he took a large vice weighing 90 pounds, in which he fixed a ſmall anvil weighing 12 pounds. The ſteel to which he wiſhed to give the magnetic virtue was laid upon the anvil in a north and ſouth poſition, which happened to be the diagonal of the ſquare ſurface of the latter. He then took a piece of iron an inch ſquare, and 33 inches long, weigning about eight pounds, having one end rounded and brightly poliſhed, the other being tapered. Holding then the ſteel faſt upon the anvil with one hand, he took the iron bar in the other; and holding it perpendicularly, he rubbed the ſteel hard with the rounded part towards him from north to ſouth, always carrying the bar far enough round about to begin again at the north. Having thus given 10 or 12 ſtrokes, the ſteel was turned upſide down, and rubbed as much on the other ſide. Proceeding in this manner till it had been rubbed 400 times, the ſteel was as ſtrongly magnetic as if it had been touched by a powerful loadſtone. The place where he began to rub was always the north pole. In theſe experiments it ſometimes happened that the virtue was imparted by a few ſtrokes; nay, by a ſingle one, a ſmall needle was made to receive a very conſiderable power. Thus he imparted to two compaſs needles ſuch a degree of magnetic power, that one took up three-fourths and another a whole ounce of iron; and though theſe needles were anointed with linſeed oil to keep them from ruſting, and a hard coat was thus formed upon them, they nevertheleſs retained their virtue. Thus alſo a knife was made ſo ſtrongly magnetical, that it would take up an ounce and three quarters of iron. Four ſmall pieces of ſteel, each an inch long and one-twelfth of an inch broad, as thin as the ſpring of a watch, were thus impregnated with the magnetic virtue, and then joined into a ſmall artificial magnet; which at its firſt formation took up eight times its own weight of iron; and after being ſix years kept in the moſt careleſs manner, was found to have rather gained than loſt any thing of its virtue. In the courſe of his experiments, Mr. Marcel found, that the end at which he began to rub was always the north pole, whatever poſition the ſteel was laid in. On rubbing a piece of ſteel from one end to the middle, and then from the other end to the middle, it acquired two north poles, one at each end, the middle being a ſouth pole. Beginning to rub

from the middle towards each end, he found a north pole in the middle and a ſouth pole at each extremity.

Magnetiſm may be communicated to a ſmall piece of ſoft ſteel in the following manner: Take two iron bars of about an inch ſquare, and upwards of three feet in length, keep them in the magnetical line, or in a perpendicular poſture, as repreſented fig. 7. pl. 12. Let the piece of ſteel C B be either faſtened to the edge of a table or held by an aſſiſtant; and placing the lower extremity of the bar A B, and the upper extremity of the bar C D, on oppoſite ſides, and in the middle of the ſteel, ſtroke the latter from the middle towards its extremities, moving both bars at the ſame time. When both are arrived at the extremities of the ſteel, remove them from it, and apply them again to the middle. Do ſo for 40 or 50 times, and the ſteel will be found to have a conſiderable degree of magnetic power. Care, however, muſt be taken, in removing the bars, not to draw them along the ſurface of the ſteel, or the experiment will not ſucceed, becauſe the magnetiſm is deſtroyed by the contrary ſtrokes.

The late Dr. Godwin Knight poſſeſſed a ſurpriſing ſkill in magnetiſm, being able to communicate an extraordinary degree of attractive or repulſive virtue, and to alter or reverſe the poles at pleaſure; but as he refuſed to diſcover his methods upon any terms whatever (even, as he ſaid, though he ſhould receive in return as many guineas as he could carry), theſe curious and valuable ſecrets have died with him. In the 69th volume of the Philoſophical Tranſactions, however, Mr. Benjamin Wilſon hath given a proceſs which at leaſt diſcovers one of the leading principles of Dr. Knight's art, and may perhaps be a means of diſcovering the whole to thoſe who ſhall be leſs reſerved. The doctor's proceſs, according to Mr. Wilſon, was as follows: Having provided himſelf with a great quantity of clean iron-filings, he put them into a large tub that was more than one-third filled with clean water; he then, with great labour, worked the tub to and fro for many hours together, that the friction between the grains of iron by this treatment might break off ſuch ſmaller parts as would remain ſuſpended in the water for a time. The obtaining of theſe very ſmall particles in ſufficient quantity ſeemed to him to be one of the principal deſiderata in the experiment. The water being by this treatment rendered very muddy, he poured the ſame into a clean iron veſſel, leaving the filings behind; and when the water had ſtood long enough to become clear, he poured it out carefully, without diſturbing ſuch of the ſediment as ſtill remained, which now appeared reduced almoſt to impalpable powder. This powder was afterwards removed into another veſſel in order to dry it; but as he had not obtained a proper quantity thereof by this one ſtep, he was obliged to repeat the proceſs many times. Having at laſt procured enough of this very fine powder, the next thing was to make a paſte of it, and that with ſome vehicle which would contain a conſiderable quantity of the phlogiſtic principle: for this purpoſe, he had recourſe to linſeed oil in preference to all other fluids. With theſe two ingredients only he made a ſtiff paſte, and took particular care to knead it well before he moulded it into convenient ſhapes. Sometimes, while the paſte continued in its ſoft ſtate, he would put the impreſſion of a ſeal upon the ſeveral pieces; one of which is in the Britiſh Muſæum. This paſte was then put upon wood, and ſometimes on tiles, in order to bake or dry it before a moderate fire, at about the diſtance of a foot or thereabouts. He found that a moderate fire was moſt proper, becauſe a greater degree of heat made the compoſition frequently crack in many places. The time required for the baking or drying of this paſte was generally about five or ſix hours before it attained a ſufficient degree of hardneſs. When that was done, and the ſeveral baked pieces were become cold, he gave them their magnetic virtue in any direction he pleaſed, by placing them between the extreme ends of his large magazine of artificial magnets for a few ſeconds or more as he ſaw occaſion. By this method the virtue they acquired was ſuch, that, when any of thoſe pieces were held between two of his beſt ten-guinea bars, with its poles purpoſely inverted, it immediately of itſelf turned about to recover its natural direction, which the force of thoſe very powerful bars was not ſufficient to counteract.

In the 66th volume of the Philoſophical Tranſactions we have the following account, from Dr. Fothergill, of Dr. Knight's method of imitating natural magnets, but which is by Mr. Cavallo ſuppoſed to be owing to ſome miſtake or miſinformation. "I do not know (ſays he), that ever the doctor (Dr. Knight) left behind him any deſcription of a compoſition he had made to form artificial loadſtones. I have ſeen in his poſſeſſion, and many other of his friends have likewiſe ſeen, ſuch a compoſition; which retained the magnetic virtue in a manner much more fixed than either any real loadſtone or any magnetic bar however well tempered. In the natural ones he could change the poles in an inſtant, ſo likewiſe in the hardeſt bars; but in the compoſition the poles were immoveable. He had ſeveral ſmall pieces of this compoſition which had ſtrong magnetic powers. The largeſt was about half an inch in breadth, very little longer than broad, and near a quarter of an inch thick. It was not armed, but the ends were powerfully magnetic; nor could the poles be altered, though it was placed between two of his largeſt bars, and they were very ſtrongly impregnated. The maſs was not very heavy, and had much the appearance of a piece of black lead, though not quite ſo ſhining. I believe he never divulged this compoſition; but I think he once told me, the baſis of it was filings of iron reduced by long continued attrition to a perfectly impalpable ſtate, and then incorporated with ſome pliant matter to give it due conſiſtence."

From theſe accounts it appears that the baſis of Dr. Knight's artificial loadſtones was the black powder to which iron filings are reduced by water, and which is known among the apothecaries by the name of *Martial Æthiops*: whence Mr. Cavallo gives the following receipt for imitating the natural magnets:—Take ſome martial æthiops, or, which is more eaſily procured, reduce into very fine powder the ſcales of iron which fall from red hot iron when hammered, and are found abundantly in ſmiths' ſhops. Mix this powder with drying linſeed oil, ſo as to form it into a very ſtiff paſte, and ſhape it in a mould ſo as to give it any form you require; whether of a terella, a human head, or any other. This done, put it into a warm place for ſome weeks, and it will dry ſo as to become very hard; then render it magnetic by the application of powerful magnets, and it will acquire a conſiderable power.

As to the method of making artificial magnets of ſteel, none has ſucceeded in it better than Mr. Canton, whoſe proceſs is as follows:

Procure a dozen of bars; ſix of ſoft ſteel, each three inches long, one quarter of an inch broad, and one twentieth of an inch thick; with two pieces of iron, each half the length of one of the bars, but of the ſame breadth and thickneſs: alſo ſix pieces of hard ſteel, each five inches and a half long, half an inch broad, and three-twentieths of an inch thick; with two pieces of iron of half the length, but the whole breadth and thickneſs of one of the hard bars; and let all the bars be marked with a line quite round them at one end. Then take an iron poker and tongs (fig. 8. pl. 12.), or two bars of iron, the larger they are and the longer they have been uſed the better; and fixing the poker upright between the knees, hold to it, near the top, one of the ſoft bars, having its marked end downwards, by a piece of ſewing ſilk, which muſt be pulled tight by the left hand, that the bar may not ſlide: then graſping the tongs with the right hand, a little below the middle,

and holding them nearly in a vertical position; let the bar be ſtroked by the lower end from the bottom to the top, about ten times on each ſide, which will give it a magnetic power ſufficient to lift a ſmall key at the marked end: which end, if the bar was ſuſpended on a point, would turn towards the north, and is therefore called the *north pole*; and the unmarked end is, for the ſame reaſon, called the *ſouth pole*. Four of the ſoft bars being impregnated after this manner, lay the two (fig. 9.) parallel to each other, at the diſtance of one fourth of an inch, between the two pieces of iron belonging to them, a north and a ſouth pole againſt each piece of iron: then take two of the four bars already made magnetical, and place them together ſo as to make a double bar in thickneſs, the north pole of one even with the ſouth pole of the other: and the remaining two being put to theſe, one on each ſide, ſo as to have two north and two ſouth poles together; ſeparate the north from the ſouth poles at one end by a large pin, and place them perpendicularly with that end downward on the middle of one of the parallel bars, the two north poles towards its ſouth and the two ſouth poles towards its north end: ſlide them backward and forward three or four times the whole length of the bar, and, removing them from the middle of this, place them on the middle of the other bar as before directed, and go over that in the ſame manner; then turn both the bars the other ſide upwards, and repeat the former operation: this being done, take the two from between the pieces of iron; and, placing the two outermoſt of the touching bars in the room, let the other two be the outermoſt of the four to touch theſe with; and this proceſs being repeated till each pair of bars have been touched three or four times over, which will give them a conſiderable magnetic power, put the half-dozen together after the manner of the four (fig. 10.), and touch them with two pair of the hard bars placed between their irons, at the diſtance of about half an inch from each other: then lay the ſoft bars aſide; and with the four hard ones let the other two be impregnated (fig. 11.), holding the touching bars apart at the lower end near two-tenths of an inch; to which diſtance let them be ſeparated after they are ſet on the parallel bar, and brought together again before they are taken off: this being obſerved, proceed according to the method deſcribed above, till each pair have been touched two or three times over. But as this vertical way of touching a bar will not give it quite ſo much of the magnetic virtue as it will receive, let each pair be now touched once or twice over in their parallel poſition between the irons (fig. 12.), with two of the bars held horizontally, or nearly ſo, by drawing at the ſame time the north pole of one from the middle over the ſouth end, and the ſouth of the other from the middle over the north end of a parallel bar; then bringing them to the middle again, without touching the parallel bar, give three or four of theſe horizontal ſtrokes to each ſide. The horizontal touch, after the vertical, will make the bars as ſtrong as they poſſibly can be made, as appears by their not receiving any additional ſtrength, when the vertical touch is given by a great number of bars, and the horizontal by thoſe of a ſuperior magnetic power. This whole proceſs may be gone through in about half an hour; and each of the large bars, if well hardened, may be made to lift 28 Troy ounces, and ſometimes more. And when theſe bars are thus impregnated, they will give to an hard bar of the ſame ſize its full virtue in leſs than two minutes; and therefore will anſwer all the purpoſes of magnetiſm in navigation and experimental philoſophy much better than the loadſtone, which is known not to have a ſufficient power to impregnate hard bars. The half dozen being put into a caſe (fig. 13.) in ſuch a manner as that two poles of the ſame denomination may not be together, and their irons with them as one bar, they will retain the virtues they have received; but if their power ſhould, by making experiments, be ever ſo far impaired, it may be reſtored without any foreign aſſiſtance in a few minutes. And if, out of curioſity, a much larger ſet of bars ſhould be required, theſe will communicate to them a ſufficient power to proceed with; and they may, in a ſhort time, by the ſame method, be brought to their full ſtrength.

To expedite the proceſs of making magnets, the bars ſhould be fixed in a groove, or between braſs pins, to prevent them from ſliding; or they may be kept ſteady by means of a weight and ruler, as in fig. 11.

§ 3. *Apparatus for making Experiments in Magnetiſm, with an Account of various Experiments tending to illuſtrate and prove the Laws already laid down.*

The apparatus neceſſary in magnetics is but ſmall; conſiſting only of a few magnets or magnetic bars, a magnetic horizontal needle or compaſs, and a dipping needle. For thoſe who do not intend to be very accurate, a common artificial horſe-ſhoe magnet and a few ſewing needles may be ſufficient; but where greater accuracy is required, it will then be neceſſary to have a good ſet of magnetic bars, commonly ſix; a few ſmall magnetic needles, a larger needle in a box with a graduated circle, and a dipping needle; towhich may be added ſome pieces of ſteel-wire, a few bars of ſoft iron, &c.

The magnetic bars ought to be made of the beſt ſteel, and tempered quite hard. There is not, however, any method known as yet by which we can diſtinguiſh the kind of ſteel which is beſt for magnetical purpoſes. It will be proper, therefore, previous to the conſtruction of the bars, to try the quality of the metal in the following manner: Take a piece of it about three inches long and a quarter of an inch thick, no matter whether round or ſquare; make it red-hot, and in that condition plunge it into cold water, which hardens it ſo that a file will not touch it. Apply then two powerful magnetic bars; holding the north-pole of one to one extremity of the ſteel, and the ſouth-pole of the other magnet to the other extremity of the ſteel. Having kept them in this poſition for about a minute, ſeparate them from the ſteel, and then try whether it will keep ſuſpended a key or other piece of iron which may be at hand. By treating in this manner pieces of different ſteel, it will eaſily be perceived which is capable of lifting the greateſt weight, and conſequently the moſt proper for the conſtruction of the bars.

Having determined the quality of the material, the next thing to be conſidered is the ſhape of the bars; for unleſs the length and breadth of them bear a certain proportion to each other, they will not be capable of receiving their utmoſt power. The beſt ſhape, according to Mr. Cavallo, is when the length is ten times the breadth and 20 times the thickneſs. The uſual dimenſions are five inches in length, half an inch in breadth, and a quarter of an inch in thickneſs. Cylindrical bars are leſs convenient.—It is not abſolutely neceſſary to poliſh theſe bars; though it will be better to do ſo, they being in this ſtate much leſs liable to ruſt. One extremity is generally marked with a line all round, to diſtinguiſh one pole from another; and it is the north pole which is uſually marked in this manner. When kept together, the magnetic bars muſt be placed alternately with the marked end of one contiguous to the unmarked end of the other. Two pieces of ſoft iron called *ſupports* always belong to each ſet of bars. Each of theſe is equal in ſize to the half of one of the bars; ſo that when placed contiguous to one another in one direction, they may equal one of the bars. Theſe are uſeful when other bodies are to be rendered magnetic. For the conſtruction of the Compass and Dipping-*Needle*, ſee thoſe articles.

Experiments with the above deſcribed Apparatus.

1. *To determine whether any ſubſtance is attracted by the*

magnet or not.—If the ſubſtance to be examined contains iron, the attraction will evidently ſhow itſelf on bringing near it one of the magnetic bars. The quantity of attraction will always be known by the force requiſite to ſeparate them, and its proportion is eſtimated by the degree of that force. Thus, if two ounces are required to ſeparate a magnet from any ſubſtance, the degree of attraction is reckoned double to that which requires only one ounce to ſeparate them. If the attraction be ſo ſmall that it cannot be perceived in this way, it muſt be put to ſwim upon water in an earthen or wooden veſſel, by means of a piece of wood or cork. In this way the attraction will be much more eaſily manifeſted by the body coming towards the magnet when approached to it. It will ſometimes be neceſſary to bring the magnet within one-tenth part of an inch of the body to be attracted; and as the latter advances, care muſt be taken to withdraw the magnet; for, if they be ſuffered to ſtrike againſt each other, the body, if hard, will generally recede; and it will likewiſe be proper to preſent the magnet to the body when the latter is at reſt.

By letting the ſubſtances to be attracted ſwim upon quickſilver, a ſtill ſmaller degree of attraction can be perceived. In uſing this fluid, the following particulars muſt be attended to: 1. The aperture of the veſſel in which the quickſilver is kept muſt be at leaſt ſix inches in diameter. The reaſon of this is, that, as the ſurface of the quickſilver deſcends near the ſides of the veſſel, the curvature of ſurface formed by that deſcent is proportionably greater in the narrow veſſels than larger ones. If the veſſel is only three or four inches in diameter, the body to be attracted will perpetually run from one ſide to another: a common ſoup-plate, however, will be found a very convenient veſſel for this purpoſe. 2. It will be neceſſary to have the quickſilver very pure; and as it is very difficult to preſerve it in that ſtate, it muſt be frequently paſſed through a piece of writing paper rolled up conically, and having a ſmall aperture of about $\frac{1}{40}$th of an inch diameter in the lower part. 3. The neighbouring air muſt not be diſturbed, that the body may be kept without motion; and, while in this ſtate, one of the poles of the magnet is to be preſented to it in the ſame manner as when the experiment is tried with water. It was in this manner that Mr. Cavallo made his experiments on the magnetiſm of braſs and other metals, of which we have already given an account.

If it be ſuſpected that the given body have ſome magnetiſm already, the very ſame proceſs is required; only obſerving to preſent a piece of ſoft and clean iron to the body when ſwimming upon water or quickſilver. A piece of iron about half an ounce weight, and an inch in length, will be very proper for this purpoſe.

2. *To find the poles of a magnetic body.*—Preſent the various parts of the body ſucceſſively to one of the poles of a magnetic needle, and it will ſoon be diſcovered which parts of the given body are poſſeſſed of a contrary polarity by the needle's ſtanding perpendicularly towards them. One of the poles being thus diſcovered, turn the oppoſite pole of the magnetic needle towards the body, and it will ſoon find out its other pole. When the magnetiſm of the body to be examined is very weak, there will be danger of reverſing the polarity by bringing the needle too near; and as the diſtance at which this effect will take place cannot be determined, it will always be proper to keep it ſo far diſtant that it can only ſenſibly affect the needle. Where there are only two poles, they may be found out merely by ſprinkling ſome iron-filings upon the body; for theſe will ſtand erect upon the polar points. They may be diſtinguiſhed by ſetting the body to float in water, or tying it to a thread and letting it hang freely, ſo that one may turn towards the north and the other towards the ſouth. This method, however, will not ſucceed when there are more than two poles, nor even very well in that caſe, unleſs they lie in parts directly oppoſite to one another.

3. *Effects of the magnet on ſoft iron.*—Having placed a magnetic needle upon a table, bring a bar of ſoft iron about eight inches long and a quarter of an inch thick, ſo near that it may draw one end of the needle a little out of the way. In this ſituation approach gradually the north pole of a magnet to the other extremity of the bar, and the north end of the needle will recede from the bar more and more in proportion as the magnet is brought nearer the bar. If the experiment be repeated with the other pole of the magnet, the north end of the needle will then be attracted by the bar. The reaſon of this is, that when we bring the north pole of the magnet towards one end of the bar, the latter acquires a ſouth polarity, and the other one of courſe a north polarity. Hence the needle is repelled, becauſe magnetic poles of the ſame kind repel one another; but when the ſouth pole is brought near the end of the bar, that end which it approaches receives the north polarity, and the other of courſe the ſouth; whence the needle, inſtead of being repelled, is now attracted. By approaching a ſmall magnetic needle to different parts of the bar, it will be found that one half of it poſſeſſes one kind of polarity, and the other the contrary kind: the magnetic centre, however, or the limit betwixt the two polarities, is not always in the middle of the bar, but is generally nearer that end which is prefented to the magnet. The difference increaſes as the bar is lengthened; and when the latter exceeds a certain length, it acquires ſeveral poles. This depends on the ſtrength of the magnet; and when it happens, the firſt magnetic centre comes very near to the end of the bar which ſtands next the magnet, and ſucceſſive centres are formed betwixt every two poles. Thus, ſuppoſing the north pole of a magnet to be brought to the end of ſuch a bar, the end it touches becomes a ſouth pole; a few inches farther a north polarity takes place, after that a ſouth polarity, and ſo on. The poles become weaker and weaker as they recede from the end which the magnet touches; ſo that if the bar be of conſiderable length, they totally vaniſh long before they come to the other end. Hence, by applying a magnet to one end of a long bar, we ſhall not thereby give any magnetiſm to the other; and this will happen when a magnet capable of lifting two pounds of iron is applied to a bar of about an inch ſquare and five feet long.

4. *The action of magnetiſm ſhown by the repulſion of two pieces of wire.*—Tie two pieces of ſoft wire each to a ſeparate thread, and, having ſuſpended them cloſe by each other, bring one of the poles of a magnet under them, and they will immediately repel; the divergency becoming greater as the magnet is brought nearer within a certain limit, and will decreaſe as the magnet is removed. If ſteel-wires or common ſewing needles be uſed, the repulſion will continue for a conſiderable time after the magnet is removed; and this divergency will even be greater after the removal of the magnet, as its attraction tends to draw them nearer each other; and, if brought too near, no repulſion will be ſhown by them. The experiment may be agreeably diverſified by uſing four or more needles, and preſenting a north pole to one pair and a ſouth pole to another, &c.

5. *In what circumſtances a magnet can lift the greateſt weight.*—By means of a crooked wire we may ſhow that the power of a magnet varies according to circumſtances. Thus, let a piece of wire about a quarter of an inch in diameter, and four or five inches long, be bent in the manner repreſented by ACB, pl. 12. fig. 14. with a ſharp corner at C. Tie it fait to a crofs bar, or let it be held by an aſſiſtant with the corner downwards. Then apply either pole of the magnet DE to one of its extremities; and if in this ſituation a ſmall piece of iron, as H, be put to the corner C, it will remain ſuſpended. On

applying the contrary pole of another magnet to the other extremity of the wire, the piece of iron will immediately fall off; but if a pole of the ſame kind be applied, it will not only be ſtill kept ſuſpended, but be more ſtrongly attracted than before.

In the caſe juſt mentioned, the firſt magnet is aſſiſted by the action of the ſecond; but in order to ſtrengthen a magnet in this manner, it does not appear neceſſary to uſe a magnet at all. Thus, having found by trial how much a magnetic bar can lift, procure an oblong piece of iron about four inches long, and ſomewhat heavier than the bar can bear. Apply one end of this to the pole of the bar, holding it with your hand till you place under the other end a larger piece of iron. It will then be found that the magnet will ſupport the piece of iron which it could not do before. The lower piece of iron is to be placed between an half and three quarters of an inch below the under part of the oblong piece which hangs at the magnet. The ſame effect will be produced by the oppoſite pole of another magnet; but a pole of the ſame denomination would weaken the attraction.

6. *The generation of poles, and of magnetic centres in the parts of a broken magnet.*—Take a magnetic bar about ſix or eight inches long and a quarter of an inch diameter, whoſe magnetic centre will be in the middle, or near it. Break off about one third part by a ſmart ſtroke of an hammer, and it will be found that the broken part, though in the magnet it had but one polarity, will now have acquired a north and ſouth pole, with a magnetic centre, as if it were a diſtinct magnet. The experiment may be diverſified as follows: Having made a ſteel bar about ſix inches long and a quarter of an inch thick quite hard, break it into two unequal parts. Join theſe, and preſs them hard together, giving it the magnetic virtue at the ſame time by means of two powerful magnets: while the parts remain in this poſition, ſo that the bar looks as if it had not been broken, it will have only two poles; but as ſoon as they are ſeparated, each part will be found to become a diſtinct magnet, having a north and ſouth pole proper to itſelf.

7. *To remove the magnetic centre in a magnet.*—This may be done in various ways; as, by ſtriking a magnetic bar repeatedly, heating it, hard rubbing, &c.; but in all theſe methods the magnetiſm of the bar is diminiſhed at the ſame time that the centre is removed; ſo that they ought not to be continued beyond what is neceſſary to produce a ſenſible removal of the magnetic centre.

8. *The diſadvantages of uſing magnets of unequal power, and of ſteel not properly hardened.*—Having communicated the magnetic virtue to a ſteel-bar by means of a magnet of any given power, then rub it with a weaker magnet, and it will be found, that the power of the bar, inſtead of being augmented, will now be diminiſhed; being no ſtronger than if it had been rubbed only with the weak magnet. The impropriety of uſing ſoft ſteel in making artificial magnets may be underſtood from the following example: Take two wires about 14 inches long, and one eighth of an inch in thickneſs; let one be of very hard ſteel, the other of ſoft ſteel or iron, though not of the ſofteſt ſort: then, by means of magnetic bars, give the virtue to thoſe wires, treating them both in the ſame manner, and it will be generally found that the hard wire will have only two poles, but the other a greater number.

9. *To weaken or deſtroy the magnetiſm of a wire by bending.*—Having communicated the magnetic virtue to an iron or ſoft ſteel wire of about four or five inches long and one-twentieth of an inch in diameter, roll it round a ſtick ſo as to make four or five revolutions. When taken off the ſtick it will be found to have its virtue quite deſtroyed, or at leaſt very much weakened by the bending. This effect cannot be produced but when the texture of the wire is ſtrained by the bending; for, if it be of ſuch an elaſtic nature as to recover its ſtraightneſs after being once rolled round the ſtick, little change is made on the magnetic power. When only the middle of the wire is bent, little or no change takes place in the magnetic power. If a piece of magnetic wire be cleft or ſplit lengthwiſe, the parts will ſometimes have the ſame poles, and ſometimes the contrary; but when one part is much thinner than the other, the ſlender part will generally have its poles reverſed.

10. *To improve natural magnets.*—This may be done by the ſame methods which are uſed to communicate the virtue to ſteel-bars or to iron-ores; but the natural magnets being generally very ſhort, we can ſeldom do more than place them between two ſtrong magnetic bars: However, when they are of ſufficient length, they muſt be rubbed with other bars beſides thoſe between which they are put; uſing the ſame precautions as in making artificial magnets. When ſubjected to this operation, it will always be proper to remove the armature from them.

11. *To arm natural or artificial magnets.*—The firſt ſtep towards this operation is to find out the poles of the magnet, after which it is to be properly ſhaped: that of a parallelopipedon is the beſt: in which caſe care muſt be taken to let the poles fall about the middle of two oppoſite ſurfaces; and in this direction the magnet ought to have the greateſt length poſſible; for a natural magnet is weakened much more by having a part cut off from its length than its breadth. This being done, provide two plates of ſoft iron, equal in breadth to thoſe ſurfaces where the poles ſtand, and projecting a little on one ſide of the ſtone, as ſhown by fig. 15. The projections marked DD muſt be much narrower than the breadth of the plates; from a quarter to half an inch being ſufficient for the larger magnets, and about one tenth of an inch for ſmall ones, for the purpoſe of applying to them the ſurface of the iron F. The thickneſs of the plates CD CD muſt be proportioned to the ſtrength of the magnet AB; and this proportion cannot eaſily be determined without an actual experiment. The beſt method, therefore, is to make them ſomewhat thick at firſt, and then keep filing them down as long as the power of the magnet increaſes; after which the filing is to be diſcontinued. The armature may be kept on either by tying or by a box; which laſt is the preferable method. The armature of ſpherical magnets muſt be adapted to their ſhape, and each large enough to cover a quarter of it. In like manner may artificial magnets be armed, and thus a compound magnet may be produced much more powerful than any ſingle one. Thus Dr. Knight conſtructed two very powerful artificial magnets, or magazines of magnetic bars, which are now in the repoſitory of the Royal Society. Each of theſe conſiſts of 240 bars diſpoſed in four lengths, ſo as to form a parallelopipedon, each length containing 60 bars. They are all kept together by iron braces, and the whole ſuſpended on pivots, with a wooden pedeſtal or carriage, by which they may be eaſily placed in any required poſition. If the artificial magnets be made in the ſhape of a horſe-ſhoe or a ſemicircle, they have no occaſion for armature, it being ſufficient to join them either by riveting or by means of a box; and indeed even when ſtraight bars are uſed, a compound magnet may be made without armature; but then as the poles cannot act in the ſame plain, it is neceſſary to have two magazines in order to give magnetiſm the more conveniently to other bodies. The power of a magnet is rather augmented by being armed, for the ſame reaſon that it is increaſed by a piece of iron affixed to it. E is a braſs ring, by which it may be ſuſpended with the iron adhering to it; which is the beſt method for preſerving its virtue.

12. *Magnetiſm requires ſome time to penetrate through iron.* Having placed a bulky piece of iron, ſuppoſe one weighing 40 or 50 pounds, ſo near a magnetic needle as to draw it a

little out of its direction, apply one of the poles of a ſtrong magnet to the other extremity of the iron, and you will find that it requires ſome ſeconds before the needle can be affected by it. The interval is greater or leſs according to the ſize of the iron and the ſtrength of the magnet.

Chap. IV. *Entertaining Experiments.*

Construction of the Magnetic Perspective-glass.] Provide an ivory tube, about two inches and a half long, and of the form expreſſed in plate 12. fig. 16. The ſides of this tube muſt be thin enough to admit a conſiderable quantity of light. It is to open at one end with a ſcrew; at that end there muſt be placed an eye-glaſs of about two inches focus, and at the other end any glaſs you pleaſe. Have a ſmall magnetic needle, like that placed on a compaſs. It muſt be ſtrongly touched, and ſo placed at the bottom of the tube that it may turn freely round. It is to be fixed on the centre of a ſmall ivory circle C, of the thickneſs of a counter, which is placed on the object-glaſs D, and painted black on the ſide next it. This circle muſt be kept faſt by a circular rim of paſteboard, that the needle may not riſe off its pivot, after the ſame manner as in the compaſs. This tube will thus become a compaſs, ſufficiently tranſparent to ſhow the motions of the needle. The eye-glaſs ſerves more clearly to diſtinguiſh the direction of the needle; and the glaſs at the other end, merely to give the tube the appearance of a common perſpective. It will appear from the laws of magnetiſm already laid down, that the needle in this tube, when placed over, and at a ſmall diſtance from, a magnet, or any machine in which it is contained, will neceſſarily place itſelf in a poſition directed by that magnet, and conſequently ſhow where the north and ſouth pole of it is placed; the north end of the needle conſtantly pointing to the ſouth end of the magnet. This effect will take place, though the magnet be incloſed in a caſe of wood, or even metal, as the magnetic effluvia penetrates all bodies. You muſt obſerve, however, that the attracting magnet muſt not be very far diſtant from the needle, eſpecially if it be ſmall, as in that caſe its influence extends but to a ſhort diſtance. This tube may be differently conſtructed, by placing the needle in a perpendicular direction, on a ſmall axis of iron, on which it muſt turn quite freely, between two ſmall plates of braſs placed on each ſide the tube: the two ends of the needle ſhould be in exact equilibrium. The north and ſouth ends of this needle will, in like manner, be attracted by the ſouth and north ends of the magnetic bar. The former conſtruction, however, appears preferable, as it is more eaſily excited, and the ſituation of the needle much more eaſily diſtinguiſhed.

Exp. 1. *The Magnetic Paradox.*

Having placed a ſmall piece of iron wire not above a tenth part of an inch long upon a table A B, plate 13. fig. 17. hold the magnetic bar E F about four or five inches above the table, with either of its poles pointing to the table, and ſo that the perpendicular let fall from the pole may touch the table at G, two or three inches from the wire; which diſtances, however, are ſubject to variations ariſing from the power of the magnet.—When the magnet is held in a proper poſition with reſpect to the iron, the latter will elevate one of its ends, as is ſhown at C D, forming an angle with the table, which is larger the nearer the wire comes to the point G, where it ſtands quite upright. Knock the table gently, and the wire C D will gradually proceed towards G, every knock making it jump up and advance a little way. This will naturally be attributed to the attraction of the magnet; which not being ſufficiently ſtrong to draw the wire directly towards it, is juſt able to bring it gradually towards G when the motion of the table lifts it up. But if, inſtead of holding the magnet over the table, it be placed below it at H I, the wire will now make an obtuſe angle towards G; as is ſhown at K L, and, on knocking the table, will recede from the magnet as if repelled, though in truth it is as much attracted as before.

The cauſe of this ſeeming repulſion will be underſtood from fig. 18, where the wire is repreſented by K L and the magnet by H. The former being rendered magnetic by the proximity of the magnet H, is inclined to it according to the laws already laid down; but, by reaſon of its weight, and being ſupported only at one end, it inclines leſs than it would do if it were freely ſuſpended by its centre. Let M N be a line paſſing through the centre of the wire; then, by the motion of the table, the wire being lifted up, the end K will be at liberty to deſcend farther in the direction in which it is attracted by the magnet than it was before. It will then take the poſition repreſented by *r* Q, its centre remaining nearly in the ſame perpendicular M N. We ſay nearly, becauſe the action of the magnet will undoubtedly move the whole wire ſomewhat nearer to itſelf; and the motion of the centre will be a diagonal compounded of the forces of gravity and of the magnet. The latter, however, being much ſmaller, will, by conſpiring with the action of gravity, draw down the neareſt end of the wire *r* ſo far, that a perpendicular line P O let fall from the extremity of it will touch the table in a point farther diſtant from the magnet than K. In this perpendicular the wire will depend very nearly, and then reſume its proper ſituation, parallel, or nearly ſo, to K L; when a ſecond knock will remove it a little farther off, for the reaſon already aſſigned. The former part of the experiment may be eaſily explained upon the ſame principles. The whole may be diverſified by uſing iron-filings inſtead of the wire. In this caſe, when the magnet is held over the table, they will be gradually collected about the point G, and diſperſed from it while the magnet is held under.

2. *The Communicative Crown.*

Take a crown-piece, and bore a hole in the ſide of it; in which place a piece of wire, or a large needle, well poliſhed, and ſtrongly touched with a magnet. Then cloſe the hole with a ſmall piece of pewter, that it may not be perceived. Now the needle in the magnetic perſpective before deſcribed, when it is brought near to this piece of money, will fix itſelf in a direction correſpondent to the wire or needle in that piece. Deſire any perſon to lend you a crown-piece, which you dexterouſly change for one that you have prepared as above. Then give the latter piece to another perſon, and leave him at liberty either to put it privately in a ſnuff box, or not; he is then to place the box on a table, and you are to tell him, by means of your glaſs, if the crown is or is not in the box. Then bringing your perſpective cloſe to the box, you will know, by the motion of the needle, whether it be there or not; for, as the needle in the perſpective will always keep to the north of itſelf, if you do not perceive it has any motion, you conclude the crown is not in the box. It may happen, however, that the wire in the crown may be placed to the north, in which caſe you will be deceived. Therefore, to be ſure of ſucceſs, when you find the needle in the perſpective remain ſtationary, you may make ſome pretence to deſire the perſon to move the box into another poſition, by which you will certainly know if the crown-piece be there or not.—You muſt remember, that the needle in the perſpective muſt here be very ſenſible, as the wire in the crown cannot poſſibly have any great attractive force.

The Magnetic Table.

Under the top of a common table place a magnet that turns on a pivot; and fix a board under it, that nothing may

appear. There may alſo be a drawer under the table, which you pull out to ſhow that there is nothing concealed. At one end of the table there muſt be a pin that communicates with the magnet, and by which it may be placed in different poſitions: this pin muſt be ſo placed as not to be viſible to the ſpectators. Strew ſome ſteel filings or very ſmall nails over that part of the table where the magnet is. Then aſk any one to lend you a knife, or a key, which will then attract part of the nails or filings. Then placing your hand in a careleſs manner on the pin at the end of the table, you alter the poſition of the magnet; and giving the key to any perſon, you deſire him to make the experiment, which he will then not be able to perform. You then give the key to another perſon; at the ſame time placing the magnet, by means of the pin, in the firſt poſition, when that perſon will immediately perform the experiment.

4. *The Myſterious Watch.*

You deſire any perſon to lend you his watch, and aſk him if he thinks it will or will not go when it is laid on the table. If he ſay it will, you place it over the end of the magnet, and it will preſently ſtop*. You then mark with chalk, or a pencil, the preciſe point where you placed the watch; and moving the poſition of the magnet, as in the laſt experiment, you give the watch to another perſon, and deſire him to make the experiment; in which he not ſucceeding, you give it to a third perſon, at the ſame time replacing the magnet, and he will immediately perform the experiment.

5. *The Magnetic Dial.*

PROVIDE a circle of wood or ivory, of about five or ſix inches diameter, as fig. 19; which muſt turn quite free on the ſtand B (fig. 20.) in the circular border A: on the circle muſt be placed the dial of paſteboard C (fig. 19.) whoſe circumference is to be divided into 12 equal parts, in which muſt be inſcribed the numbers from 1 to 12, as on a common dial. There muſt be a ſmall groove in the circular frame D, to receive the paſteboard circle: and obſerve, that the dial muſt be made to turn ſo free, that it may go round without moving the circular border in which it is placed. Between the paſteboard circle and the bottom of the frame, place a ſmall artificial magnet E (fig. 21.), that has a hole in its middle, or a ſmall protuberance. On the outſide of the frame place a ſmall pin P, which ſerves to ſhow where the magnetic needle I, that is placed on a pivot at the centre of the dial, is to ſtop. This needle muſt turn quite free on its pivot, and its two ſides ſhould be in exact equilibrium. Then provide a ſmall bag, that has five or ſix diviſions, like a lady's work-bag, but ſmaller. In one of theſe diviſions put ſmall ſquare pieces of paſteboard, on which are wrote the numbers from 1 to 12, and if you pleaſe you may put ſeveral of each number. In each of the other diviſions you muſt put 12 or more like pieces; obſerving, that all the pieces in each diviſion muſt be marked with the ſame number. Now the needle being placed upon its pivot, and turned quickly about, it will neceſſarily ſtop at that point where the north end of the magnetic bar is placed, and which you previouſly know by the ſituation of the ſmall pin in the circular border. You therefore preſent to any perſon that diviſion of the bag which contains the ſeveral pieces on which is wrote the number oppoſite to the north end of the bar, and tell him to draw any one of them he pleaſes. Then placing the needle on the pivot, you turn it quickly about, and it will neceſſarily ſtop, as we have already ſaid, at that particular number.

Another experiment may be made with the ſame dial, by deſiring two perſons to draw each of them one number out of two different diviſions of the bag; and if their numbers, when added together, exceed 12, the needle or index will ſtop at the number they exceed it; but if they do not amount to 12, the index will ſtop at the ſum of thoſe two numbers. In order to perform this experiment, you muſt place the pin againſt the number 5, if the two numbers to be drawn from the bag be 10 and 7; or againſt 9 if they be 7 and 2.—If this experiment be made immediately after the former, as it eaſily may, by dexterouſly moving the pin, it will appear the more extraordinary.

6. *The Dexterous Painter.*

PROVIDE two ſmall boxes, as M and N (fig. 22), four inches wide, and four inches and a half long. Let the box M be half an inch deep, and N two-thirds of an inch. They muſt both open with hinges, and ſhut with a claſp. Have four ſmall pieces of light wood (fig. 23, 24, 25, 26.), of the ſame ſize with the inſide of the box M (fig. 22), and about one-third of an inch thick. In each of theſe let there be a groove, as AB, EF, CD, GH; theſe grooves muſt be in the middle, and parallel to two of the ſides. In each of theſe grooves place a ſtrong artificial magnet, as fig. 27. The poles of theſe magnets muſt be properly diſpoſed with regard to the figures that are to be painted on the boards; as is expreſſed in the plate. Cover the bars with paper, to prevent their being ſeen; but take care, in paſting it on, not to wet the bars, as they will thereby ruſt, which will conſiderably impair their virtue. When you have painted ſuch ſubjects as you chooſe, you may cover them with a very thin clear glaſs. At the centre of the box N, place a pivot (fig. 28), on which a ſmall circle of paſteboard OPQR (fig. 29), is to turn quite free; under which is to be a touched needle S. Divide this circle into four parts, which are to be diſpoſed with regard to the poles of the needle, as is expreſſed in the figure. In theſe four diviſions you are to paint the like ſubjects as are on the four boards, but reduced to a ſmaller compaſs. Cover the inſide of the top of this box with a paper M (ſee fig. 22), in which muſt be an opening D, at about half an inch from the centre of the box, that you may perceive, ſucceſſively, the four ſmall pictures on the paſteboard circle juſt mentioned. This opening is to ſerve as the cloth on which the little painter is ſuppoſed to draw one of the pictures. You may cover the top of the box, if you pleaſe, with a thin glaſs. Then give the firſt box to any perſon, and tell him to place any one of the four pictures in it privately, and, when he has cloſed it, to give it you. You then place the other box over it; when the moveable circle, with the needle, will turn till it comes in the ſame poſition with the bar in the firſt box. It will then appear that the little dexterous painter has already copied the picture that is encloſed in the firſt box.

7. *The Cylindric Oracle.*

PROVIDE a hollow cylinder of about ſix inches high and three wide, as AB, fig. 30. Its cover CD muſt be made to fix on any way. On one ſide of this box or cylinder let there be a groove nearly of the ſame length with that ſide; in which place a ſmall ſteel bar (fig. 31) that is ſtrongly impregnated, with the north pole next the bottom of the cylinder. On the upper ſide of the cover deſcribe a circle; and divide it into ten equal parts, in which are to be wrote the numbers from 1 to 10, as is expreſſed in fig. 32. Place a pivot at the centre of this circle, and have ready a magnetic needle. You are

* To perform this experiment, you muſt uſe a ſtrong magnetic bar; and the balance of the watch muſt not be of braſs, but ſteel.

then to provide a bag, in which there are ſeveral diviſions, like that deſcribed in Exper. 5. In each of theſe diviſions put a number of papers, on which the ſame or ſimilar queſtions are wrote. In the cylinder put ſeveral different anſwers to each queſtion, and ſeal them up in the manner of ſmall letters. On each of theſe letters or anſwers is to be wrote one of the numbers of the dial or circle at the top of the box. You are ſuppoſed to know the number of the anſwers to each queſtion. You then offer one of the diviſions of the bag, obſerving which diviſion it is, to any perſon, and deſire him to draw one of the papers. Next put the top on the cylinder, with that number which is wrote on the anſwer directly over the bar. Then placing the needle on the pivot, you turn it briſkly about, and it will naturally ſtop at the number over the bar. You then deſire the perſon who drew the queſtion to obſerve the number at which the needle ſtands, and to ſearch in the box for a paper with the ſame number, which he will find to contain the anſwer. You may repeat the experiment by offering another diviſion of the bag to the ſame or another perſon; and placing the number that correſponds to the anſwer over the magnetic bar, proceed as before.

It is eaſy to conceive of ſeveral anſwers to the ſame queſtion. For example, ſuppoſe the queſtion to be, Is it proper to marry? Anſwer 1. While you are young, not yet; when you are old, not at all. 2. Marry in haſte, and repent at leiſure. 3. Yes, if you can get a good fortune; for ſomething has ſome ſavour, but nothing has no flavour. 4. No, if you are apt to be out of humour with yourſelf; for then you will have two perſons to quarrel with. 5. Yes, if you are ſure to get a good huſband (wife); for that is the greateſt bleſſing of life. But take care you are ſure. 6. No, if the perſon you would marry is an angel; unleſs you will be content to live with the devil.

8. *The Enchanted Ewer.*

Fix a common ewer, as A, (fig. 33) of about 12 inches high, upon a ſquare ſtand BC; in one ſide of which there muſt be a drawer D, of about four inches ſquare and half an inch deep. In the ewer place a hollow tin cone, inverted, as AB, fig. 34, of about four inches and a half diameter at top, and two inches at bottom; and at the bottom of the ewer there muſt likewiſe be a hole of two inches diameter.

Upon the ſtand, at about an inch diſtance from the bottom of the ewer, and directly under the hole, place a ſmall convex mirror H, of ſuch convexity that a perſon's viſage, when viewed in it, at about 15 inches diſtance, may not appear above two inches and a half long.

Upon the ſtand likewiſe, at the point I, place a pivot of half an inch high, on which muſt be fixed a touched needle RQ, incloſed in a circle of very thin paſteboard OS, fig. 35. of five inches diameter. Divide this paſteboard into four parts, in each of which draw a ſmall circle: and in three of theſe circles paint a head, as *x*, *y*, *z*, the dreſs of each of which is to be different, one, for example, having a turban, another a hat, and the other a woman's cap. Let that part which contains the face in each picture be cut out, and let the fourth circle be entirely cut out; as it is expreſſed in the figure. You muſt obſerve, that the poles of the needle are to be diſpoſed in the ſame manner as in the plate.

You are next to provide four ſmall frames of wood or paſteboard, No. 1, 2, 3, 4, each of the ſame ſize with the inſide of the drawer. On theſe frames muſt be painted the ſame figures as on the circular paſteboard; with this difference, that there muſt be no part of them cut out. Behind each of theſe pictures place a magnetic bar, in the ſame direction as is expreſſed in the plate; and cover them over with paper, that they may not be viſible. Matters being thus prepared, you firſt place in the drawer the frame No. 4. on which there is nothing painted. You then pour a ſmall quantity of water into the ewer, and deſire the company to look into it, aſking them if they ſee their own figures as they are. Then you take out the frame No. 4. and give the three others to any one, deſiring him to chooſe in which of thoſe dreſſes he would appear. Then put the frame with the dreſs he has choſe in the drawer; and a moment after, the perſon looking into the ewer will ſee his own face ſurrounded with the dreſs of that picture. For, the paſteboard circle (divided, as above deſcribed, into four parts, in three of which are painted the ſame figures as on three of the boards, and the fourth left blank) containing a magnetic needle, and the four boards having each a concealed magnet; therefore, when one of them is put in the drawer under the ewer, the circle will correſpond to the poſition of that magnet, and conſequently the perſon looking into the top of the ewer will ſee his own face ſurrounded with the head-dreſs of the figure in the drawer.—This experiment, well performed, is highly agreeable. As the paſteboard circle can contain only three heads, you may have ſeveral ſuch circles, but you muſt then have ſeveral other frames: and the ewer muſt be made to take off from the ſtand.

9. *The Box of Metals.*

Provide a wooden box, about 13 inches long and ſeven wide, as ABCD fig. 36. pl. 14. The cover of this box ſhould be as thin as poſſible. Have ſix ſmall boxes or tables, about an inch deep, all of the ſame ſize and form, as EFGHIK, that they may indiſcriminately go into ſimilar holes made in the bottom of the large box. In each of theſe tablets is to be placed a ſmall magnetic ball, and their poles are to be diſpoſed as expreſſed in the figure. Cover each of theſe tablets with a thin plate of one of the ſix following metals, viz. gold, ſilver, copper, iron, pewter, and lead. You muſt alſo have a magnetic perſpective, at the end of which are to be two circles, one divided into ſix equal parts, and the other into four, as in fig. 37. from the centre of which there muſt be drawn an index N, whoſe point is to be placed to the north. Therefore, when you are on the ſide CD of the box, and hold your perſpective over any one of the tablets that are placed on the holes E, F, G, ſo that the index drawn on the circle is perpendicular to the ſide AB, the needle in the perſpective will have its ſouth pole directed to the letter that denotes the metal contained in that tablet. When you hold the perſpective over one of the boxes placed in the holes H, I, K, ſo that the index drawn on the circle is perpendicular to the ſide CD, the ſouth pole of the needle will in like manner expreſs the name of the metal incloſed. If the under ſide of any one of the tablets be turned upwards, the needle will be ſlower in its motion, on account of the greater diſtance of the bar. The gold and ſilver will ſtill have the ſame direction; but the four other metals will be expreſſed by the letters on the interior circle. If any one of the metals be taken away, the needle will not then take any of the above directions, but naturally point to the north; and its motion will be much ſlower. You therefore give the box to any one, and leave him at liberty to diſpoſe all the tablets in what manner, and with what ſide upward he pleaſe, and even to take any one of them away. Then, by the aid of your perſpective, you tell him immediately the name of the metal on each tablet, and of that he has taken away.

This box of metals will, on compariſon, be found far to exceed that which has been publicly exhibited: for that, being compoſed of ſix tablets, of which two only differ in form, admits but of ſix different diſpoſitions, whereas in this the tablets may be placed 720 different ways. In the other, you muſt alſo know the particular ſide of the box, which in this is not at all neceſſary. Nay, you may here diſtinguiſh each metal, though the box be completely covered with paper; for the effect of the needle will be always the ſame. The experiments with this

box are therefore much more extraordinary, and its conſtruction at the ſame time more ſimple.

10. *The Magnetic Planetarium.*

CONSTRUCT a round box, ILMN, (fig. 38.) of eight or nine inches diameter, and half an inch deep. On its bottom fix a circle of paſteboard, on which draw the central circle A, and the ſeven circumjacent circles B, C, D, E, F, G, H. Divide the central circle into ſeven equal parts by the lines AB, AC, AD, AE, AF, AG, and AH, which muſt paſs through the centres of the other circles, and divide each of them into two equal parts. Then divide the circumference of each of thoſe circles into 14 equal parts, as in the figure. You are likewiſe to have another paſteboard of the ſame figure, and divided in the ſame manner, which muſt turn freely in the box by means of an axis placed on a pivot; one end of which is to be fixed in the centre of the circle A. (See fig. 39.) On each of the ſeven ſmaller circles at the bottom of the box, place a magnetic bar, two inches long, in the ſame direction with the diameters of thoſe circles, and their poles in the ſituations expreſſed in the figure. There muſt be an index O (fig. 39.), like that of the hour-hand of a dial, which is to be fixed on the axis of the central circle, and by which the paſteboard circle in the box may be turned about. There muſt be alſo a needle P, which muſt turn freely on the axis, without moving the circular paſteboard.—In each of the ſeven diviſions of the central circle write a different queſtion; and in another circle, divided into 12 parts, you may write the names of the 12 months. In each of the ſeven circles write two anſwers to each queſtion, obſerving that there muſt be but ſeven words in each anſwer; in the following manner: In the firſt diviſion of the circle G fig. 37. which is oppoſite to the firſt queſtion, write the firſt word of the firſt anſwer. In the ſecond diviſion of the next circle, write the ſecond word; and ſo on to the laſt word, which will be in the ſeventh diviſion of the ſeventh circle. In the eighth diviſion of the firſt circle, write the firſt word of the ſecond anſwer; in the ninth diviſion of the ſecond circle write the ſecond word of the ſame anſwer; and ſo on to the 14th diviſion of the ſeventh circle, which muſt contain the laſt word of that anſwer. The ſame muſt be done for all the ſeven queſtions; and to each of them muſt be aſſigned two anſwers, the words of which are to be diſperſed through the ſeven circles. At the centre of each of theſe circles place a pivot; and have two magnetic needles, the pointed end of one of which muſt be north, and the other ſouth, QR; (fig. 39.) Now, the index of the central circle being directed to any one of the queſtions, if you place one of the two magnetic needles on each of the ſeven leſſer circles, they will fix themſelves according to the direction of the bars on the correſpondent circles at the bottom of the box, and conſequently point to the ſeven words that compoſe the anſwer. If you place one of the other needles on each circle, it will point to the words that are diametrically oppoſite to thoſe of the firſt anſwer, the north pole being in the place of the ſouth pole of the other.—You therefore preſent this planetarium to any perſon, and deſire him to chooſe one of the queſtions there wrote; and you then ſet the index of the central circle to that queſtion, and putting one of the needles on each of the ſeven circles, you turn it about; and when they all ſettle, they will point to the ſeven words that compoſe the anſwer. The two anſwers may be one favourable and the other unfavourable; and the different needles will ſerve to diverſify the anſwers when you repeat the experiment.

There may be alſo a moveable needle to place againſt the names of the months; and when the party has fixed upon a queſtion, you place that needle againſt the month in which he was born, which will give the buſineſs an air of more myſtery. On the centre of the large circle may be the figure of the ſun; and on each of the ſeven ſmaller circles one of the characters of the five planets, together with the earth and moon. This experiment, well executed, is one of the moſt entertaining that magnetiſm has produced.

11. *The Sagacious Swan.*

PROVIDE a box XY, (pl. 14. fig. 40.) 18 inches long, 9 wide, and 2 deep, the top of which is to ſlide on and off at the end Y. Toward the end X, deſcribe a circle of ſix inches diameter, round which are to be fixed ſix ſmall vaſes of wood or ivory, of one inch and a half high; and to each of them there muſt be a cover. At the end Y place an egg B, of ivory or other matter, of about three inches and a half high, with a cover that ſhuts by a hinge, and faſtens with a ſpring. It muſt be fixed on the ſtand C; through which, as well as the bottom of the egg, and the part of the box directly underneath, there muſt paſs a hole of one-third of an inch in diameter. In this cavity place an ivory cylinder F, that can move freely, and riſes or falls by means of the ſpring R. You muſt have a thin copper baſon A, of ſix inches diameter, which is to be placed on the centre of the circle at X, and conſequently in the middle of the ſix vaſes. Let a proper workman conſtruct the movement expreſſed by fig. 41. which is compoſed of a quadrant G, that has 16 teeth, and is moveable about an axis in the ſtand H, that has an elbow, by which it is ſcrewed to the bottom of the box at L. To the quadrant there muſt be joined the ſtraight piece K. The horizontal wheel M has 24 teeth; and is ſupported by the piece S, which is ſcrewed to the end of the box next Y. On the axis of this wheel place a braſs rod OP, five inches long; and at the part O place a large bar or horſe-ſhoe, of a ſemicircular form, and about two inches and a half diameter, ſtrongly impregnated. The ſteel rod V, takes at one end the teeth of the quadrant G, by the pinion F, and at the other end the wheel M, by the perpendicular wheel N, of 30 teeth; the two ends of this rod are ſupported by the two ſtands that hold the other pieces. Under the piece K, that joins to the quadrant, muſt be placed the ſpring R, by which it is raiſed, and puſhes up the cylinder that goes through the ſtand C into the egg. You muſt alſo have ſix ſmall etwees or caſes, as Y,Y,Y,Y,Y,Y. They muſt be of the ſame circumference with the cylinder in the ſtand, and round at their extremities: their length muſt be different, that, when they are placed in the egg, and the lower end enters the hole in which is the cylinder, they may thruſt it down more or leſs, when the top of the egg, againſt which they preſs, is faſtened down; and thereby lower the bar that is fixed to the end of the quadrant, and conſequently, by means of the pinion Z and wheels NM, turn the horſe-ſhoe that is placed upon the axis of the laſt wheel. The exact length of theſe etwees can be determined by trials only; which trials, however, may be made with round pieces of wood. In each of theſe etwees place a different queſtion, wrote on a ſlip of paper and rolled up, and in each of the vaſes put the anſwer to one of the queſtions; as you will know, by trials, where the magnetic bar or horſe-ſhoe will ſtop. Laſtly, provide a ſmall figure of a ſwan, or what other you pleaſe, made of cork or enamel, in which you muſt fix a touched needle, of the largeſt ſize of thoſe commonly uſed in ſewing.

Being thus prepared, you offer a perſon the ſix etwees, and deſire him to chooſe any one of them himſelf, and conceal the others, or give them to different perſons. He is then to open his etwee, read the queſtion it contains to himſelf, and return the etwee to you, after replacing the queſtion. You then put the etwee in the egg; and placing the ſwan upon the water in the baſon, you tell the company ſhe will preſently diſcover in which of the vaſes the anſwer is contained. The ſame experiment may be repeated with all the etwees.

12. *The Multifarious Verſe.*

The eight words that compoſe this Latin verſe,

Tot ſunt tibi dotes, quot cœli ſidera, virgo,

being privately placed in any one of the different combinations of which they are ſuſceptible, and which are 40320 in number, to tell the order in which they are placed.

Provide a box that ſhuts with hinges, (fig. 42.) and is eight inches long, three wide, and half an inch deep. Have eight pieces of wood about one third of an inch thick, two inches long, and one and a half wide, which will therefore, when placed cloſe together, exactly fill the box. In each of theſe pieces or tablets place a magnetic bar, with their poles as is expreſſed in the figure. The bars being covered over, write on each of the tablets, in the order they then ſtand, one of the words of the foregoing Latin verſe. On a very thin board of the ſame dimenſions with the box, draw the eight circles, A, B, C, D, E, F, G, H, (fig. 43.) whoſe centres ſhould be exactly over thoſe of the eight tablets in the box when the board is placed upon it. Divide each of thoſe circles into eight parts, as in the figure; and in each of thoſe diviſions write one of the words of the Latin verſe, and in the preciſe order expreſſed in the plate; ſo that, when the board is placed over the box, the eight touched needles placed at the centre of the circles may be regulated by the poles of the bars in the box, and conſequently the word that the needle points to in the circle be the ſame with that inſcribed on the tablet. Cover the board with a glaſs, to prevent the needles from riſing off their pivots, as is done in the ſea-compaſs. Over the board place four plates of glaſs, I, L, M, N, fig. 44. which will give the machine the figure of a truncated pyramid of eight inches high. Cover it with a glaſs, or rather a board, in which are placed two lenſes, O O, of eight inches focus, and diſtant from each other about half an inch. Line the four plates of glaſs that compoſe the ſides with very thin paper, that will admit the light, and at the ſame time prevent the company from ſeeing the circles on the board.

Theſe preparations being made, you give the box to any one; and tell him to place the tablets on which the words are wrote, privately, in what poſition he thinks proper, then to cloſe the box, and, if he pleaſe, to wrap it up in paper, ſeal it, and give it you. Then placing the board with a pyramid upon it, you immediately tell him the order in which the tablets are placed, by reading the words to which the needles on the circles point.

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Animal Magnetism, a ſympathy lately ſuppoſed by ſome perſons to exiſt between the magnet and the human body; by means of which the former became capable of curing many diſeaſes in an unknown way, ſomething reſembling the performances of the old magicians.

The fanciful ſyſtem, to call it by no worſe name, of animal magnetiſm, appears to have originated, in 1774, from a German philoſopher named *Father Hehl*, who greatly recommended the uſe of the magnet in medicine. M. Meſmer, a phyſician of the ſame country, by adopting the principles of Hehl, became the direct founder of the ſyſtem: but, afterwards deviating from the tenets of his inſtructor, he loſt his patronage, as well as that of Dr. Ingenhouſz, which he had formerly enjoyed. Meſmer had already diſtinguiſhed himſelf by "A diſſertation on the influence of the ſtars upon the human body," which he publicly defended in a theſis before the univerſity of Vienna; but he was ſo unable to ſtand before the oppoſition of Hehl and Ingenhouſz, that his ſyſtem fell almoſt inſtantly into diſrepute. Meſmer appealed to the academy of ſciences at Berlin; but they rejected his principles as deſtitute of foundation, and unworthy of the ſmalleſt attention. He then made a tour through Germany, publiſhing every where the great cures he performed by means of his animal magnetiſm, while his enemies every where purſued him with detections of the falſehood of his aſſertions.

Meſmer, ſtill undaunted by ſo many defeats, returned to Vienna; but meeting there with no better ſucceſs than before, he retired to Paris in the beginning of the year 1778. Here he met with a very different reception. He was firſt patroniſed by the author of the *Dictionnaire des Merveilles de la Nature*; in which work a great number of his cures were publiſhed, Meſmer himſelf receiving likewiſe an ample teſtimony of his candour and *ſolid reaſoning*. Our phyſician ſoon collected ſome patients; and in the month of April 1778 retired with them to Creteil, from whence he in a ſhort time returned with them perfectly cured. His ſucceſs was now as great as his diſappointment had been before. Patients increaſed ſo rapidly that the doctor was ſoon obliged to take in pupils to aſſiſt him in his operations. Theſe pupils ſucceeded equally well as Meſmer himſelf; and ſo well did they take care of their own emolument, that one of them, named M. Deſlon, realized upwards of 100,000l. ſterling. In 1779 Meſmer

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publiſhed a memoir on the ſubject of Animal Magnetiſm, promiſing afterwards a complete work upon the ſame, which ſhould make as great a revolution in philoſophy as it had already done in medicine.

The new ſyſtem now gained ground daily; and ſoon became ſo faſhionable, that the jealouſy of the faculty was thoroughly awakened, and an application concerning it was made to government. In conſequence of this a committee was appointed to inquire into the matter, conſiſting partly of phyſicians and partly of members of the royal academy of ſciences, with Dr. Benjamin Franklin at their head. This was a thunderſtroke to the ſupporters of the new doctrine —Meſmer himſelf refuſed to have any communication with the committee; but his moſt celebrated pupil Deſlon was leſs ſcrupulous, and explained the principles of his art in the following maner:

1. Animal magnetiſm is an univerſal fluid, conſtituting an abſolute plenum in nature, and the medium of all mutual influence between the celeſtial bodies and betwixt the earth and animal bodies.

2. It is the moſt ſubtile fluid in nature; capable of a flux and reflux, and of receiving, propagating, and continuing all kinds of motion.

3. The animal body is ſubjected to the influences of this fluid by means of the nerves, which are immediately affected by it.

4. The human body has poles and other properties analogous to the magnet.

5. The action and virtue of animal magnetiſm may be communicated from one body to another, whether animate or inanimate.

6. It operates at a great diſtance without the intervention of any body.

7. It is increaſed and reflected by mirrors; communicated, propagated, and increaſed by ſound; and may be accumulated, concentrated, and tranſported.

8. Notwithſtanding the univerſality of this fluid, all animal bodies are not equally affected by it; on the other hand, there are ſome, though but few in number, the preſence of which deſtroys all the effects of animal magnetiſm.

9. By means of this fluid nervous diſorders are cured immediately, and others mediately; and its virtues, in ſhort, extend to the univerſal cure and preſervation of mankind.

From this extraordinary theory, Meſmer, or M. Deſlon,

had fabricated a paper, in which he ſtated that there was in nature but one diſeaſe and one cure, and that this cure was animal magnetiſm: and, laſtly, M. Deſlon engaged, 1. To prove to the commiſſioners that ſuch a thing as animal magnetiſm exiſted: 2. To prove the utility of it in the cure of diſeaſes: after which he was to communicate to them all that he knew upon the ſubject. The commiſſioners accordingly attended in the room where the patients underwent the magnetical operations. The apparatus conſiſted of a circular platform made of oak, and raiſed about a foot and an half from the ground; which platform was called the *baquet*. At the top of it were a number of holes, in which were iron rods with moveable joints for the purpoſe of applying them to any part of the body. The patients were placed in a circle round, each touching an iron rod, which he could apply to any part of the body at pleaſure; they were joined to one another by a cord paſſing round their bodies, the deſign being to increaſe the effect by communication. In the corner of the room was a piano forte, on which ſome airs were played, occaſionally accompanied with a ſong. Each of the patients held in his hand an iron rod ten or twelve feet long; the intention of which, as Deſlon told the commiſſioners, was to concentrate the magnetiſm in its point, and thus to render its effects more ſenſible. Sound is another conductor of this magnetiſm; and in order to communicate the magnetiſm to the piano-forte, nothing more is neceſſary than to bring the iron rod near it. Some magnetiſm is alſo furniſhed by the perſon who plays it; and this magnetiſm is tranſmitted to the patients by the ſounds. The internal part of the platform was ſaid to be ſo contrived as to concentrate the magnetiſm, and was the reſervoir whence the virtue diffuſed itſelf among the patients. Its ſtructure, however, is not mentioned; but the committee ſatisfied themſelves, by means of a needle and electrometer, that neither common magnetiſm nor electricity was concerned.

Beſides the different ways of receiving the magnetiſm already mentioned, viz. by the iron, cord, and piano-forte, the patients alſo had it directly from the doctor's finger, and a rod which he held in his hand, and which he carried about the face, head, or ſuch parts of the patient as were diſeaſed; obſerving always the direction of what he called the poles. The principal application of magnetiſm, however, was by preſſure of the hands or fingers on the hypochondria or lower regions of the ſtomach.

The effects of theſe operations upon Deſlon's patients were very different. Some felt nothing, neither had the magnetiſm any effect whatever upon them. Some ſpit, coughed, ſweat, and felt, or pretended to feel, extraordinary heats in different parts of the body. Many women, but very few men, had convulſions, which Deſlon called their criſis, &c.—The commiſſioners at laſt found that they could come to no ſatisfactory concluſion while they attended in this public way, and therefore determined to try the experiments themſelves privately. As the fluid itſelf, however, was totally imperceptible by any of the ſenſes, they could only aſcertain themſelves of its exiſtence by ultimately curing diſeaſes, or by its obſervable effects upon the human body. Being well aſſured, however, that, though many diſeaſes were cured, it would not amount to any proof of the exiſtence of animal magnetiſm, they determined to obſerve its effects on the animal œconomy. For this purpoſe they made the following experiments:

1. They tried it upon themſelves, and felt nothing.

2. Seven of Deſlon's patients were magnetiſed at Dr. Franklin's houſe, four of whom felt nothing; three felt, or affected to feel ſomething.

3. Several perſons in a higher ſphere of life were magnetiſed, and felt nothing.

4. The commiſſioners, now determined to diſcover what ſhare imagination had in this buſineſs, blindfolded ſeveral of the common people, and made them ſometimes think that they were magnetiſed, at other times they magnetiſed them without letting them know that they did ſo: the conſequence was, that when they ſuppoſed themſelves magnetiſed, the patients likewiſe thought they felt ſomething, and *vice verſa*.

5. A magnetiſed tree was ſaid to produce convulſions: a young man, blindfolded, fell into convulſions when he imagined himſelf near the tree, though he was really at a conſiderable diſtance from it. Deſlon accounted for this on the principle of all trees being magnetic: but, in this caſe, every one ſuſceptible of magnetiſm would be ſeized with convulſions when he approached a tree. The ſame influence of imagination was obſerved in a woman accuſtomed to have convulſions when magnetiſed. They came on when nothing was done to her, on being told, when blinded, that ſhe was magnetiſed.

Other inſtances are given, from which it was evident, either that the patients were impoſtors, or in ſuch a moſt wretched ſtate of debility both of mind and body, that the moſt trifling effects of the former had the moſt powerful effects on the latter. The commiſſioners therefore entirely diſapproved of the whole. The touch, imitation, and imagination, they concluded, were the great cauſes of the effects produced by Mr. Deſlon's operations; and by means of theſe they ſuppoſed that convulſions, which in themſelves are a very violent diſorder, might be ſpread much farther than could be wiſhed, even through a whole city. It was obſerved that the operator ſometimes preſſed ſtrongly, and for a length of time, upon different parts of the body, particularly the hypochondria and pit of the ſtomach; and it is well known that a ſtrong preſſure on theſe parts will produce diſagreeable ſenſations in thoſe who enjoy perfect health.

It is needleſs to add more upon this ſubject, than that Meſmer complained of the report of the commiſſioners, petitioned parliament, was by them commanded to diſcover the myſteries of his doctrine; and that it is now exploded by every man of ſenſe.—The concluſion of the academicians concerning it was, that it is not entirely uſeleſs even to philoſophy; as it is one *fact* more to be conſigned to the hiſtory of the errors and illuſions of the human mind, and a ſignal inſtance of the power of imagination.

MAGNIEZ (NICOLAS), a learned and laborious eccleſiaſtic, who died in the year 1719 at an advanced age. He is known by his excellent Latin dictionary, entitled *Novitius*, printed at Paris 1721, 2 vols. 4to. Notwithſtanding the great utility of this dictionary to maſters, and the merited eſteem in which it is held, it has never undergone another edition; for in that which bears the date of 1733, there is no circumſtance of difference except the frontiſpiece. In this dictionary, beſides the words to be met with in the claſſics, we find all thoſe which occur in the bible, the breviary, and the eccleſiaſtical authors, the terms of art, the names of great men, heathen gods, biſhops, councils, hereſies, &c. in ſhort, more than 6000 words which are not to be found in the common dictionaries.

MAGNIFYING, the making of objects appear larger than they would otherwiſe do; whence convex lenſes, which have the power of doing this, are called *magnifying glaſſes*. See OPTICS.

MAGNITUDE, whatever is made up of parts locally extended, or that has ſeveral dimenſions; as a line, ſurface, ſolid, &c.

MAGNOLIA, the LAUREL-LEAVED TULIP-TREE, in botany: a genus of the polygynia order, belonging to the polyandria claſs of plants; and in the natural method ranking under the 52d order, *Coadnatæ*. The calyx is triphyllous; there are nine petals; the capſules bivalved and imbricated; the ſeeds pendulous, and in the form of a berry.

The *ſpecies* are, 1, The *glauca*, or ſmall magnolia, is a na-

tive of Virginia, Carolina, and other parts of North America. In moiſt places it riſes from ſeven or eight to 15 or 16 feet high, with a ſlender ſtem. The wood is white and ſpongy, the bark ſmooth and of a greeniſh white colour; the branches garniſhed with thick ſmooth leaves, like thoſe of the bay; but of an oval ſhape, ſmooth on their edges, and white underneath. The flowers are produced at the extremities of the branches, are white, compoſed of ſix concave petals, and have an agreeable ſcent. After the flowers are paſt, the fruit increaſes in ſize till it becomes as large as a walnut with its cover; but of a conical ſhape, having many cells round the outſide, in each of which is a flat ſeed about the ſize of a ſmall kidney-bean. When ripe, the fruit is of a brown colour, the ſeeds are diſcharged from their cells, and hang by a ſlender thread. 2. The *grandiflora*, or great magnolia, is a native of Florida and South Carolina. It riſes to the height of 80 feet or more, with a ſtraight trunk upwards of two feet diameter, having a regular head. The leaves reſemble thoſe of the laurel, but are larger, and continue green throughout the year. The flowers are produced at the ends of the branches, and are of a purpliſh white colour. 3. The *tripetala*, or umbrella tree, is a native of Carolina. It riſes, with a ſlender trunk, to the height of 16 or 20 feet; the wood is ſoft and ſpongy; the leaves remarkably large, and produced in horizontal circles, ſomewhat reſembling an umbrella, from whence the inhabitants of thoſe countries have given it this name. The flowers are compoſed of 10 or 11 white petals, that hang down without any order. The leaves drop off at the beginning of winter. 4. The *acuminata*, with oval, ſpear-ſhaped, pointed leaves, is a native of the inland parts of North America. The leaves are near eight inches long, and five broad, ending in a point. The flowers come out early in the ſpring, and are compoſed of 12 white petals; the wood is of a fine grain, and an orange colour.

All theſe ſpecies are propagated by ſeeds, which muſt be procured from the places where they grow naturally. They ſhould be put up in ſand, and ſent over as ſoon as poſſible; for, if they are kept long out of the ground, they rarely grow. The glauca generally grows in a poor ſwampy ſoil, or on wet meadows. The Engliſh and Swedes in Pennſylvania and New Jerſey call it *beaver-tree*, becauſe the root of it is the dainty of beavers, which are caught by its means. It drops its leaves early in autumn, though ſome of the young trees keep them all the winter. This tree is ſeldom found to the north of Pennſylvania, where it begins to flower about the end of May. The ſcent of its bloſſoms is exquiſite; for by it you can diſcover, within three quarters of an Engliſh mile, whether theſe little trees ſtand in the neighbourhood, provided the wind be not againſt it; for the whole air is filled with this ſweet and pleaſant odour. It is beyond deſcription agreeable to travel in the woods about that time, eſpecially towards night. They retain their flowers for three weeks, and even longer, according to the quality of the ſoil on which the trees ſtand; and during the whole time of their being in bloſſom they ſpread their odoriferous exhalations. The berries likewiſe look very fine when they are ripe; for they have a rich red colour, and hang in bunches on ſlender ſtalks. Coughs and other pectoral diſeaſes are cured by putting the berries into rum or brandy, of which a draught every morning may be taken: the virtues of this remedy were univerſally extolled, and even praiſed, for their ſalutary effects in conſumptions. The bark being put into brandy, or boiled in any other liquor, is ſaid not only to eaſe pectoral diſeaſes, but likewiſe to be of ſome ſervice againſt all internal pains and heat; and it was thought that a decoction of it could ſtop the dyſentery. Perſons who had caught cold boiled the branches of the beaver-tree in water, and drank it to their great relief. *Kalm.*

MAGNUS (John), archbiſhop of Upſal, was born at Lincopping in 1483. Being made apoſtolical nuncio, he uſed his utmoſt endeavours to prevent Guſtavus Vaſa from becoming king of Sweden, and the introduction of Lutheraniſm into his dominions; and ſpared no means to attain theſe ends. He died at Rome in 1545. He wrote a hiſtory of Sweden, and a hiſtory of the archbiſhops and biſhops of Upſal.

Magnus (Olaus), archbiſhop of Upſal in Sweden, ſucceeded his brother John Magnus in 1544. He appeared with great credit at the council of Trent in 1546, and ſuffered much afterwards for the Catholic religion. We have of his writing A Hiſtory of the Manners, Cuſtoms, and Wars, of the Northern Nations of Europe.

Magnus *Campus*, (anc. geog.), a tract lying towards Scythopolis, or Bethſan in Galilee, beyond which it extends into Samaria; Joſephus placing the common boundary between theſe two diſtricts, in the Campus Magnus. Called alſo *Eſdrelon*, (Judith): 30 miles long and 18 broad; having Samaria with mount Ephraim to the ſouth, the lake Geneſareth to the eaſt, mount Carmel to the weſt, and Lebanon to the north.

Magnus *Portus*, (anc. geog.), a port of the Belgæ in Britain, on the Channel; now thought to be Portſmouth in Hampſhire.—Another *Portus Magnus* of Bætica in Spain; a port to the eaſt of Abdera.

MAGO, (anc. geog.), a citadel and town of the Balearis Minor, or Minorca: now Maon, or Mahon. E. lon. 4. 6. Lat. 39. 5.

MAGONTIACUM, Moguntiacum, or *Mogontiacus*, truncated afterwards by the poets to Mogontia, Maguntia, and Moguntia: a town of Gallia Belgica. Now *Mentz*, capital of the electorate of that name; ſituated at the confluence of the Rhine and Maine. E. lon. 8. Lat. 50.

MAGOPHONIA (formed from μαγος "magus," and φονος "ſlaughter), the name of a feaſt among the ancient Perſians, held in memory of the expulſion of the Magians. The Magus Smerdis having uſurped the throne of Perſia upon the death of Cambyſes, 521 years before Jeſus Chriſt, ſeven of the principal lords of the court conſpired to drive him out of it.—Their deſign was executed with good ſucceſs: Smerdis and his brother, another Magus, called Patizithes, were killed. Upon which the people alſo roſe, and put all the Magi to the ſword, inſomuch that there would not one have eſcaped, had not night come upon them. Darius, ſon of Hyſtaſpes, was then elected king; and, in memory of this maſſacre of the Magi, a feaſt was inſtituted, ſays Herodotus, called *Magophonia*. See Magi.

MAGPIE, in ornithology. See Corvus.

MAHIE, the name given by the inhabitants of Otaheite, or George's iſland, to their bread-fruit, when made into a kind of ſour paſte, which, in conſequence of having undergone a fermentation, will keep a conſiderable time, and ſupply them with food when no ripe fruit is to be had. When therefore they ſee a great ſhow of new fruit on the trees, they ſtrip them all at once of their former crop, of which they make mahie. This *ſuccedaneum* for ripe bread-fruit is thus made: They gather the fruit before it is perfectly ripe, and laying it in heaps cover it cloſely with leaves. In this ſtate it ferments, and becomes diſagreeably ſweet; the core is then taken out entire, and the reſt of the fruit thrown into a hole in their houſes, dug on purpoſe, and neatly lined in the bottom and ſides with graſs. The whole is then covered with leaves, and heavy ſtones are laid upon them. In this ſtate it undergoes a ſecond fermentation, and becomes ſour; after which it will ſuffer no change for many months. It is taken out of this hole as it is wanted for uſe, and, being made into balls, is wrapped up in leaves and baked; and thus dreſſed it will keep for five or ſix weeks. It is eaten, both cold and hot, and the natives of thoſe countries ſeldom make a meal without it; but to Captain Cook

and his company the taſte was as diſagreeable as that of a pickled olive generally is the firſt time it is eaten.

MAHO. See HIBISCUS.

MAHOGANY. See SWIETENIA.

MAHOMET, or MOHAMMED, ſtyled the *Impoſtor*, was born in the reign of Anuſhirwan the Juſt, emperor of Perſia, about the end of the 6th century of the Chriſtian æra. He came into the world under ſome diſadvantages. His father Abd'allah was a younger ſon of Abd'almotalleb; and dying very young, and in his father's lifetime, left his widow and infant ſon in very mean circumſtances, his whole ſubſtance conſiſting but of five camels and one Ethiopian ſhe-ſlave. Abd'almotalleb was therefore obliged to take care of his grandchild Mahomet; which he not only did during his life, but at his death enjoined his eldeſt ſon Abu Taleb, who was brother to Abd'allah by the ſame mother, to provide for him for the future: which he very affectionately did, and inſtructed him in the buſineſs of a merchant, which he followed; and to that end he took him into Syria when he was but 13. He afterwards recommended him to Khadijah, a noble and rich widow, for her factor; in whoſe ſervice he behaved himſelf ſo well, that by making him her huſband ſhe ſoon raiſed him to an equality with the richeſt in Mecca.

After he began by this advantageous match to live at his eaſe, it was, that he formed the ſcheme of eſtabliſhing a new religion, or, as he expreſſed it, of replanting the only true and ancient one profeſſed by Adam, Noah, Abraham, Moſes, Jeſus, and all the prophets, by deſtroying the groſs idolatry into which the generality of his countrymen had fallen, and weeding out the corruptions and ſuperſtitions which the latter Jews and Chriſtians had, as he thought, introduced into their religion, and reducing it to its original purity, which conſiſted chiefly in the worſhip of one only God.

Before he made any attempt abroad, he rightly judged that it was neceſſary for him to begin with the converſion of his own houſehold. Having therefore retired with his family, as he had done ſeveral times before, to a cave in mount Hara, he there opened the ſecret of his miſſion to his wife Khadijah; and acquainted her, that the angel Gabriel had juſt before appeared to him, and told him that he was appointed the apoſtle of God: he alſo repeated to her a paſſage which he pretended had been revealed to him by the miniſtry of the angel, with thoſe other circumſtances of this firſt appearance which are related by the Mahometan writers. Khadijah received the news with great joy; ſwearing by him in whoſe hands her ſoul was, that ſhe truſted he would be the prophet of his nation; and immediately communicated what ſhe had heard to her couſin Warakah Ebn Nawfal, who being a Chriſtian, could write in the Hebrew character, and was tolerably well verſed in the ſcriptures; and he as readily came into her opinion, aſſuring her that the ſame angel who had formerly appeared unto Moſes was now ſent to Mahomet. The firſt overture the prophet made was in the month of Ramadan, in the 40th year of his age, which is therefore uſually called the year of his miſſion.

Encouraged by ſo good a beginning, he reſolved to proceed, and try for ſome time what he could do by private perſuaſion, not daring to hazard the whole affair by expoſing it too ſuddenly to the public. He ſoon made proſelytes of thoſe under his own roof, viz. his wife Khadijah, his ſervant Zeid Ebn Haretha, to whom he gave his freedom on that occaſion, (which afterwards became a rule to his followers) and his couſin and pupil Ali, the ſon of Abu Taleb, though then very young: but this laſt, making no account of the other two, uſed to ſtyle himſelf the *firſt of believers*. The next perſon Mahomet applied to was Abd'allah Ebn Abi Kohafa, ſurnamed *Abu Becr*, a man of great authority among the Koreiſh, and one whoſe intereſt he well knew would be of great ſervice to him; as it ſoon appeared: for Abu Becr, being gained over, prevailed alſo on Othman Ebn Affan, Abd'alraham Ebn Awf, Saad Ebn Abbi Wakkas, al Zobeir Ebn al Awam, and Telha Ebn Obeid'allah, all principal men of Mecca, to follow his example. Theſe men were the ſix chief companions, who, with a few more, were converted in the ſpace of three years: at the end of which, Mahomet having, as he hoped, a ſufficient intereſt to ſupport him, made his miſſion no longer a ſecret, but gave out that God had commanded him to admoniſh his near relations; and in order to do it with more convenience and proſpect of ſucceſs, he directed Ali to prepare an entertainment, and invite the ſons and deſcendants of Abd'almotalleb, intending then to open his mind to them. This was done, and about 40 of them came; but Abu Laheb, one of his uncles, making the company break up before Mahomet had an opportunity of ſpeaking, obliged him to give them a ſecond invitation the next day; and when they were come, he made them the following ſpeech: "I know no man in all Arabia who can offer his kindred a more excellent thing than I now do you: I offer you happineſs both in this life, and in that which is to come; God Almighty hath commanded me to call you unto him: Who, therefore, among you will be aſſiſtant to me herein, and become my brother and my vicegerent?" All of them heſitating, and declining the matter, Ali at length roſe up, and declared that he would be his aſſiſtant; and vehemently threatened thoſe who ſhould oppoſe him. Mahomet upon this embraced Ali with great demonſtrations of affection, and deſired all who were preſent to hearken to and obey him as his deputy; at which the company broke out into a great laughter, telling Abu Taleb that he muſt now pay obedience to his ſon.

This repulſe, however, was ſo far from diſcouraging Mahomet, that he began to preach in public to the people; who heard him with ſome patience till he came to upbraid them with the idolatry, obſtinacy, and perverſeneſs of themſelves and their fathers; which ſo highly provoked them, that they declared themſelves his enemies, and would ſoon have procured his ruin had he not been protected by Abu Taleb. The chief of the Koreiſh warmly ſolicited this perſon to deſert his nephew, making frequent remonſtrances againſt the innovations he was attempting; which proving ineffectual, they at length threatened him with an open rupture, if he did not prevail on Mahomet to deſiſt. At this Abu Taleb was ſo far moved, that he earneſtly diſſuaded his nephew from purſuing the affair any further, repreſenting the great danger he and his friends muſt otherwiſe run. But Mahomet was not to be intimidated; telling his uncle plainly, *that if they ſet the ſun againſt him on his right hand, and the moon on his left, he would not leave his enterpriſe:* and Abu Taleb, ſeeing him ſo firmly reſolved to proceed, uſed no further arguments, but promiſed to ſtand by him againſt all his enemies. The Koreiſh, finding they could prevail neither by fair words nor menaces, tried what they could do by force and ill-treatment; uſing Mahomet's followers ſo very injuriouſly, that it was not ſafe for them to continue at Mecca any longer: whereupon Mahomet gave leave to ſuch of them as had not friends to protect them to ſeek for refuge elſewhere. And accordingly in the fifth year of the prophet's miſſion, 16 of them, four of whom were women, fled into Ethiopia; and among them Othman Ebn Affan and his wife Rakiah, Mahomet's daughter. This was the firſt flight; but afterwards ſeveral others followed them, retiring one after another, to the number of 83 men and 18 women, beſides children. Theſe refugees were kindly received by the Najaſhi, or king of Ethiopia; who refuſed to deliver them up to thoſe whom the Koreiſh ſent to demand them, and, as the Arab writers unanimouſly atteſt, even profeſſed the Mahometan religion.

In the ſixth year of his miſſion, Mahomet had the pleaſure

of ſeeing his party ſtrengthened by the converſion of his uncle Hamza, a man of great valour and merit; and of Omar Ebn al Kattab, a perſon highly eſteemed, and once a violent oppoſer of the prophet. As perſecution generally advances rather than obſtructs the ſpreading of a religion, Iſlamiſm made ſo great a progreſs among the Arab tribes, that the Koreiſh, to ſuppreſs it effectually if poſſible, in the ſeventh year of Mahomet's miſſion, made a ſolemn league or covenant againſt the Haſhemites and the family of Abd'almotâlleb, engaging themſelves to contract no marriages with any of them, and to have no communication with them; and to give it the greater ſanction, reduced it into writing, and laid it up in the Caaba. Upon this the tribe became divided into two factions; and the family of Haſhem all repaired to Abu Taleb, as their head; except only Abd'al Uzza, ſurnamed *Abu Laheb*, who, out of inveterate hatred to his nephew and his doctrine, went over to the oppoſite party, whoſe chief was Abu Sofian Ebn Harb, of the family of Ommeya.

The families continued thus at variance for three years; but in the tenth year of his miſſion, Mahomet told his uncle Abu Taleb, that God had manifeſtly ſhowed his diſapprobation of the league which the Koreiſh had made againſt them, by ſending a worm to eat out every word of the inſtrument except the name of *God*. Of this accident Mahomet had probably ſome private notice: for Abu Taleb went immediately to the Koreiſh, and acquainted them with it; offering, if it proved falſe, to deliver his nephew up to them; but in caſe it were true, he inſiſted that they ought to lay aſide their animoſity, and annul the league they had made againſt the Haſhemites. To this they acquieſced; and going to inſpect the writing, to their great aſtoniſhment found it to be as Abu Taleb had ſaid; and the league was thereupon declared void.

In the ſame year Abu Taleb died, at the age of above fourſcore; and it is the general opinion that he died an infidel: though others ſay, that when he was at the point of death he embraced Mahometaniſm; and produce ſome paſſages out of his poetical compoſitions to confirm their aſſertion. About a month, or, as ſome write, three days after the death of this great benefactor and patron, Mahomet had the additional mortification to loſe his wife Khadijah, who had ſo generouſly made his fortune. For which reaſon this year is called the *year of mourning*.

On the death of theſe two perſons, the Koreiſh began to be more troubleſome than ever to their prophet, and eſpecially ſome who had formerly been his intimate friends; inſomuch that he found himſelf obliged to ſeek for ſhelter elſewhere, and firſt pitched upon Tayef, about 60 miles eaſt from Mecca, for the place of his retreat. Thither therefore he went, accompanied by his ſervant Zied, and applied himſelf to two of the chief of the tribe of Thakif who were the inhabitants of that place; but they received him very coldly. However, he ſtaid there a month; and ſome of the more conſiderate and better ſort of men treated him with a little reſpect: but the ſlaves and inferior people at length roſe againſt him; and bringing him to the wall of the city, obliged him to depart and return to Mecca, where he put himſelf under the protection of Al Motaam Ebn Adi.

This repulſe greatly diſcouraged his followers. However, Mahomet was not wanting to himſelf; but boldly continued to preach to the public aſſemblies at the pilgrimage, and gained ſeveral proſelytes; and among them ſix of the inhabitants of Yathreb of the Jewiſh tribe of Khazraj; who, on their return home, failed not to ſpeak much in commendation of their new religion, and exhorted their fellow-citizens to embrace the ſame.

In the 12th year of his miſſion it was that Mahomet gave out that he had made his night-journey from Mecca to Jeruſalem, and thence to heaven, ſo much ſpoken of by all that write of him. Dr. Prideaux thinks he invented it, either to anſwer the expectations of thoſe who demanded ſome miracle as a proof of his miſſion; or elſe, by pretending to have converſed with God, to eſtabliſh the authority of whatever he ſhould think fit to leave behind by way of oral tradition, and make his ſayings to ſerve the ſame purpoſe as the oral law of the Jews. But it does not appear that Mahomet himſelf ever expected ſo great a regard ſhould be paid to his ſayings, as his followers have ſince done; and ſeeing he all along diſclaimed any power of performing miracles, it ſeems rather to have been a fetch of policy to raiſe his reputation, by pretending to have actually converſed with God in heaven, as Moſes had heretofore done in the mount, and to have received ſeveral inſtitutions immediately from him, whereas before he contented himſelf with perſuading them that he had all by the miniſtry of Gabriel.

However, this ſtory ſeemed ſo abſurd and incredible, that ſeveral of his followers left him upon it; and had probably ruined the whole deſign, had not Abu Becr vouched for his veracity, and declared, that, if Mahomet affirmed it to be true, he verily believed the whole: which happy incident not only retrieved the prophet's credit, but increaſed it to ſuch a degree, that he was ſecure of being able to make his diſciples ſwallow whatever he pleaſed to impoſe on them for the future. And this fiction, notwithſtanding its extravagance, was one of the moſt artful contrivances Mahomet ever put in practice, and what chiefly contributed to the raiſing of his reputation to that great height to which it afterwards arrived.

In this year, called by the Mahometans the *accepted year*, 12 men of Yathreb or Medina, of whom 10 were of the tribe of Khazraj, and the other two of that of Aws, came to Mecca, and took an oath of fidelity to Mahomet at al Akaba, a hill on the north of that city. This oath was called the *women's oath*; not that any women were preſent at this time, but becauſe a man was not thereby obliged to take up arms in defence of Mahomet or his religion; it being the ſame oath that was afterwards exacted of the women, the form of which we have in the Koran, and is to this effect: *viz.* That they ſhould renounce all idolatry: that they ſhould not ſteal, nor commit fornication, nor kill their children (as the Pagan Arabs uſed to do when they apprehended they ſhould not be able to maintain them), nor forge calumnies; and that they ſhould obey the prophet in all things that were reaſonable. When they had ſolemnly engaged to all this, Mahomet ſent one of his diſciples, named *Maſab Ebn Omair*, home with them, to inſtruct them more fully in the grounds and ceremonies of his new religion.

Maſab, being arrived at Medina, by the aſſiſtance of thoſe who had been formerly converted, gained ſeveral proſelytes; particularly Oſaid Ebn Hodeira, a chief man of the city; and Saad Ebn Moadh, prince of the tribe of Aws; Mahometaniſm ſpreading ſo faſt that there was ſcarce a houſe wherein there were not ſome who had embraced it.

The next year, being the 13th of Mahomet's miſſion, Maſab returned to Mecca, accompanied by 73 men and two women of Medina who had profeſſed Iſlamiſm, beſides ſome others who were as yet unbelievers. On their arrival, they immediately ſent to Mahomet, and offered him their aſſiſtance; of which he was now in great need, for his adverſaries were by this time grown ſo powerful in Mecca that he could not ſtay there much longer without imminent danger. Wherefore he accepted their propoſal, and met them one night, by appointment, at al Akaba above mentioned, attended by his uncle al Abbas; who, though he was not then a believer, wiſhed his nephew well, and made a ſpeech to thoſe of Medina, wherein he told them, that as Mahomet was obliged to

quit his native city, and ſeek an aſylum elſewhere, and they had offered him their protection, they would do well not to deceive him; that, if they were not firmly reſolved to defend and not betray him, they had better declare their minds, and let him provide for his ſafety in ſome other manner. Upon their proteſting their ſincerity, Mahomet ſwore to be faithful to them, on condition that they ſhould protect him againſt all inſults as heartily as they would their own wives and families. They then aſked him what recompenſe they were to expect if they ſhould happen to be killed in his quarrel; he anſwered, Paradiſe. Whereupon they pledged their faith to him, and ſo returned home; after Mahomet had choſen 12 out of their number, who were to have the ſame authority among them as the 12 apoſtles of Chriſt had among his diſciples.

Hitherto Mahomet had propagated his religion by fair means; ſo that the whole ſucceſs of his enterpriſe, before his flight to Medina, muſt be attributed to perſuaſion only, and not to compulſion. For before this ſecond oath of fealty or inauguration at al Akaba, he had no permiſſion to uſe any force at all; and in ſeveral places of the Koran, which he pretended were revealed during his ſtay at Mecca, he declares his buſineſs was only to preach and admoniſh; that he had no authority to compel any perſon to embrace his religion; and that, whether people believe or not, was none of his concern, but belonged ſolely unto God. And he was ſo far from allowing his followers to uſe force, that he exhorted them to bear patiently thoſe injuries which were offered them on account of their faith; and, when perſecuted himſelf, choſe rather to quit the place of his birth and retire to Medina, than to make any reſiſtance. But this great paſſiveneſs and moderation ſeem entirely owing to his want of power, and the great ſuperiority of his oppoſers for the firſt 12 years of his miſſion; for no ſooner was he enabled, by the aſſiſtance of thoſe of Medina, to make head againſt his enemies, than he gave out, that God had allowed him and his followers to defend themſelves againſt the infidels; and at length, as his forces increaſed, he pretended to have the divine leave even to attack them; and to deſtroy idolatry, and ſet up the true faith by the ſword; finding, by experience, that his deſigns would otherwiſe proceed very ſlowly, if they were not utterly overthrown; and knowing, on the other hand, that innovators, when they depend ſolely on their own ſtrength, and can compel, ſeldom run any riſk; from whence, ſays Machiavel, it follows, that all the armed prophets have ſucceeded, and the unarmed ones have failed. Moſes, Cyrus, Theſeus, and Romulus, would not have been able to eſtabliſh the obſervance of their inſtitutions for any length of time, had they not been armed. The firſt paſſage of the Koran which gave Mahomet the permiſſion of defending himſelf by arms, is ſaid to have been that in the 22d chapter; after which a great number to the ſame purpoſe were revealed.

That Mahomet had a right to take up arms for his own defence againſt his unjuſt perſecutors, may perhaps be allowed; but whether he ought afterwards to have made uſe of that means for the eſtabliſhing of his religion, it is not ſo eaſy to determine. How far the ſecular power may or ought to interpoſe in affairs of this nature, mankind are not agreed. The method of converting by the ſword gives no very favourable idea of the faith which is ſo propagated, and is diſallowed by every body in thoſe of another religion, though the ſame perſons are willing to admit of it for the advancement of their own; ſuppoſing that, though a falſe religion ought not to be eſtabliſhed by authority, yet a true one may; and accordingly force is almoſt as conſtantly employed in theſe caſes by thoſe who have the power in their hands, as it is conſtantly complained of by thoſe who ſuffer the violence. It is certainly one of the moſt convincing proofs that Mahometaniſm was no other than a human invention, that it owed its progreſs and eſtabliſhment almoſt entirely to the ſword; and it is one of the ſtrongeſt demonſtrations of the divine original of Chriſtianity, that it prevailed againſt all the force and powers of the world by the mere dint of its own truth, after having ſtood the aſſaults of all manner of perſecutions, as well as other oppoſitions, for 300 years together, and at length made the Roman emperors themſelves ſubmit thereto; after which time, indeed, this proof ſeems to fail, Chriſtianity being then eſtabliſhed, and Paganiſm aboliſhed, by public authority, which has had great influence in the propagation of the one and deſtruction of the other ever ſince. But to return.

Mahomet, having provided for the ſecurity of his companions as well as his own, by the league offenſive and defenſive which he had now concluded with thoſe of Medina, directed them to repair thither, which they accordingly did; but himſelf with Abu Becr and Ali ſtaid behind, having not yet received the divine permiſſion, as he pretended, to leave Mecca. The Koreiſh fearing the conſequence of this new alliance, began to think it abſolutely neceſſary to prevent Mahomet's eſcape to Medina; and having held a council thereon, after ſeveral milder expedients had been rejected, they came to a reſolution that he ſhould be killed; and agreed that a man ſhould be choſen out of every tribe for the execution of this deſign; and that each man ſhould have a blow at him with his ſword, that the guilt of his blood might fall equally on all the tribes, to whoſe united power the Haſhemites were much inferior, and therefore durſt not attempt to revenge their kinſman's death.

This conſpiracy was ſcarce formed, when, by ſome means or other, it came to Mahomet's knowledge; and he gave out that it was revealed to him by the angel Gabriel, who had now ordered him to retire to Medina. Whereupon, to amuſe his enemies, he directed Ali to lie down in his place, and wrap himſelf up in his green cloak, which he did; and Mahomet eſcaped miraculouſly, as they pretend, to Abu Becr's houſe, unperceived by the conſpirators, who had already aſſembled at the prophet's door. They, in the mean time, looking through the crevice, and ſeeing Ali, whom they took to be Mahomet himſelf, aſleep, continued watching there till morning, when Ali aroſe, and they found themſelves deceived.

From Abu Becr's houſe Mahomet and he went to a cave in mount Thur, to the ſouth-eaſt of Mecca, accompanied only by Amer Ebn Foheirah, Abu Becr's ſervant, and Abd'allah Ebn Oreitah, an idolater whom they had hired for a guide. In this cave they lay hid three days, to avoid the ſearch of their enemies; which they very narrowly eſcaped, and not without the aſſiſtance of more miracles than one: for ſome ſay that the Koreiſh were ſtruck with blindneſs, ſo that they could not find the cave; others, that after Mahomet and his companions were got in, two pigeons laid their eggs at the entrance, and a ſpider covered the mouth of the cave with her web, which made them look no farther. Abu Becr, ſeeing the prophet in ſuch imminent danger, became very ſorrowful; wherenpon Mahomet comforted him with theſe words, recorded in the Koran, *Be not grieved, for God is with us.* Their enemies being retired, they left the cave, and ſet out for Medina by a by-road; and, having fortunately, or, as the Mahometans tell us, miraculouſly eſcaped ſome who were ſent to purſue them, arrived ſafely at that city; whither Ali followed them in three days, after he had ſettled ſome affairs at Mecca.

The firſt thing Mahomet did after his arrival at Medina, was to build a temple for his religious worſhip, and a houſe for himſelf, which he did on a parcel of ground which had before ſerved to put camels in, or, as others tell us, for a burying-ground,

and belonged to Sahal and Soheil the ſons of Amru, who were orphans. This action Dr. Prideaux exclaims againſt, repreſenting it as a flagrant inſtance of injuſtice; for that, ſays he, he violently diſpoſſeſſed theſe poor orphans, the ſons of an inferior artificer (whom the author he quotes calls a *carpenter*), of this ground, and ſo founded the firſt fabric of his worſhip with the like wickedneſs as he did his religion. But, to ſay nothing of the improbability that Mahomet ſhould act in ſo impolitic a manner at his firſt coming, the Mahometan writers ſet this affair in a quite different light: one tells us that he treated with the lads about the price of the ground, but they deſired he would accept it as a preſent: however, as hiſtorians of good credit aſſure us, he actually bought it; and the money was paid by Abu Becr. Beſides, had Mahomet accepted it as a preſent, the orphans were in circumſtances ſufficient to have afforded it: for they were of a very good family, of the tribe of Najjer, one of the moſt illuſtrious among the Arabs; and not the ſons of a carpenter, as Dr. Prideaux's author writes, who took the word *Najjer*, which ſignifies "a carpenter," for an appellative, whereas it is a proper name.

Mahomet, being ſecurely ſettled at Medina, and able not only to defend himſelf againſt the inſults of his enemies, but to attack them, began to ſend out ſmall parties to make repriſals on the Koreiſh; the firſt party conſiſting of no more than nine men, who intercepted and plundered a caravan belonging to that tribe, and in the action took two priſoners. But what eſtabliſhed his affairs very much, and was the foundation on which he built all his ſucceeding greatneſs, was the gaining of the battle of Bedr, which was fought in the ſecond year of the Hegira, and is ſo famous in the Mahometan hiſtory. Some reckon no leſs than 27 expeditions wherein Mahomet was perſonally preſent, in nine of which he gave battle, beſides ſeveral other expeditions in which he was not preſent. His forces he maintained partly by the contributions of his followers for this purpoſe, which he called by the name of *zacat* or *alms*, and the paying of which he very artfully made one main article of his religion; and partly by ordering a fifth part of the plunder to be brought into the public treaſury for that purpoſe, in which matter he likewiſe pretended to act by the divine direction.

In a few years, by the ſucceſs of his arms (notwithſtanding he ſometimes came off by the worſt) he conſiderably raiſed his credit and power. In the ſixth year of the Hegira he ſet out with 1400 men to viſit the temple of Mecca, not with any intent of committing hoſtilities, but in a peaceable manner. However, when he came to al Hodeibiya, which is ſituated partly within and partly without the ſacred territory, the Koreiſh ſent to let him know that they would not permit him to enter Mecca, unleſs he forced his way; whereupon he called his troops about him, and they all took a ſolemn oath of fealty or homage to him, and he reſolved to attack the city; but thoſe of Mecca ſending Arwa Ebn Maſud, prince of the tribe of Thakif, as their ambaſſador, to deſire peace, a truce was concluded between them for ten years, by which any perſon was allowed to enter into league either with Mahomet, or with the Koreiſh, as he thought fit.

It may not be improper, in order to ſhow the inconceivable veneration and reſpect the Mahometans by this time had for their prophet, to mention the account which the above-mentioned ambaſſador gave the Koreiſh, at his return, of their behaviour. He ſaid he had been at the courts both of the Roman emperor and of the king of Perſia, and never ſaw any prince ſo highly reſpected by his ſubjects as Mahomet was by his companions: for, whenever he made the ablution, in order to ſay his prayers, they ran and catched the water that he had uſed; and, whenever he ſpit, they immediately licked it up, and gathered every hair that fell from him with great ſuperſtition.

In the ſeventh year of the Hegira, Mahomet began to think of propagating his religion beyond the bounds of Arabia; and ſent meſſengers to the neighbouring princes, with letters to invite them to Mahometiſm. Nor was this project without ſome ſucceſs. Khoſru Parviz, then king of Perſia, received his letter with great diſdain, and tore it in a paſſion, ſending away the meſſenger very abruptly; which when Mahomet heard, he ſaid, *God ſhall tear his kingdom.* And ſoon after a meſſenger came to Mahomet from Badhan king of Yaman, who was a dependent on the Perſians, to acquaint him that he had received orders to ſend him to Khoſru. Mahomet put off his anſwer till the next morning, and then told the meſſenger it had been revealed to him that night that Khoſru was ſlain by his ſon Shiruyeh; adding, that he was well aſſured his new religion and empire ſhould riſe to as great a height as that of Khoſru; and therefore bid him adviſe his maſter to embrace Mahometiſm. The meſſenger being returned, Badhan in a few days received a letter from Shiruyeh, informing him of his father's death, and ordering him to give the prophet no further diſturbance. Whereupon Badhan and the Perſians with him turned Mahometans.

The emperor Heraclius, as the Arabian hiſtorians aſſure us, received Mahomet's letter with great reſpect, laying it on his pillow, and diſmiſſed the bearer honourably. And ſome pretend that he would have profeſſed this new faith, had he not been afraid of loſing his crown.

Mahomet wrote to the ſame effect to the king of Ethiopia, though he had been converted before, according to the Arab writers; and to Mokawkas, governor of Egypt, who gave the meſſenger a very favourable reception, and ſent ſeveral valuable preſents to Mahomet, and among the reſt two girls, one of which, named Mary, became a great favourite with him. He alſo ſent letters of the like purport to ſeveral Arab princes: particularly one to al Hareth Ebn Abi Shamer king of Ghaſſan, who returning for anſwer that he would go to Mahomet himſelf, the prophet ſaid, *May his kingdom periſh!* another to Hawdha Ebn Ali, king of Yamama, who was a Chriſtian, and, having ſome time before profeſſed Iſlamiſm, had lately returned to his former faith; this prince ſent back a very rough anſwer, upon which Mahomet curſing him, he died ſoon after: and a third to al Mondar Ebn Sawa, king of Bahrein, who embraced Mahometiſm, and all the Arabs of that country followed his example.

The eighth year of the Hegira was a very fortunate year to Mahomet. In the beginning of it, Khaled Ebn al Walid and Amru Ebn al As, both excellent ſoldiers, the firſt of whom afterwards conquered Syria and other countries, and the latter Egypt, became proſelytes to Mahometiſm. And ſoon after the prophet ſent 3000 men againſt the Grecian forces, to revenge the death of one of his ambaſſadors, who, being ſent to the governor of Boſra on the ſame errand as thoſe who went to the above-mentioned princes, was ſlain by an Arab, of the tribe of Ghaſſan, at Muta, a town in the territory of Balka in Syria, about three days journey eaſtward from Jeruſalem, near which town they encountered. The Grecians being vaſtly ſuperior in number (for, including the auxiliary Arabs, they had an army of 100,000 men), the Mahometans were repulſed in the firſt attack, and loſt ſucceſſively three of their generals, viz. Zeid Ebn Haretha Mahomet's freedman, Jaafar the ſon of Abu Taleb, and Abdallah Ebn Rawaha: but Khaleb Ebn al Walid ſucceeding to the command, overthrew the Greeks with a great ſlaughter, and brought away abundance of rich ſpoil; on occaſion of which action Mahomet gave him the title of *Seif min ſeyuf Allah*, "one of the ſwords of God."

In this year alſo Mahomet took the city of Mecca, the inhabitants whereof had broken the truce concluded on two years before. For the tribe of Becr, who were confederates with the Koreiſh, attacking thoſe of Khozaah, who were allies of Mahomet, killed ſeveral of them, being ſupported in the action by a party of the Koreiſh themſelves. The conſequence of this violation was ſoon apprehended; and Abu Sofian himſelf made a journey to Medina on purpoſe to heal the breach and renew the truce: but in vain; for Mahomet, glad of this opportunity, refuſed to ſee him: whereupon he applied to Abu Becr and Ali; but they giving him no anſwer, he was obliged to return to Mecca as he came.

Mahomet immediately gave orders for preparations to be made, that he might ſurpriſe the Meccans while they were unprovided to receive him: in a little time he began his march thither; and by that time he came near the city, his forces were increaſed to 10,000 men. Thoſe of Mecca, being not in a condition to defend themſelves againſt ſo formidable an army, ſurrendered at diſcretion; and Abu Sofian ſaved his life by turning Mahometan. About 28 of the idolaters were killed by a party under the command of Khaled; but this happened contrary to Mahomet's orders, who, when he entered the town, pardoned all the Koreiſh on their ſubmiſſion, except only ſix men and four women, who were more obnoxious than ordinary (ſome of them having apoſtatiſed), and were ſolemnly proſcribed by the prophet himſelf; but of theſe no more than three men and one woman were put to death, the reſt obtaining pardon on their embracing Mahometiſm, and one of the women making her eſcape.

The remainder of this year Mahomet employed in deſtroying the idols in and round Mecca, ſending ſeveral of his generals on expeditions for that purpoſe, and to invite the Arabs to Iſlamiſm: wherein it is no wonder if they now met with ſucceſs.

The next year, being the ninth of the Hegira, the Mahometans call *the year of embaſſies*: for the Arabs had been hitherto expecting the iſſue of the war between Mahomet and the Koreiſh: but, ſo ſoon as that tribe, the principal of the whole nation, and the genuine deſcendants of Iſhmael, whoſe prerogatives none offered to diſpute, had ſubmitted, they were ſatisfied that it was not in their power to oppoſe Mahomet; and therefore began to come in to him in great numbers, and to ſend embaſſies to make their ſubmiſſions to him, both to Mecca, while he ſtaid there, and alſo to Medina, whither he returned this year. Among the reſt, five kings of the tribe of Hamyar profeſſed Mahometiſm, and ſent ambaſſadors to notify the ſame.

In the 10th year, Ali was ſent into Yaman to propagate the Mahometan faith there; and, as it is ſaid, converted the whole tribe of Hamdan in one day. Their example was quickly followed by all the inhabitants of that province, except only thoſe of Najran, who, being Chriſtians, choſe rather to pay tribute.

Thus was Mahometiſm eſtabliſhed, and idolatry rooted out, even in Mahomet's lifetime (for he died the next year), throughout all Arabia, except only Yamama, where Moſeilama, who ſet up alſo for a prophet as Mahomet's competitor, had a great party, and was not reduced till the kalifat of Abu Becr: and the Arabs being then united in one faith, and under one prince, found themſelves in a condition of making thoſe conqueſts which extended the Mahometan faith over ſo great a part of the world.

MAHOMET, the name of ſeveral emperors of the Turks; of whom the moſt celebrated is MAHOMET II. furnamed *the Great*, their ſeventh ſultan. He was born at Adrianople the 24th of March 1430; and is to be remembered chiefly by us for taking Conſtantinople in 1453, and thereby driving many learned Greeks into the Weſt, which was a great cauſe of the reſtoration of learning in Europe, as the Greek literature was then introduced here. He was one of the greateſt men upon record, with regard to the qualities neceſſary to a conqueror: for he conquered two empires, twelve kingdoms, and two hundred conſiderable cities. He was very ambitious of the title of Great, and the Turks gave it him; even the Chriſtians have not diſputed it with him; for he was the firſt of the Ottoman emperors whom the Weſtern nations dignified with the title of Grand Seignior or Great Turk, which poſterity has preſerved to his deſcendants. Italy had ſuffered greater calamities, but ſhe had never felt a terror equal to that which this ſultan's victories imprinted. The inhabitants ſeemed already condemned to wear the turban: it is certain, that pope Sixtus IV. repreſented to himſelf Rome as already involved in the dreadful fate of Conſtantinople; and thought of nothing but eſcaping into Provence, and once more transferring the holy ſee to Avignon. Accordingly, the news of Mahomet's death, which happened the 3d of May 1481, was received at Rome with the greateſt joy that ever was beheld there. Sixtus cauſed all the churches to be thrown open, made the tradeſpeople leave off their work, ordered a feaſt of three days with public prayers and proceſſions, commanded a diſcharge of the whole artillery of the caſtle of St. Angelo all that time, and put a ſtop to his journey to Avignon.

He appears to be the firſt ſultan who was a lover of arts and ſciences; and even cultivated polite letters. He often read the hiſtory of Auguſtus, and the other Cæſars; and he peruſed thoſe of Alexander, Conſtantine, and Theodoſius, with more than ordinary pleaſure, becauſe theſe had reigned in the ſame country with himſelf. He was fond of painting, muſic, and ſculpture; and he applied himſelf to the ſtudy of agriculture. He was much addicted to aſtrology; and uſed to encourage his troops by giving out, that the motion and influence of the heavenly bodies promiſed him the empire of the world. Contrary to the genius of his country, he delighted ſo much in the knowledge of foreign languages, that he not only ſpoke the Arabian, to which the Turkiſh laws, and the religion of their legiſlator Mahomet, are appropriated, but alſo the Perſian, the Greek, and the French, that is, the corrupted Italian. Landin, a knight of Rhodes, collected ſeveral letters which this ſultan wrote in the Syriac, Greek, and Turkiſh languages, and tranſlated them into Latin. Where the originals are, nobody knows; but the tranſlation has been publiſhed ſeveral times; as at Lyons 1520, in 4to; at Baſil 1554, 12mo; in a collection publiſhed by Oporinus, at Marpurg 1604, in 8vo; and at Leipſic 1690, in 12mo. Melchior Junius, profeſſor of eloquence at Strafburg, publiſhed at Montbeliard, 1595, a collection of letters, in which there are three written by Mahomet II. to Scanderbeg. One cannot diſcover the leaſt air of Turkiſh ferocity in theſe letters: they are written in as civil terms, and as obliging a manner, as the moſt polite prince in Chriſtendom could have written.

MAHOMETANISM, or MAHOMETISM, the ſyſtem of religion broached by Mahomet, and ſtill adhered to by his followers. See MAHOMET, and ALCORAN. Mahometaniſm is profeſſed by the Turks, Perſians, and ſeveral nations among the Africans, and many among the Eaſt Indians. The Mahometans divide their religion into two general parts, faith and practice: of which the firſt is divided into ſix diſtinct branches; Belief in God, in his angels, in his ſcriptures, in his prophets, in the reſurrection and final judgment, and in God's abſolute decrees. The points relating to practice are, Prayer, with waſhings, &c. alms, faſting, pilgrimage to Mecca, and circumciſion.

I. Of the Mahometan *Faith.*] 1. That both Mahomet, and thoſe among his followers who are reckoned orthodox, had and continue to have juſt and true notions of God and his attributes, appears ſo plain from the Koran itſelf, and all the Mahometan divines, that it would be loſs of time to refute thoſe who ſuppoſe the God of Mahomet to be different from the true God, and only a fictitious deity or idol of his own creation.

2. The exiſtence of angels, and their purity, are abſolutely required to be believed in the Koran; and he is reckoned an infidel who denies there are ſuch beings, or hates any of them, or aſſents any diſtinction of ſexes among them. They believe them to have pure and ſubtile bodies, created of fire; that they neither eat nor drink, nor propagate their ſpecies; that they have various forms and offices, ſome adoring God in different poſtures, others ſinging praiſes to him, or interceding for mankind. They hold, that ſome of them are employed in writing down the actions of men; others in carrying the throne of God, and other ſervices.

The four angels, whom they look on as more eminently in God's favour, and often mention on account of the offices aſſigned them, are, Gabriel, to whom they give ſeveral titles, particularly thoſe of the *holy ſpirit*, and the *angel of revelations*, ſuppoſing him to be honoured by God with a greater confidence than any other, and to be employed in writing down the divine decrees; Michael, the friend and protector of the Jews; Azrael, the *angel of death*, who ſeparates men's ſouls from their bodies; and Iraſil, whoſe office it will be to ſound the trumpet at the reſurrection. The Mahometans alſo believe, that two guardian angels attend on every man, to obſerve and write down his actions, being changed every day, and therefore called *al Moakkibat*, or "the angels who continually ſucceed one another."

The devil, whom Mahomet names *Eblis*, from his *deſpair*, was once one of thoſe angels who are neareſt to God's preſence, called *Azazil*; and fell, according to the doctrine of the Koran, for refuſing to pay homage to Adam at the command of God.

Beſides angels and devils, the Mahometans are taught by the Koran to believe an intermediate order of creatures, which they call *jin* or *genii*, created alſo of fire, but of a groſſer fabric than angels, ſince they eat and drink, and propagate their ſpecies, and are ſubject to death. Some of theſe are ſuppoſed to be good, and others bad, and capable of future ſalvation or damnation, as men are; whence Mahomet pretended to be ſent for the converſion of genii as well as men.

3. As to the ſcriptures, the Mahometans are taught by the Koran, that God, in divers ages of the world, gave revelations of his will in writing to ſeveral prophets, the whole and every one of which it is abſolutely neceſſary for a good Moſlem to believe. The number of theſe ſacred books were, according to them, 104. Of which 10 were given to Adam, 50 to Seth, 30 to Edris or Enoch, 10 to Abraham; and the other four, being the Pentateuch, the Pſalms, the Goſpel, and the Koran, were ſucceſſively delivered to Moſes, David, Jeſus, and Mahomet; which laſt being the ſeal of the prophets, thoſe revelations are now cloſed, and no more are to be expected. All theſe divine books, except the four laſt, they agree to be now entirely loſt, and their contents unknown; though the Sabians have ſeveral books which they attribute to ſome of the antediluvian prophets. And of thoſe four, the Pentateuch, Pſalms, and Goſpel, they ſay, have undergone ſo many alterations and corruptions, that, though there may poſſibly be ſome part of the true word of God therein, yet no credit is to be given to the preſent copies in the hands of the Jews and Chriſtians. The Mahometans have alſo a goſpel in Arabic, attributed to St. Barnabas; wherein the hiſtory of Jeſus Chriſt is related in a manner very different from what we find in the true goſpels, and correſpondent to thoſe traditions which Mahomet has followed in his Koran. Of this goſpel the Moriſcoes in Africa have a tranſlation in Spaniſh; and there is, in the library of prince Eugene of Savoy, a manuſcript of ſome antiquity, containing an Italian tranſlation of the ſame goſpel; made, it is to be ſuppoſed, for the uſe of renegades. This book appears to be no original forgery of the Mahometans; though they have, no doubt, interpolated and altered it ſince, the better to ſerve their purpoſe; and in particular, inſtead of the *Paraclete*, or *Comforter*, they have in this apocryphal goſpel inſerted the word *Periclyte*, that is, the "famous," or "illuſtrious;" by which they pretend their prophet was foretold by name, that being the ſignification of *Mohammed* in Arabic: and this they ſay to juſtify that paſſage of the Koran, where Jeſus Chriſt is formally aſſerted to have foretold his coming, under his other name of *Ahmed*, which is derived from the ſame root as *Mohammed*, and of the ſame import. From theſe, or ſome other forgeries of the ſame ſtamp, it is that the Mahometans quote ſeveral paſſages, of which there are not the leaſt footſteps in the New Teſtament.

4. The number of the prophets, which have been from time to time ſent by God into the world, amounts to no leſs than 224,000, according to one Mahometan tradition; or to 124,000 according to another: among whom 313 were apoſtles, ſent with ſpecial commiſſions to reclaim mankind from infidelity and ſuperſtition; and ſix of them brought new laws or diſpenſations, which ſucceſſively abrogated the preceding: theſe were Adam, Noah, Abraham, Moſes, Jeſus, and Mahomet. All the prophets in general, the Mahometans believe to have been free from great ſins and errors of conſequence, and profeſſors of one and the ſame religion, that is, Iſlam, notwithſtanding the different laws and inſtitutions which they obſerved. They allow of degrees among them, and hold ſome of them to be more excellent and honourable than others. The firſt place they give to the revealers and eſtabliſhers of new diſpenſations, and the next to the apoſtles.

In this great number of prophets, they not only reckon divers patriarchs and perſons named in ſcripture, but not recorded to have been prophets (wherein the Jewiſh and Chriſtian writers have ſometimes led the way), as Adam, Seth, Lot, Iſhmael, Nun, Joſhua, &c. and introduce ſome of them under different names, as *Enoch*, *Heber*, and *Jethro*, who are called, in the Koran, *Edris*, *Hud*, and *Shoaib*; but ſeveral others whoſe very names do not appear in ſcripture (though they endeavour to find ſome perſons there to fix them on), as Saleh, Khedr, Dhu'lkefl, &c.

5. The belief of a general reſurrection and a future judgment.

When a corpſe is laid in the grave, they ſay he is received by an angel, who gives him notice of the coming of the two examiners; who are two black livid angels, of a terrible appearance, named *Monker* and *Nakir*. Theſe order the dead perſon to ſit upright; and examine him concerning his faith, as to the unity of God, and the miſſion of Mahomet: if he anſwer rightly, they ſuffer the body to reſt in peace, and it is refreſhed by the air of paradiſe; but if not, they beat him on the temples with iron maces, till he roars out for anguiſh ſo loud, that he is heard by all from eaſt to weſt, except men and genii. They then preſs the earth on the corpſe, which is gnawed and ſtung till the reſurrection by 99 dragons, with ſeven heads each; or, as others ſay, their ſins will become venomous beaſts, the grievous ones ſtinging like dragons, the ſmaller like ſcorpions, and the other like ſerpents: circumſtances which ſome underſtand in a figurative ſenſe.

As to the ſoul, they hold that, when it is ſeparated from the body by the angel of death, who performs his office with eaſe and gentleneſs towards the good, and with violence towards the wicked, it enters into that which they call *al berzakh*, or *the interval* between death and the reſurrection. If the departed perſon was a believer they ſay two angels meet it, who convey it to heaven, that its place there may be aſſigned, according to its merit and degree. For they diſtinguiſh the ſouls of the faithful into three claſſes: the firſt of prophets, whoſe ſouls are admitted into paradiſe immediately; the ſecond of martyrs, whoſe ſpirits, according to a tradition of Mahomet, reſt in the crops of green birds, which eat of the fruits and drink of the rivers of paradiſe; and the third of other believers, concerning the ſtate of whoſe ſouls before the reſurrection there are various opinions.

Though ſome among the Mahometans have thought that the reſurrection will be merely ſpiritual, and no more than the returning of the ſoul to the place whence it firſt came, (an opinion defended by Ebn Sina, and called by ſome the *opinion of the philoſophers*); and others, who allow man to conſiſt of body only, that it will be merely corporeal; the received opinion is, that both body and ſoul will be raiſed: and their doctors argue ſtrenuouſly for the poſſibility of the reſurrection of the body, and diſpute with great ſubtilty concerning the manner of it. But Mahomet has taken care to preſerve one part of the body, whatever becomes of the reſt, to ſerve for a baſis of the future edifice, or rather a leaven for the maſs which is to be joined to it. For he taught, that a man's body was entirely conſumed by the earth, except only the bone called *al ajb*, which we name the *os coccygis*, or rump-bone; and that, as it was the firſt formed in the human body, it will alſo remain uncorrupted till the laſt day, as a ſeed from whence the whole is to be renewed; and this, he ſaid, would be effected by a forty years rain, which God ſhould ſend, and which would cover the earth to the height of 12 cubits, and cauſe the bodies to ſprout forth like plants. Herein, alſo, is Mahomet beholden to the Jews; who ſay the ſame things of the bone luz, excepting that what he attributes to a great rain, will be effected, according to them, by a dew impregnating the duſt of the earth.

The time of the reſurrection the Mahometans allow to be a perfect ſecret to all but God alone; the angel Gabriel himſelf acknowledging his ignorance in this point, when Mahomet aſked him about it. However, they ſay, the approach of that day may be known from certain ſigns which are to precede it. Theſe ſigns they diſtinguiſh into two ſorts, the leſſer and the greater.

The leſſer ſigns are, 1. The decay of faith among men. 2. The advancing of the meaneſt perſons to eminent dignity. 3. That a maid-ſervant ſhall become the mother of her miſtreſs (or maſter); by which is meant, either that towards the end of the world men ſhall be much given to ſenſuality, or that the Mahometans ſhall then take many captives. 4. Tumults and ſeditions. 5. A war with the Turks. 6. Great diſtreſs in the world; ſo that a man, when he paſſes by another's grave, ſhall ſay, Would to God I were in his place! 7. That the provinces of Irac and Syria ſhall refuſe to pay their tribute. And, 8. That the buildings of Median ſhall reach to Ahab or Yahab.

The greater ſigns are, 1. The ſun's riſing in the weſt; which ſome have imagined it originally did. 2. The appearance of the beaſt which ſhall riſe out of the earth, in the temple of Mecca, or on mount Safa, or in the territory of Tayef, or ſome other place. This beaſt, they ſay, is to be 60 cubits high; though others, not ſatisfied with ſo ſmall a ſize, will have her reach to the clouds and to heaven, when her head only is out; and that ſhe will appear for three days, but ſhow only a third part of her body. They deſcribe this monſter, as to her form, to be a compound of various ſpecies; having the head of a bull, the eyes of a hog, the ears of an elephant, the horns of a ſtag, the neck of an oſtrich, the breaſt of a lion, the colour of a tiger, the back of a cat, the tail of a ram, the legs of a camel, and the voice of an aſs. Some ſay, this beaſt is to appear three times in ſeveral places, and that ſhe will bring with her the rod of Moſes and the ſeal of Solomon; and, being ſo ſwift that none can overtake or eſcape her, will with the firſt ſtrike all the believers on the face, and mark them with the word *mumen*, *i. e.* believer; and with the latter will mark the unbelievers on the face likewiſe with the word *cafer*, *i. e.* infidel, that every perſon may be known for what he really is. They add, that the ſame beaſt is to demonſtrate the vanity of all religions except Iſlam, and to ſpeak Arabic. All this ſtuff ſeems to be the reſult of a confuſed idea of the beaſt in the Revelations. 3. War with the Greeks, and the taking Conſtantinople by 70,000 of the poſterity of Iſaac, who ſhall not win that city by force of arms, but the walls ſhall fall down while they cry out, *There is no God but God, God is moſt great!* As they are dividing the ſpoil, news will come to them of the appearance of Antichriſt; whereupon they ſhall leave all, and return back. 4. The coming of Antichriſt, whom the Mahometans call *Maſih al Dajjal*, *i. e.* the falſe or lying Chriſt, and ſimply *al Dajjal*. He is to be one-eyed, and marked on the forehead with the letters C. F. R. ſignifying *cafer*, or infidel. They ſay that the Jews give him the name of *Meſſiah ben David*; and pretend he is to come in the laſt days, and to be lord both of land and ſea, and that he will reſtore the kingdom to them. 5. The deſcent of Jeſus on earth. They pretend that he is to deſcend near the white tower to the eaſt of Damaſcus, when the people are returned from the taking of Conſtantinople: that he is to embrace the Mahometan religion, marry a wife, get children kill Antichriſt, and at length die after 40 years, or, according to others, 24 years continuance on earth. Under him, they ſay, there will be great ſecurity and plenty in the world, all hatred and malice being laid aſide; when lions and camels, bears and ſheep, ſhall live in peace, and a child ſhall play with ſerpents unhurt. 6. War with the Jews; of whom the Mahometans are to make a prodigious ſlaughter, the very trees and ſtones diſcovering ſuch of them as hide themſelves, except only the tree called *gharkad*, which is the tree of the Jews. 7. The eruption of Gog and Magog, or, as they are called in the eaſt, *Yajuj* and *Majuj*; of whom many things are related in the Koran and the traditions of Mahomet. Theſe barbarians, they tell us, having paſſed the lake of Tiberias, which the vanguard of their vaſt army will drink dry, will come to Jeruſalem, and there greatly diſtreſs Jeſus and his companions; till, at his requeſt, God will deſtroy them, and all the earth with their carcaſes, which, after ſome time, God will ſend birds to carry away, at the prayers of Jeſus and his followers. Their bows, arrows, and quivers, the Moſlems will burn for ſeven years together; and, at laſt, God will ſend a rain to cleanſe the earth and to make it fertile. 8. A ſmoke which ſhall fill the whole earth. 9. An eclipſe of the moon. Mahomet is reported to have ſaid, that there would be three eclipſes before the laſt hour; one to be ſeen in the eaſt, another in the weſt, and the third in Arabia. 10. The returning of the Arabs to the worſhip of Allat and al Uzza, and the reſt of their ancient idols, after the deceaſe of every one in whoſe heart there was faith equal to a grain of muſtard-ſeed, none but the very worſt of men being left alive. For God, they ſay, will ſend a cold odoriferous wind, blowing from Syria Damaſcena, which ſhall ſweep away the ſouls of all the faithful, and the Koran itſelf, ſo that men will remain in the groſſeſt ignorance for 100 years. 11. The diſcovery of a vaſt heap of gold and ſilver by the retreating of the Euphrates, which will be the deſtruction of many. 12. The demolition

of the Caaba, or temple of Mecca, by the Ethiopians. 13. The ſpeaking of beaſts and inanimate things. 14. The breaking out of fire in the province of Hejaz; or, according to others, in Yaman. 15. The appearance of a man of the deſcendants of Kahtan, who ſhall drive men before him with his ſtaff. 16. The coming of the Mohdi, or director; concerning whom Mahomet propheſied, that the world ſhould not have an end till one of his own family ſhould govern the Arabians, whoſe name ſhould be the ſame with his own name, and whoſe father's name ſhould alſo be the ſame with his father's name; and who ſhould fill the earth with righteouſneſs. This perſon the Shiites believe to be now alive, and concealed in ſome ſecret place till the time of his manifeſtation; for they ſuppoſe him no other than the laſt of the 12 Imams, named *Mahomet Abu'lkaſem*, as their prophet was; and the ſon of Haſſan al Aſkeri, the 11th of that ſucceſſion. He was born at Sermanrai, in the 255th year of the Hegira. From this tradition, it is to be preſumed, an opinion pretty current among the Chriſtians took its riſe, that the Mahometans are in expectation of their prophet's return. 17. A wind which ſhall ſweep away the ſouls of all who have but a grain of faith in their hearts, as has been mentioned under the tenth ſign.

Theſe are the greater ſigns, which, according to their doctrine, are to precede the reſurrection, but ſtill leave the hour of it uncertain: for the immediate ſign of its being come will be the firſt blaſt of the trumpet, which they believe will be ſounded three times. The firſt they call the *blaſt of conſternation*; at the hearing of which all creatures in heaven and earth ſhall be ſtruck with terror, except thoſe whom God ſhall pleaſe to exempt from it. The effects attributed to this firſt ſound of the trumpet are very wonderful; for they ſay the earth will be ſhaken, and not only all buildings, but the very mountains levelled; that the heavens ſhall melt, the ſun be darkened, the ſtars fall, on the death of the angels, who, as ſome imagine, hold them ſuſpended between heaven and earth; and the ſea ſhall be troubled and dried up, or, according to others, turned into flames, the ſun, moon, and ſtars being thrown into it: the Koran, to expreſs the greatneſs of the terror of that day, adds, that women who give ſuck ſhall abandon the care of their infants, and even the ſhe camels which have gone ten months with young (a moſt valuable part of the ſubſtance of that nation) ſhall be utterly neglected. A farther effect of this blaſt will be that concourſe of beaſts mentioned in the Koran, though ſome doubt whether it be to precede the reſurrection or not. They who ſuppoſe it will precede, think that all kinds of animals, forgetting their reſpective natural fierceneſs and timidity, will run together into one place, being terrified by the ſound of the trumpet, and the ſudden ſhock of nature.

The Mahometans believe that this firſt blaſt will be followed by a ſecond which they call the *blaſt of exinanition*; by which all creatures both in heaven and earth ſhall die or be annihilated, except thoſe which God ſhall pleaſe to exempt from the common fate; and this, they ſay, ſhall happen in the twinkling of an eye, nay, in an inſtant; nothing ſurviving except God alone, with paradiſe and hell, and the inhabitants of thoſe two places, and the throne of glory. The laſt who ſhall die will be the angel of death

Forty years after this will be heard the *blaſt of reſurrection*, when the trumpet ſhall be ſounded the third time by Iſrafil, who, together with Gabriel and Michael, will be previouſly reſtored to life, and, ſtanding on the rock of the temple of Jeruſalem, ſhall, at God's command, call together all the dry and rotten bones, and other diſperſed parts of the bodies, and the very hairs to judgment. This angel having, by the divine order, ſet the trumpet to his mouth, and called together all the ſouls from all parts, will throw them into his trumpet, from whence, on his giving the laſt ſound, at the command of God, they will fly forth like bees, and fill the whole ſpace between heaven and earth, and then repair to their reſpective bodies, which the opening earth will ſuffer to ariſe; and the firſt who ſhall ſo ariſe, according to a tradition of Mahomet, will be himſelf. For this birth the earth will be prepared by the rain above mentioned, which is to fall continually for 40 years, and will reſemble the ſeed of a man, and be ſupplied from the water under the throne of God, which is called *living water*; by the efficacy and virtue of which the dead bodies ſhall ſpring forth from their graves, as they did in their mother's womb, or as corn ſprouts forth by common rain, till they become perfect; after which breath will be breathed into them, and they will ſleep in their ſepulchres till they are raiſed to life at the laſt trump.

When thoſe who have riſen ſhall have waited the limited time, the Mahometans believe God will at length appear to judge them; Mahomet undertaking the office of interceſſor, after it ſhall have been declined by Adam, Noah, Abraham, and Jeſus, who ſhall beg deliverance only for their own ſouls. They ſay, that on this ſolemn occaſion God will come in the clouds ſurrounded by angels, and will produce the books wherein the actions of every perſon are recorded by their guardian angels, and will command the prophets to bear witneſs againſt thoſe to whom they have been reſpectively ſent. Then every one will be examined concerning all his words and actions uttered and done by him in this life; not as if God needed any information in theſe reſpects, but to oblige the perſon to make public confeſſion and acknowledgment of God's juſtice. The particulars of which they ſhall give an account, as Mahomet himſelf enumerated them, are, of their time, how they ſpent it; of their wealth, by what means they acquired it, and how they employed it; of their bodies, wherein they exerciſed them; of their knowledge and learning, what uſe they made of them. To the queſtions we have mentioned each perſon ſhall anſwer, and make his defence in the beſt manner he can, endeavouring to excuſe himſelf by caſting the blame of his evil deeds on others; ſo that a diſpute ſhall ariſe even between the ſoul and the body, to which of them their guilt ought to be imputed; the ſoul ſaying, *O Lord, my body I received from thee; for thou createdſt me without a hand to lay hold with, a foot to walk with, an eye to ſee with, or an underſtanding to apprehend with, till I came and entered into this body; therefore puniſh it eternally, but deliver me.* The body, on the other ſide, will make this apology: *O Lord, thou createdſt me like a ſtock of wood, having neither hand that I could lay hold with, nor foot that I could walk with, till this ſoul, like a ray of light, entered into me, and my tongue began to ſpeak, my eye to ſee, and my foot to walk; therefore puniſh it eternally, but deliver me.* But God will propound to them the following parable of the blind man and the lame man, which, as well as the preceding diſpute, was borrowed by the Mahometans from the Jews. A certain king, having a pleaſant garden, in which were ripe fruits, ſet two perſons to keep it, one of whom was blind, and the other lame; the former not being able to ſee the fruit, nor the latter to gather it: the lame man, however, ſeeing the fruit, perſuaded the blind man to take him upon his ſhoulders, and by that means he eaſily gathered the fruit, which they divided between them. The lord of the garden coming ſome time after, and inquiring after his fruit, each began to excuſe himſelf: the blind man ſaid he had no eyes to ſee with; and the lame man, that he had no feet to approach the trees. But the king, ordering the lame man to be ſet on the blind, paſſed ſentence on and puniſhed them both. And in the ſame manner will God deal with the body and the ſoul. As theſe apologies will not avail on that day, ſo it will be in vain for any one to deny his evil

actions; ſince men and angels, and his own members, nay, the very earth itſelf, will be ready to bear witneſs againſt him.

At this examination, they alſo believe that each perſon will have the book wherein all the actions of his life are written delivered to him: which books the righteous will receive into their right hand, and read with great pleaſure and ſatisfaction; but the ungodly will be obliged to take them, againſt their wills, in their left, which will be bound behind their backs, their right hand being tied up to their necks.

To ſhow the exact juſtice which will be obſerved on this great day of trial, the next thing they deſcribe is the balance wherein all things ſhall be weighed. They ſay it will be held by Gabriel; and that it is of ſo vaſt a ſize, that its two ſcales, one of which hangs over paradiſe, and the other over hell, are capacious enough to contain both heaven and hell. Though ſome are willing to underſtand what is ſaid in the Koran concerning this balance allegorically, and only as a figurative repreſentation of God's equity; yet the more ancient and orthodox opinion is, that they are to be taken literally; and ſince words and actions, being mere accidents, are not capable of being themſelves weighed, they ſay that the books wherein they are written will be thrown into the ſcales, and according as thoſe wherein the good or evil actions are recorded ſhall preponderate, ſentence will be given: thoſe whoſe balances laden with good works ſhall be heavy, will be ſaved; but thoſe whoſe balances are light will be condemned. Nor will any one have cauſe to complain that God ſuffers any good action to paſs unrewarded, becauſe the wicked for the good they do have their reward in this life, and therefore can expect no favour in the next.

This examination being paſt, and every one's works weighed in a juſt balance, that mutual retaliation will follow, according to which every creature will take vengeance one of another, or have ſatisfaction made them for the injuries which they have ſuffered. And, ſince there will then be no other way of returning like for like, the manner of giving this ſatisfaction will be by taking away a proportional part of the good works of him who offered the injury, and adding it to thoſe of him who ſuffered it. Which being done, if the angels (by whoſe miniſtry this is to be performed) ſay, *Lord, we have given to every one his due, and there remaineth of this perſon's good works ſo much as equalleth the weight of an ant*, God will, of his mercy, cauſe it to be doubled unto him, that he may be admitted into paradiſe; but if, on the contrary, his good works be exhauſted, and there remain evil works only, and there be any who have not yet received ſatisfaction from him, God will order that an equal weight of their ſins be added unto his, that he may be puniſhed for them in their ſtead, and he will be ſent to hell laden with both. This will be the method of God's dealing with mankind. As to brutes, after they ſhall have likewiſe taken vengeance of one another, he will command them to be changed into duſt; wicked men being reſerved to more grievous puniſhment, ſo that they ſhall cry out, on hearing this ſentence paſſed on the brutes, *Would to* God *that we were duſt alſo!* As to the genii, many Mahometans are of opinion, that ſuch of them as are true believers will undergo the ſame fate as the irrational animals, and have no other reward than the favour of being converted into duſt; and for this they quote the authority of their prophet.

The trials being over, and the aſſembly diſſolved, the Mahometans hold, that thoſe who are to be admitted into paradiſe will take the right-hand way, and thoſe who are deſtined to hell-fire will take the left; but both of them muſt firſt paſs the bridge called in Arabic *al Sirat*, which they ſay is laid over the midſt of hell, and deſcribe to be finer than a hair, and ſharper than the edge of a ſword; ſo that it ſeems very difficult to conceive how any one ſhall be able to ſtand upon it: for which reaſon, moſt of the ſect of the Motazalites reject it as a fable; though the orthodox think it a ſufficient proof of the truth of this article, that it was ſeriouſly affirmed by him who never aſſerted a falſehood, meaning their prophet: who, to add to the difficulty of the paſſage, has likewiſe declared, that this bridge is beſet on each ſide with briars and hooked thorns: which will however be no impediment to the good; for they ſhall paſs with wonderful eaſe and ſwiftneſs, like lightning, or the wind, Mahomet and his Moſlems leading the way; whereas the wicked, what with the ſlipperineſs and extreme narrowneſs of the path, the intangling of the thorns, and the extinction of the light which directed the former to paradiſe, will ſoon miſs their footing, and fall down headlong into hell, which is gaping beneath them.

As to the puniſhment of the wicked, the Mahometans are taught, that hell is divided into ſeven ſtories or apartments, one below another, deſigned for the reception of as many diſtinct claſſes of the damned. The firſt, which they call *Jehennam*, they ſay, will be the receptacle of thoſe who acknowledged one God, that is, the wicked Mahometans; who, after having there been puniſhed according to their demerits, will at length be releaſed. The ſecond, named *Ladha*, they aſſign to the Jews; the third, named *al Hotama*, to the Chriſtians; the fourth, named *al Sair*, to the Sabians; the fifth, named *Sakar*, to the Magians; the ſixth, named *al Jahim*, to the idolaters; and the ſeventh, which is the loweſt and worſt of all, is called *al Hawyat*, to the hypocrites, or thoſe who outwardly profeſſed ſome religion, but in their hearts were of none. Over each of theſe apartments they believe there will be ſet a guard of angels, 19 in number; to whom the damned will confeſs the juſt judgment of God, and beg them to intercede with him for ſome alleviation of their pain, or that they may be delivered by being annihilated.

Mahomet has, in his Koran and traditions, been very exact in deſcribing the various torments of hell, which, according to him, the wicked will ſuffer both from intenſe heat and exceſſive cold. We ſhall, however, enter into no detail of them here; but only obſerve, that the degrees of theſe pains will alſo vary in proportion to the crimes of the ſufferer, and the apartment he is condemned to; and that he who is puniſhed the moſt lightly of all will be ſhod with ſhoes of fire, the fervour of which will cauſe his ſkull to boil like a cauldron. The condition of theſe unhappy wretches, as the ſame prophet teaches, cannot be properly called either *life or death*; and their miſery will be greatly increaſed by their deſpair of being ever delivered from that place, ſince, according to that frequent expreſſion in the Koran, *they muſt remain therein for ever*. It muſt be remarked, however, that the infidels alone will be liable to eternity of damnation; for the Moſlems, or thoſe who have embraced the true religion, and have been guilty of heinous ſins, will be delivered thence after they ſhall have expiated their crimes by their ſufferings. The time which theſe believers ſhall be detained there, according to a tradition handed down from their prophet, will not be leſs than 900 years, nor more than 7000. And as to the manner of their delivery, they ſay that they ſhall be diſtinguiſhed by the marks of proſtration on thoſe parts of their bodies with which they uſed to touch the ground in prayer, and over which the fire will therefore have no power; and that, being known by this characteriſtic, they will be releaſed by the mercy of God, at the interceſſion of Mahomet and the bleſſed: whereupon thoſe who ſhall have been dead, will be reſtored to life, as has been ſaid; and thoſe whoſe bodies ſhall have contracted any footineſs or filth from the flames and ſmoke of hell, will be immerſed in one of the rivers of paradiſe, called the *river of life*, which will waſh them whiter than pearls.

The righteous, as the Mahometans are taught to believe, having ſurmounted the difficulties, and paſſed the ſharp bridge

above mentioned, before they enter paradiſe, will be refreſhed by drinking at the *pond* of their prophet, who deſcribes it to be an exact ſquare of a month's journey in compaſs; its water, which is ſupplied by two pipes from al Cawthar, one of the rivers of paradiſe, being whiter than milk or ſilver, and more odoriferous than muſk, with as many cups ſet around it as there are ſtars in the firmament; of which water whoever drinks will thirſt no more for ever. This is the firſt taſte which the bleſſed will have of their future and now near-approaching felicity.

Though paradiſe be ſo very frequently mentioned in the Koran, yet it is a diſpute among the Mahometans whether it be already created, or to be created hereafter; the Motazalites and ſome other ſectaries aſſerting, that there is not at preſent any ſuch place in nature, and that the paradiſe which the righteous will inhabit in the next life will be different from that from which Adam was expelled. However, the orthodox profeſs the contrary, maintaining that it was created even before the world, and deſcribe it, from their prophet's traditions, in the following manner:

They ſay it is ſituated above the ſeven heavens (or in the ſeventh heaven), and next under the throne of God: and, to expreſs the amenity of the place, tell us, that the earth of it is of the fineſt wheat flour, or of the pureſt muſk, or, as others will have it, of ſaffron: that its ſtones are pearls and jacinths, the walls of its buildings enriched with gold and ſilver, and that the trunks of all its trees are of gold; among which the moſt remarkable is the tree called *Tuba*, or the tree of happineſs. Concerning this tree, they fable, that it ſtands in the palace of Mahomet, though a branch of it will reach to the houſe of every true believer; that it will be laden with pomegranates, grapes, dates, and other fruit, of ſurpriſing bigneſs, and of taſtes unknown to mortals. So that, if a man deſire to eat of any particular kind of fruit, it will immediately be preſented him; or, if he chooſe fleſh, birds ready dreſſed will be ſet before him, according to his wiſh. They add, that the boughs of this tree will ſpontaneouſly bend down to the hand of the perſon who would gather of its fruits, and that it will ſupply the bleſſed not only with food, but alſo with ſilken garments, and beaſts to ride on ready ſaddled and bridled, and adorned with rich trappings, which will burſt forth from its fruits; and that this tree is ſo large, that a perſon mounted on the fleeteſt horſe would not be able to gallop from one end of its ſhade to the other in 100 years.

As plenty of water is one of the greateſt additions to the pleaſantneſs of any place, the Koran often ſpeaks of the rivers of paradiſe as a principal ornament thereof: ſome of theſe rivers, they ſay, flow with water, ſome with milk, ſome with wine, and others with honey; all taking their riſe from the root of the tree Tuba.

But all theſe glories will be eclipſed by the reſplendent and raviſhing girls of paradiſe, called, from their large black eyes, *Hur al oyun*, the enjoyment of whoſe company will be a principal felicity of the faithful. Theſe, they ſay, are created, not of clay, as mortal women are, but of pure muſk; being, as their prophet often affirms in his Koran, free from all natural impurities, defects, and inconveniences incident to the ſex, of the ſtricteſt modeſty, and ſecluded from public view in pavilions of hollow pearls, ſo large, that, as ſome traditions have it, one of them will be no leſs than four paraſangs (or, as others ſay, 60 miles) long, and as many broad.

The name which the Mahometans uſually give to this happy manſion, is *al Jannat*, or "the garden;" and ſometimes they call it, with an addition, *Jannat al Ferdaws*, "the garden of paradiſe:" *Jannat Aden*, "the garden of Eden;" (though they generally interpret the word *Eden*, not according to its acceptation in Hebrew, but according to its meaning in their own tongue, wherein it ſignifies "a ſettled or perpetual habitation;") *Jannat al Mawa*, "the garden of abode;" *Jannat al Naim*, "the garden of pleaſure;" and the like: by which ſeveral appellations ſome underſtand ſo many different gardens, or at leaſt places of different degrees of felicity (for they reckon no leſs than 100 ſuch in all), the very meaneſt whereof will afford its inhabitants ſo many pleaſures and delights, that one would conclude they muſt even ſink under them, had not Mahomet declared, that, in order to qualify the bleſſed for a full enjoyment of them, God will give to every one the abilities of 100 men.

6. God's abſolute decree and predeſtination both of good and evil. The orthodox doctrine is, that whatever hath or ſhall come to paſs in this world, whether it be good or whether it be bad, proceedeth entirely from the divine will, and is irrevocably fixed and recorded from all eternity in the preſerved table: God having ſecretly predetermined not only the adverſe and proſperous fortune of every perſon in this world, in the moſt minute particulars, but alſo his faith or infidelity, his obedience or diſobedience, and conſequently his everlaſting happineſs or miſery after death; which fate or predeſtination it is not poſſible by any foreſight or wiſdom to avoid.

Of this doctrine Mahomet makes great uſe in his Koran for the advancement of his deſigns; encouraging his followers to fight without fear, and even deſperately, for the propagation of their faith, by repreſenting to them, that all their caution could not avert their inevitable deſtiny, or prolong their lives for a moment; and deterring them from diſobeying or rejecting him as an impoſtor, by ſetting before them the danger they might thereby incur of being, by the juſt judgment of God, abandoned to ſeduction, hardneſs of heart, and a reprobate mind, as a puniſhment for their obſtinacy.

II. *Religious practice.* 1. The firſt point is *prayer*, under which are alſo comprehended thoſe legal waſhings or purifications which are neceſſary preparations thereto.

Of theſe purifications there are two degrees, one called *ghoſl*, being a total immerſion or bathing of the body in water; and the other called *wodu* (by the Perſians, *abdeſt*), which is the waſhing of their faces, hands, and feet, after a certain manner. The firſt is required in ſome extraordinary caſes only, as after having lain with a womam, or being polluted by emiſſion of ſeed, or by approaching a dead body; women alſo being obliged to it after their courſes or childbirth. The latter is the ordinary ablution in common caſes, and before prayer, and muſt neceſſarily be uſed by every perſon before he can enter upon that duty. It is performed with certain formal ceremonies, which have been deſcribed by ſome writers, but much eaſier apprehended by ſeeing them done, than by the beſt deſcription.

That his followers might be more punctual in this duty, Mahomet is ſaid to have declared, that *the practice of religion is founded on cleanlineſs*, which is the *one half of the faith*, and the *key of prayer*, without which it will not be heard by God. That theſe expreſſions may be the better underſtood, al Ghazali reckons four degrees of purification; of which the firſt is the cleanſing of the body from all pollution, filth, and excrements; the ſecond, the cleanſing of the members of the body from all wickedneſs and unjuſt actions; the third, the cleanſing the heart from all blameable inclinations and odious vices; and the fourth, the purging a man's ſecret thoughts from all affections which may divert their attendance on God; adding, that the body is but as the outward ſhell, in reſpect to the heart, which is as the kernel.

Circumciſion, though it be not ſo much as once mentioned in the Koran, is yet held by the Mahometans to be an ancient divine inſtitution, confirmed by the religion of Iſlam, and, though not ſo abſolutely neceſſary but that it may be diſpenſed with in ſome caſes, yet highly proper and expedient. The

Arabs uſed this rite for many ages before Mahomet, having probably learned it from Iſhmael, though not only his deſcendants, but the Hamyarites and other tribes practiſed the ſame. The Iſhmaelites, we are told, uſed to circumciſe their children, not on the eighth day, as is the cuſtom of the Jews, but when about 12 or 13 years old, at which age their father underwent that operation; and the Mahometans imitate them ſo far as not to circumciſe children before they may be able at leaſt diſtinctly to pronounce that profeſſion of their faith, *There is no* God *but* God, Mahomet *is the apoſtle of* God; but pitch on what age they pleaſe for the purpoſe, between 6 and 16, or thereabouts.

Prayer was by Mahomet thought ſo neceſſary a duty, that he uſed to call it *the pillar of religion and the key of paradiſe*; and when the Thakifites, who dwelt at Tayef, ſending, in the ninth year of the Hegira, to make their ſubmiſſion to the prophet, after the keeping of their favourite idol had been denied them, begged, at leaſt, that they might be diſpenſed with as to their ſaying of their appointed prayers, he anſwered, *That there could be no good in that religion wherein was no prayer.*

That ſo important a duty, therefore, might not be neglected, Mahomet obliged his followers to pray five times every 24 hours, at certain ſtated times, viz. 1. In the morning before ſun-riſe: 2. When noon is paſt, and the ſun begins to decline from the meridian: 3. In the afternoon, before ſun-ſet: 4. In the evening, after ſun-ſet, and before day be ſhut in: and, 5. After the day is ſhut in, and before the firſt watch of the night. For this inſtitution he pretended to have received the divine command from the throne of God himſelf, when he took his night-journey to heaven; and the obſerving of the ſtated times of prayer is frequently inſiſted on in the Koran, though they be not particularly preſcribed therein. Accordingly, at the aforeſaid times, of which public notice is given by the Muedhdhins, or Criers, from the ſteeples of their moſques (for they uſe no bells), every conſcientious Moſlem prepares himſelf for prayer, which he performs either in the moſque or any other place, provided it be clean, after a preſcribed form, and with a certain number of praiſes or ejaculations (which the more ſcrupulous count by a ſtring of beads), and uſing certain poſtures of worſhip; all which have been particularly ſet down and deſcribed, though with ſome few miſtakes, by other writers, and ought not to be abridged, unleſs in ſome ſpecial caſes, as on a journey, on preparing for battle, &c.

For the regular performance of the duty of prayer among the Mahometans, beſides the particulars above mentioned, it is alſo requiſite that they turn their faces, while they pray, towards the temple of Mecca; the quarter where the ſame is ſituated being, for that reaſon, pointed out within their moſques by a niche, which they call *al Mehrab*; and without, by the ſituation of the doors opening into the galleries of the ſteeples: there are alſo tables calculated for the ready finding out their Keblah, or part towards which they ought to pray, in places where they have no other direction.

2. *Alms* are of two ſorts, *legal* and *voluntary*. The *legal alms* are of indiſpenſable obligation, being commanded by the law, which directs and determines both the portion which is to be given, and of what things it ought to be given; but the *voluntary alms* are left to every one's liberty, to give more or leſs, as he ſhall ſee fit. The former kind of alms ſome think to be properly called *zacat*, and the latter *ſadakat*; though this name be alſo frequently given to the legal alms. They are called *zacat*, either becauſe they *increaſe* a man's ſtore by drawing down a bleſſing thereon, and produce in his ſoul the virtue of liberality; or becauſe they *purify* the remaining part of one's ſubſtance from pollution, and the ſoul from the filth of avarice; and *ſadakat*, becauſe they are a proof of a man's ſincerity in the worſhip of God. Some writers have called the legal alms *tithes*; but improperly, ſince in ſome caſes they fall ſhort, and in others exceed that proportion.

3. *Faſting* is a duty of ſo great moment, that Mahomet uſed to ſay, it was *the gate of religion*, and that the *odour of the mouth of him who faſteth is more grateful to* God *than that of muſk*; and al Ghazali reckons faſting *one fourth part of the faith*. According to the Mahometan divines, there are three degrees of faſting: 1. The reſtraining the belly and other parts of the body from ſatisfying their luſts: 2. The reſtraining the ears, eyes, tongue, hands, feet, and other members, from ſin; and, 3. The faſting of the heart from worldly cares, and reſtraining the thought from every thing beſides God.

The Mahometans are obliged, by the expreſs command of the Koran, to faſt the whole month of Ramadan, from the time the new moon firſt appears, till the appearance of the next new moon; during which time they muſt abſtain from eating, drinking, and women, from day-break till night or ſun-ſet. And this injunction they obſerve ſo ſtrictly, that, while they faſt, they ſuffer nothing to enter their mouths, or other parts of their body, eſteeming the faſt broken and null, if they ſmell perfumes, take a clyſter or injection, bathe, or even purpoſely ſwallow their ſpittle; ſome being ſo cautious, that they will not open their mouths to ſpeak leſt they ſhould breathe the air too freely: the faſt is alſo deemed void, if a man kiſs or touch a woman, or if he vomit deſignedly. But after ſun-ſet they are allowed to refreſh themſelves, and to eat and drink, and enjoy the company of their wives till day-break; though the more rigid begin the faſt again at midnight. This faſt is extremely rigorous and mortifying when the month of Ramadan happens to fall in ſummer (for the Arabian year being lunar, each month runs through all the different ſeaſons in the courſe of 33 years), the length and heat of the days making the obſervance of it much more difficult and uneaſy than in winter.

The reaſon given why the month of Ramadan was pitched on for this purpoſe is, that on that month the Koran was ſent down from heaven. Some pretend, that Abraham, Moſes, and Jeſus, received their reſpective revelations in the ſame month.

4. The pilgrimage to Mecca is ſo neceſſary a point of practice, that, according to a tradition of Mahomet, he who dies without performing it may as well die a Jew or a Chriſtian; and the ſame is expreſſly commanded in the Koran.

The temple of Mecca ſtands in the midſt of the city, and is honoured with the title of *Maſjad al elharam*, i. e. *the ſacred or inviolable temple*. What is principally reverenced in this place, and gives ſanctity to the whole, is a ſquare ſtone building, called the Caaba. See that article.

To this temple every Mahometan, who has health and means ſufficient, ought, once at leaſt in his life, to go on pilgrimage; nor are women excuſed from the performance of this duty. The pilgrims meet at different places near Mecca, according to the different parts from whence they come, during the months of Shawal and Dhu'lkaada; being obliged to be there by the beginning of Dhu'lhajja; which month, as its name imports, is peculiarly ſet apart for the celebration of this ſolemnity.

At the place above mentioned the pilgrims properly commence ſuch; when the men put on the Ihram or ſacred habit, which conſiſts only of two woollen wrappers, one wrapped about their middle to cover their privities, and the other thrown over their ſhoulders, having their heads bare, and a kind of ſlippers which cover neither the heel nor the inſtep, and ſo enter the ſacred territory in their way to Mecca. While they have this habit on they muſt neither hunt nor fowl (though they are allowed to fiſh); which precept is ſo punctually obſerved, that they will not kill even a louſe or flea if they find them on their bodies: there are ſome noxious animals, however,

which they have permiſſion to kill during the pilgrimage, as kites, ravens, ſcorpions, mice, and dogs given to bite. During the pilgrimage, it behoves a man to have a conſtant guard over his words and actions; to avoid all quarrelling or ill-language, all converſe with women, and all obſcene diſcourſe; and to apply his whole attention to the good work he is engaged in.

The pilgrims, being arrived at Mecca, immediately viſit the temple; and then enter on the performance of the preſcribed ceremonies, which conſiſt chiefly in going in proceſſion round the Caaba, in running between the mounts Safa and Merwa, in making the ſtation on mount Araſat, and ſlaying the victims, and ſhaving their heads in the valley of Mina.

In compaſſing the Caaba, which they do ſeven times, beginning at the corner where the black ſtone is fixed, they uſe a ſhort quick pace the three firſt times they go round it, and a grave ordinary pace the four laſt; which, it is ſaid, was ordered by Mahomet, that his followers might ſhow themſelves ſtrong and active to cut off the hopes of the infidels, who gave out that the immoderate heats of Medina had rendered them weak. But the aforeſaid quick pace they are not obliged to uſe every time they perform this piece of devotion, but only at ſome particular times. So often as they paſs by the black ſtone, they either kiſs it, or touch it with their hand and kiſs that.

The running between Safa and Merwa is alſo performed ſeven times, partly with a ſlow pace, and partly running: for they walk gravely till they come to a place between two pillars; and there they run, and afterwards walk again; ſometimes looking back, and ſometimes ſtopping, like one who had loſt ſomething, to repreſent Hagar ſeeking water for her ſon; for the ceremony is ſaid to be as ancient as her time.

On the ninth of Dhu'lhajja, after morning-prayer, the pilgrims leave the valley of Mina, whither they come the day before; and proceed in a tumultuous and ruſhing manner to mount Araſat, where they ſtay to perform their devotions till ſun-ſet: then they go to Mozdaliſa, an oratory between Araſat and Mina; and there ſpend the night in prayer and reading the Koran. The next morning by day-break they viſit *al Maſher al Karam*, or "the ſacred monument;" and, departing thence before ſun-riſe, haſte by Batn Mohaſſer to the valley of Mina, where they throw ſeven ſtones at three marks or pillars, in imitation of Abraham, who, meeting the devil in that place, and being by him diſturbed in his devotions, or tempted to diſobedience when he was going to ſacrifice his ſon, was commanded by God to drive him away by throwing ſtones at him; though others pretend this rite to be as old as Adam, who alſo put the devil to flight in the ſame place, and by the ſame means.

This ceremony being over, on the ſame day, the tenth of Dhu'lhajja, the pilgrims ſlay their victims in the ſaid valley of Mina; of which they and their friends eat part, and the reſt is given to the poor. Theſe victims muſt be either ſheep, goats, kine, or camels; males, if of either of the two former kinds; and females, if of either of the latter; and of a fit age. The ſacrifices being over, they ſhave their heads and cut their nails, burying them in the ſame place; after which the pilgrimage is looked on as completed: though they again viſit the Caaba, to take their leave of that ſacred building.

The rapid ſucceſs which attended the propagation of this new religion was owing to cauſes that are plain and evident, and muſt remove, or rather prevent, our ſurpriſe, when they are attentively conſidered. The terror of Mahomet's arms, and the repeated victories which were gained by him and his ſucceſſors, were, no doubt, the irreſiſtible arguments that perſuaded ſuch multitudes to embrace his religion and ſubmit to his dominion. Beſides, his law was artfully and marvellouſly adapted to the corrupt nature of man; and, in a more particular manner, to the manners and opinions of the eaſtern nations, and the vices to which they were naturally addicted: for the articles of faith which it propoſed were few in number, and extremely ſimple; and the duties it required were neither many nor difficult, nor ſuch as were incompatible with the empire of appetites and paſſions. It is to be obſerved farther, that the groſs ignorance, under which the Arabians, Syrians, Perſians, and the greateſt part of the eaſtern nations, laboured at this time, rendered many an eaſy prey to the artifice and eloquence of this bold adventurer. To theſe cauſes of the progreſs of Mahometiſm, we may add the bitter diſſenſions and cruel animoſities that reigned among the Chriſtian ſects, particularly the Greeks, Neſtorians, Eutychians, and Monophyſites; diſſenſions that filled a great part of the Eaſt with carnage, aſſaſſinations, and ſuch deteſtable enormities as rendered the very name of Chriſtianity odious to many. We might add here, that the Monophyſites and Neſtorians, full of reſentment againſt the Greeks, from whom they had ſuffered the bittereſt and moſt injurious treatment, aſſiſted the Arabians in the conqueſt of ſeveral provinces, into which, of conſequence, the religion of Mahomet was afterwards introduced. Other cauſes of the ſudden progreſs of that religion will naturally occur to ſuch as conſider attentively its ſpirit and genius, and the ſtate of the world at this time.

MAHOMETANS, thoſe who believe in the religion and divine miſſion of Mahomet. See MAHOMET, MAHOMETANISM, and ALCORAN.

MAHRATTA. See MARHATTA.

MAHWAH, or MAWEE, in botany; an Eaſt-Indian tree, ſo called by the natives of Bahar and the neighbouring countries, but of which the Shanſcrit name is *Madhuca* or *Madhudruma*. According to Lieut. C. Hamilton, by whom a very particular account of this tree is given in the *Aſiatic Reſearches*, (Vol. I. art. xiv.), it is of the claſs of the polyandria-monogynia of Linnæus, but of a genus not deſcribed by him. The calyx is monophyllous, quadrifid, half divided, and imbricated in its divided part; the two oppoſite and outer parts covering partially the two oppoſite and inner. The corolla is monopetalous, having an inflated tube for its lower part, of near an inch long, thick, fleſhy, and of a cream colour: from this ariſe nine ſmall leaves, as it were, like petals from a calyx, that are imbricated and twiſted, one over the other, from right to left, claſping the lower part of the ſtyle in a point; by which they ſeem to ſerve, in ſome reſpect, like a forceps, to detach the whole corolla at the ſeaſon of its dropping. There are no filaments; but the antheræ, which are in number moſt commonly twenty-ſix, long, ſcabrous, and ſpear-headed, are inſerted in rows, on the inſide and upper part of the tube of the corolla. The ſtyle is long, round, and tapering, and projects about an inch beyond the corolla; it is ſucceeded by a drupe, with a thick pericarpium, bilocular, containing two ſeeds or kernels covered with a dark brown ſkin: there are often, however, three of theſe in three ſeparate diviſions. The flowers riſe in bunches, from the extremities of the ſmaller branches; and have each a pedicle of about an inch and a half long: theſe are moſtly turned downwards, whence the corollas more eaſily drop off.

The tree, when full grown, is about the ſize of a common Mango tree, with a buſhy head and oval leaves a little pointed; its roots, ſpreading horizontally, are ſunk but little in the earth: the trunk, which is often of a conſiderable thickneſs, riſes ſeldom to any great height, without giving off branches; it is, however, not uncommon to ſee it ſhoot up clear to the length of eight or ten feet: the wood itſelf is moderately hard, fine grained, and of a reddiſh colour. By inciſion the tree affords a reſinous gum from the bark.

The flowers are of a nature very extraordinary, "differing

eſſentially (ſays Mr. Hamilton) from thoſe of any other plant with which I am acquainted, as they have not, in any reſpect, the uſual appearance of ſuch, but rather reſemble *berries*; and I, like many others, had long conceived them to be the fruit of the Mahwah." The tree drops its leaves in the month of February, and early in March theſe flowers begin to come out in cluſters of thirty, forty, or fifty, from the extremity of every ſmall branch; and from this period till the latter end of April, as the flowers come to maturity (for they never open or expand), they continue falling off, with their antheræ, in the mornings, a little after ſun-riſe; when they are gathered, and afterwards dried by an expoſure of a few days in the ſun: when thus prepared, they very much reſemble a dried grape, both in taſte and flavour. Immediately after the flowers drop off, freſh ſhoots are made for the new leaves, which ſoon make their appearance, coming preſently to their full growth.

The fruit (*properly* ſo called) is of two ſorts in ſhape; the one reſembling a ſmall walnut, the other ſomewhat larger and pointed: it is ripe towards the middle of May; and continues dripping from the tree till the whole fall, which is generally about the beginning or towards the middle of June. The outer covering, or *pericarpium*, which is of a ſoft texture, commonly burſts in the fall, ſo that the ſeeds are very eaſily ſqueezed out of it: the ſeeds are ſomewhat of the ſhape but longer than an olive. Theſe ſeeds are replete with a thick oil, of the conſiſtence of butter or *ghee*, which is obtained by expreſſion.

From this deſcription it may eaſily be conceived, that the Mahwah tree and its productions are of ſingular and general uſe, eſpecially in thoſe dry and barren countries, which, from the nature of their ſituation, are not ſo well calculated for producing in plenty or perfection the other neceſſaries of life.

The corolla or flowers, after being dried as before deſcribed, are eaten by the natives raw or dreſſed with their *curries*; and, when even ſimply boiled with rice, they afford a ſtrengthening and wholeſome nouriſhment. They are indeed, our author tells us, often applied to a leſs laudable purpoſe; for, being fermented, they yield by diſtillation a ſtrong ſpirit, which the people here ſell ſo very cheap, that for one *pice* (about a halfpenny) may be purchaſed no leſs than a *cutchaſeer* (above a pint Engliſh) with which any man may get completely drunk. Theſe flowers make an article of trade; being exported from this country to Patna and elſewhere in no inconſiderable quantities.

The oil yielded by the fruit, as before mentioned, reſembles ghee ſo much, that, being cheaper, the natives often mix it with that commodity. They uſe it the ſame as ghee in their victuals, and in the compoſition of ſome ſorts of ſweetmeats; and burn it in their lamps. It is alſo regarded as a ſalutary remedy, applied exteriorly to wounds and all cutaneous eruptions. It is at firſt of the conſiſtence of common oil, but ſoon coagulates: after being kept for ſome time, it acquires a bitteriſh taſte and rancid ſmell, which renders it ſomewhat leſs agreeable as an article of food: but this is an inconvenience which, by the oil being properly clarified and prepared at firſt, might be perhaps avoided. This oil is alſo exported both in its adulterated and original ſtate to Patna and other parts of the low country.

The author does not know any purpoſe to which the gum has ever been applied: but if found upon trial to be of uſe, he informs us that it might be collected in large quantities; and that the beſt ſeaſon for this would be in the months of March and April, about the time the flowers come out, when the tree ſeems to be moſt replete with it: ſuch an operation, indeed, would probably diminiſh its produce in the fruit and flower; but where it was ſufficiently cultivated, the loſs in thoſe could be but little felt.

The wood, from what has been already ſaid of it, cannot be expected to be often had in beams of any conſiderable length, ſo as to make it ſo very uſeful in building as it would otherwiſe be from its not being liable to be eat by the white ants: Mr. Keir, however, told our author, that when he was at Chowfee (a village upon the Caramnaſſa near Buxar), he had beams of it which were to the beſt of his remembrance above 20 feet long: but in many other reſpects it is a moſt uſeful wood; and as it is tough, and of a ſtrong texture, it might perhaps be employed to advantage in ſhip-building; in which caſe, if properly cultivated in many grounds that ſeem well adapted for it and fit for little elſe, it might thus in time become a valuable article in that branch at Calcutta, whither it could eaſily be tranſported during the rainy ſeaſon from almoſt any part of theſe countries, by ſeveral rivers that are then ſufficiently full to float it down.

The tree, it is ſaid, though it does not refuſe a rich ſoil, will grow in the moſt barren ground, even amongſt ſtones and gravel where there is the leaſt appearance of a ſoil; and it ſeems to deſtroy all the ſmaller trees and bruſhwood about it. It does not require much moiſture, ſeeming to produce nearly as well in the drieſt as in the moſt favourable years, and in every ſituation; and is therefore admirably fitted for the convenience of the inhabitants of theſe hilly countries, which are peculiarly ſubject to long and ſevere droughts during the hot months.

"Yet notwithſtanding its utility, and the immenſe quantity of ground that ſeems ſo well adapted to the growth of it, both here and in the neighbouring provinces of Catak, Pacheet, Rotas, &c. (greateſt part of which, indeed, ſeems fit for no other uſeful production) I have myſelf never obſerved (ſays our author), nor can I find any of my acquaintance who ever have remarked, one ſingle tree in its infant ſtate. We can ſee, every where, full grown trees in great abundance; but, never meeting with any young plants, both I and all whom I have ſpoken to on the ſubject, are at ſome loſs to conceive how they ſhould have come here: neither can the country people themſelves, of whom I have inquired, give any rational account of this; although it appears pretty evident that numbers of them muſt have been cultivated ſome time or other, every village having many of them growing about it. This is a circumſtance which ſufficiently marks the true character of the lower order of natives in their moſt ſupine indolence and ſloth; owing chiefly, perhaps, to the ignorance and ſtupid rapacity of their rajahs, zemindars, and other landholders, and their total inattention to the welfare of thoſe dejected wretches from whom they derive their conſequence and power. Of their baſe indifference to the intereſts of thoſe whom they thus affect to hold beneath their regard, many ſtriking inſtances occurred to me in the courſe of my inquiries upon this very ſubject; and it was not long ago that, aſking ſome queſtions concerning the mahwah of a zemindar in this neighbourhood, he anſwered, that 'it was the food of the poor people, and how ſhould he know any thing about it?'

"It was this ſtrange neglect of the culture of it, and a knowledge of its uſefulneſs (continues our author), which firſt led me to enquire into the nature of this tree, from which the bulk of the people hereabouts already draw ſuch great benefit, in order to know whether they might not increaſe it without any great trouble to themſelves; and whether thereby the revenue might not alſo be increaſed, and a certain proviſion be made againſt famines, from which the natives often ſuffer ſeverely in theſe higher diſtricts.

"To effect this, it would be neceſſary to give the Ryots every poſſible encouragement to raiſe the tree from the ſeeds; but as the torpid apathy of theſe people, whether natural or

acquired, will ever prevent their being moved to any exertion by a proſpect, however alluring, of diſtant advantage, I apprehend the only way of bringing this about would be making the planting and raiſing of a certain number of mahwahs (in proportion to the value of the tenure) an article in their kahooleats or agreements.

"The tree, as has been already obſerved, will grow almoſt anywhere; it ought to be ſown about the beginning of the rains, either in beds (to be afterwards tranſplanted), or at about thirty or forty feet diſtance, in the ground deſigned for it. It is ſaid that in ſeven years the trees will give flowers and fruit; in ten, they will yield about half of their common produce; and that in twenty years they come to their full growth; after which, if my information be good, they will laſt near one hundred years. This account, I acknowledge, muſt neceſſarily be very vague and uncertain, as I never have met with a ſingle perſon who appeared to have had either opportunity or inclination to obſerve its progreſs. Such, however, is what the country people ſay of it.

"I am told that a good tree will eaſily give four puckha maunds (about three hundred weight avoirdupois) of dried flowers, which will ſell here for about two rupees; and of ſeeds it will afford about two maunds; and this, of oil, will yield 26 ſeers puckha weight (near 60 lb.) which, in a year like this, when oil is cheap, will ſell at this place for two rupees more. It is to be obſerved, however, that every tree will not give ſo much, neither are the flowers and oil ſo clear in any part of the hills as at Chitra; but, allowing only a half of this or leſs, to be the product of each tree (though it might be rendered ſtill much greater by the very leaſt care and induſtry in the cultivation of it), within the ſpace of 20 years a ſubſiſtence might be raiſed to the inhabitants, and a conſiderable revenue to the proprietors of the lands throughout an immenſe tract of country; the greateſt part of which, in its preſent ſtate, is little better than a barren waſte, and cannot pay one ſingle anna to the zemindar or the government. That ſuch an advantage might be derived from it, may be proved by the moſt moderate calculation: for, ſuppoſing the trees to be ſown at 40 feet diſtance from each other, on each begah (about the third of an acre) might ſtand eight trees; and ſuppoſing the product of each tree to be only half a rupee, there would be four rupees of annual value on a begah of ground; half of which going to the proprietor, it would thus give a far better rent than the generality of the beſt grounds in theſe parts; and the labourer would have a produce, without any other trouble than that of ſowing the ſeed, and fencing the ground whilſt the trees were young; and that of annually gathering the flowers and preparing the oil when they arrive at their proper ſize; and they would probably begin to give a produce within leſs than 10 years after the ſowing.

"As this tree will yield nearly its uſual quantity of flowers and fruit in ſeaſons when, for want of rain, every other crop fails; if thus cultivated, it would afford the inhabitants a ſure and certain reſource, under the moſt dreadful, and, what has hitherto been to them the moſt deſtructive, of all calamities, famine. It is well known, that the rice and other ſorts of grain which form the chief part of their ſuſtenance, require a conſiderable degree of moiſture to bring them to perfection; an unuſually dry ſeaſon deſtroys the harveſt in theſe articles, and reduces the Ryots in general to the utmoſt miſery; a predicament into which they could hardly fall, even in the ſevereſt dearth of grain, whilſt they had plenty of the flowers and fruit of the mahwah to depend upon."

MAIA, (fab. hiſt.), the daughter of Atlas and Pleione. She was the mother of Mercury by Jupiter. She was one of the Pleiades, the moſt luminous of the ſeven ſiſters; (ſee PLEIADES.) Alſo, a ſurname of Cybele.

MAIDEN, an inſtrument for beheading criminals. Of the uſe and form of this inſtrument Mr. Pennant gives the following account: "It ſeems to have been confined to the limits of the foreſt of Hardwick, or the 18 towns and hamlets within its precincts. The time when this cuſtom took place is unknown; whether earl Warren, lord of this foreſt, might have eſtabliſhed it among the ſanguinary laws then in uſe againſt the invaders of the hunting rights, or whether it might not take place after the woollen manufactures at Halifax began to gain ſtrength, is uncertain. The laſt is very probable; for the wild country around the town was inhabited by a lawleſs ſet, whoſe depredations on the cloth-tenters might ſoon ſtifle the efforts of infant induſtry. For the protection of trade, and for the greater terror of offenders by ſpeedy execution, this cuſtom ſeems to have been eſtabliſhed, ſo as at laſt to receive the force of law, which was, 'That if a felon be taken within the liberty of the foreſt of Hardwick, with goods ſtolen out, or within the ſaid precincts, either hand-habend, back-berand, or confeſſioned, to the value of thirteen-pence halfpenny, he ſhall, after three market-days or meeting-days within the town of Halifax next after ſuch his apprehenſion, and being condemned, be taken to the gibbet, and there have his head cut from his body.'

"The offender had always a fair trial; for, as ſoon as he was taken, he was brought to the lord's bailiff at Halifax: he was then expoſed on the three markets (which here were held thrice in a week), placed in a ſtocks, with the goods ſtolen on his back, or, if the theft was of the cattle kind, they were placed by him; and this was done both to ſtrike terror into others, and to produce new informations againſt him. The bailiff then ſummoned four freeholders of each town within the foreſt to form a jury. The felon and proſecutors were brought face to face; the goods, the cow or horſe, or whatſoever was ſtolen, produced. If he was found guilty, he was remanded to priſon, had a week's time allowed for preparation, and then was conveyed to this ſpot, where his head was ſtruck off by this machine. I ſhould have premiſed, that if the criminal, either after apprehenſion or in the way to execution, could eſcape out of the limits of the foreſt (part being cloſe to the town), the bailiff had no farther power over him; but if he ſhould be caught within the precincts at any time after, he was immediately executed on his former ſentence.

"This privilege was very freely uſed during the reign of Elizabeth: the records before that time were loſt. Twenty-five ſuffered in her reign, and at leaſt twelve from 1623 to 1650; after which I believe the privilege was no more exerted.

"This machine of death is now deſtroyed; but I ſaw one of the ſame kind in a room under the parliament-houſe at Edinburgh, where it was introduced by the regent Morton, who took a model of it as he paſſed through Halifax, and at length ſuffered by it himſelf. It is in form of a painter's eaſel, and about ten feet high: at four feet from the bottom is a croſs bar, on which the felon lays his head, which is kept down by another placed above. In the inner edges of the frame are grooves: in theſe is placed a ſharp ax, with a vaſt weight of lead, ſupported at the very ſummit with a peg; to that peg is faſtened a cord, which the executioner cutting, the ax falls, and does the affair effectually, without ſuffering the unhappy criminal to undergo a repetition of ſtrokes, as has been the caſe in the common method. I muſt add, that if the ſufferer is condemned for ſtealing a horſe or a cow, the ſtring is tied to the beaſt, which, on being whipped, pulls out the peg, and becomes the executioner."

MAIDEN is alſo the name of a machine firſt uſed in Yorkſhire, and ſince introduced into other places, for waſhing of linen; conſiſting of a tub 19 inches high, and 27 in diameter at the top, in which the linen is put, with hot water and ſoap, to which is adapted a cover, fitting it very cloſely, and faſtened to the tub by two wedges; through a hole in the middle of the cover paſſes an upright piece of wood, kept at a proper height by a peg above, and furniſhed with two handles, by which it is turned backward and forward: to the lower end of this upright piece is faſtened a round piece of wood, in which are fixed ſeveral pieces, like cogs of a wheel. The operation of this machine is to make the linen paſs and repaſs quick through the water.

MAIDEN-*Rents*, in our old writers, a noble paid by the tenants of ſome manors on their marriage. This was ſaid to be given to the lord for his omitting the cuſtom of marcheta, whereby he was to have the firſt night's lodging with his tenant's wife; but it ſeems more probably to have been a fine for a licence to marry a daughter.

MAIDENHEAD, a town of Berks, 26 miles from London, with a ſtone bridge over the Thames. It is governed by a high-ſteward, a mayor, a ſteward, and 10 aldermen, out of which laſt two bridgemaſters are choſen every year. Here is a gaol both for debtors and felons. The town ſtands partly in the pariſh of Bray and partly in that of Cookham; and here is a chapel peculiar to the corporation, the miniſter whereof is choſen by the inhabitants, and not obliged to attend the biſhop's viſitation. Here are ſeveral alms-houſes and charities. This town, now ſo conſiderable, did not begin to flouriſh till, by the building of its bridge, travellers were brought this way, who before uſed a ferry at that called *Babham's End*, two miles north of it. The barge pier-bridge is maintained by the corporation, for which they are allowed the tolls both over and under it. The bridge pier divides Berks from Bucks. There is a great trade here in malt, meal, and timber, which they carry in their barges to London. As this is the great thoroughfare from thence to Bath, Briſtol, and other ſouth-weſt parts of England, the adjacent wood or thicket has been noted for many robberies. The market here is on Wedneſdays; there are three fairs; and here are frequent horſe-races.

MAIDSTONE, a town in the county of Kent, 36 miles from London, ſeated on the river Medway, a branch of which runs through it. It is a corporation, and ſends two members to parliament. Its chief trade, beſides linen-thread, which it makes to great perfection, is in hops; of which there are great plenty of plantations about the town, as well as orchards of cherries. The tide flows quite up to the town, and brings up barges, &c. of 50 or 60 tons. It has a fine ſtone bridge. One of the public gaols for the county is kept in this town; and the cuſtody of weights and meaſures, renewed by the ſtandard of king Henry VII. was committed to it by parliament, as being in the centre of Kent: for which reaſon the knights of the ſhire are always elected, and the courts of juſtice always held here, and generally the aſſizes. The archbiſhop of Canterbury is conſtant parſon of this pariſh, which is his peculiar, and ſerved by his curate. Here are four charity ſchools, in which are above 100 boys and girls, who are viſited once a week and catechiſed by the miniſter. This is ſuch a plentiful country, and the lands hereabouts are ſo rich, that London is ſupplied with more commodities from hence than from any market-town in England; particularly with the large bullocks that come from the Weald of Kent, which begins but ſix miles off; with timber, wheat, and great quantities of hops, apples, and cherries; with a ſort of paving-ſtone, eight or ten inches ſquare, that is exceedingly durable; and with the fine white ſand for glaſs-houſes and ſtationers. There are ſo many gentlemen's ſeats within 10 miles, that it is rare to find a town of ſo much trade and buſineſs ſo full of gentry and good company. The market here, which is the beſt in the county, is on Thurſday; it has another on the ſecond Tueſday of every month, granted them by George II. in 1751; and fairs on February 13th, May 12th, June 20th (called *Garlic fair*), and October 17th. Here was a college or hoſpital, erected by archbiſhop Boniface; and a chantry, by archbiſhop Thomas Arundel, which is now the free-ſchool.

MAIGNAN (EMANUEL), a religious minim, and one of the greateſt philoſophers of his age, was born of an ancient and noble family at Thouloufe in 1601. Like the famous Paſcal, he became a complete mathematician without the aſſiſtance of a teacher; and filled the profeſſor's chair at Rome in 1636, where, at the expence of Cardinal Spada, he publiſhed his book *De Perſpectiva Horaria*. He returned to Thouloufe in 1650, and was created provincial: the king, who in 1660 entertained himſelf with the machines and curioſities in his cell, made him offers by Cardinal Mazarine, to draw him to Paris: but he humbly deſired to ſpend the remainder of his days in a cloiſter. He publiſhed a Courſe of Philoſophy, 4 vols. 8vo. at Thouloufe; to the ſecond edition of which he added two treatiſes, one againſt the vortices of Deſcartes, and the other on the ſpeaking trumpet invented by Sir Samuel Morland. He is ſaid to have ſtudied even in his ſleep, his very dreams being employed in theorems, the demonſtrations of which would awaken him with joy. He died in 1676.

MAJESTY, a title given to kings, which frequently ſerves as a term of diſtinction. The word ſeems compoſed of the two Latin words, *major* "greater," and *ſtatus* "ſtate." The emperor is called *Sacred Majeſty*, *Imperial Majeſty*, and *Cæſarean Majeſty*: The king of Hungary is ſtyled *His Apoſtolic Majeſty*. The king of Spain is termed *His Moſt Catholic Majeſty*; and the king of Portugal, *His moſt Faithful Majeſty*. The king of France uſed to be called *His moſt Chriſtian Majeſty*; and when he treated with the emperor, the word *Sacred* was added: His laſt title was *King of the French*.—With reſpect to other kings, the name of the kingdom is added; as *His Britannic Majeſty*, *His Poliſh Majeſty*, &c. Formerly princes were more ſparing in giving titles, and more modeſt in claiming them: before the reign of Charles V. the king of Spain had only the title of *Highneſs*; and before that of Henry VIII. the kings of England were only addreſſed under the titles of *Grace* and *Highneſs*.

Under the Roman republic, the title *Majeſty* (*majeſtas*) belonged to the whole body of the people, and to the principal magiſtrates; ſo that to diminiſh or wound the majeſty of the commonwealth, was to be wanting in reſpect to the ſtate or to its miniſters. But the power afterwards paſſing into the hands of a ſingle perſon, the appellation of *Majeſty* was transferred to the emperor and the imperial family. Pliny compliments Trajan on his being contented with the title of *Greatneſs*; and ſpeaks very invidiouſly of thoſe who affected that of *Majeſty*. And yet this laſt ſeems to be the moſt modeſt and juſt title that can be attributed to ſovereigns, ſince it ſignifies no more than the royalty or ſovereign power.

MAII INDUCTIO, an ancient cuſtom for the prieſt and people of country villages to go in proceſſion to ſome adjoining wood on a May-day morning; and return in a kind of triumph, with a May-pole, boughs, flowers, garlands, and other tokens of the ſpring. This May-game, or rejoicing at the coming of the ſpring, was for a long time obſerved, and ſtill is in ſome parts of England; but there was thought to be ſo much

heathen vanity in it, that it was condemned and prohibited within the diocefe of Lincoln by the good old bifhop Groft-head.

MAIL *(Maille)*, a term primarily applied to the meſhes or holes in net-work.

Coat of MAIL. See COAT. It is called alſo *habergeon*. Anciently they alſo wore ſhirts of mail under the waiſtcoat, to ſerve as a defence againſt ſwords and poniards. We alſo read of gloves of mail.

MAIL, or *Moll*, alſo ſignifies a round ring of iron; whence the play of pall-mall, from *pal'a* "a ball," and *maille* "the round ring through which it is to paſs."

MAIL, or *Maille*, in our old writers, a ſmall kind of money. Silver half-pence were likewiſe termed *mailles*, 9 Hen. V. By indenture in the mint, a pound weight of old ſterling ſilver was to be coined into 360 ſterlings or pennies, or 720 *mails* or halfpennies, or 1440 farthings. Hence the word *mail* was derived, which is now vulgarly uſed in Scotland to ſignify an annual rent.

MAIL, or *Maill*, on ſhip-board, a ſquare machine compoſed of a number of rings interwoven net-wiſe, and uſed for rubbing off the looſe hemp which remains on lines or white cordage after it is made.

MAIL is likewiſe uſed for the leather bag wherein letters are carried by the poſt.

MAIL *Coaches*. See COACH.

MAILLA (JOSEPH-ANNE-MARIE DE MOYRIAC DE), a learned Jeſuit, was born in the caſtle of Maillac in the Bugey, and appointed a miſſionary to China, whither he went in 1703. At the age of 28 he had acquired ſo great ſkill in the characters, arts, ſciences, mythology, and ancient books of the Chineſe, as to aſtoniſh even the learned. He was greatly beloved and eſteemed by the emperor Kam-Hi, who died in 1722. He, together with other miſſionaries, was employed by that prince to draw a chart of China and Chineſe Tartary, which was engraved in France in the year 1732. He drew likewiſe particular charts of ſome of the provinces of this vaſt empire; with which the emperor was ſo pleaſed, that he ſettled the author at his court. The great annals of China were alſo tranſlated into French by Father Mailla, and his manuſcript was tranſmitted to France in 1737. This work was publiſhed in 12 volumes quarto, under the inſpection of M. Groſier, and is the firſt complete hiſtory of that extenſive empire. The ſtyle, which was full of hyperbole and bombaſt, has been reviſed by the editor, and the ſpeeches which extended to too great a length, and had too much fameneſs in them, have been omitted. Father Mailla, after having reſided 45 years in China, died at Pekin on the 28th of June 1748, in the 79th year of his age. Kien-Lung the reigning emperor paid the expences of his funeral. He was a man of a lively and gentle character, capable of the moſt perſevering labour and the moſt unremitting activity.

MAILLET (BENOIT DE), deſcended from a noble family in Lorrain, was born in 1659, and appointed, at the age of 33, conſul-general for Egypt. He fulfilled this office for 16 years with great ability, ſupported the king's authority againſt the janizaries, and greatly extended the trade of France into that part of Africa. As a recompenſe for his ſervices, the king beſtowed upon him the conſulſhip of Leghorn, which is the firſt and moſt conſiderable conſulſhip in his gift. Being at laſt appointed in 1715 to viſit the ſea-ports in the Levant and on the coaſt of Barbary, he was ſo ſucceſsful in the execution of his commiſſion, that he obtained permiſſion to retire with a conſiderable penſion. He ſettled at Marſeilles; where he died in 1738, in the 79th year of his age. He was a man of a lively imagination, and gentle manners; in ſociety he was very amiable, and he poſſeſſed the ſtricteſt probity. He was fond of praiſe, and very anxious about the reputation of genius. During the whole of his life he paid particular attention to the ſtudy of natural hiſtory; and his principal object was to become acquainted with the origin of our globe. On this important ſubject he left ſome curious obſervations, which have been publiſhed in octavo under the title of *Telliamed*, which is the name *de Maillet* written backwards. The editor Abbé Maſcrier has given to this work the form of dialogue. An Indian philoſopher is introduced as explaining to a French miſſionary his opinion concerning the nature of the globe, and the origin of mankind; and, which is very incredible, he ſuppoſes it to have come out of the waters, and makes an abode uninhabitable by man the birthplace of the human race. His great object is to prove, that all the ſtrata of which this globe is compoſed, even to the tops of the higheſt mountains, have come from the boſom of the waters; that they are the work of the ſea, which continually retires to allow them gradually to appear. Telliamed dedicated his book to the illuſtrious Cyrano de Bergerac, author of the imaginary "Travels to the ſun and moon." In the humorous epiſtle which is addreſſed to him, the Indian philoſopher informs us that theſe dialogues are nothing but a collection of dreams and fancies. He cannot be accuſed of having broken his word; but he may well be reproached with not having written them in the ſame ſtyle with his letter to Cyrano, and with not having diſplayed equal livelineſs and humour. A ſubject the moſt extravagant is handled in the graveſt manner, and his ridiculous opinion is delivered with all the ſerious air of a philoſopher. Of the ſix dialogues which compoſe the work, the four firſt contain many curious obſervations truly philoſophical and important: in the other two we find nothing but conjectures, fancies, and fables, ſometimes amuſing, but always abſurd. To Maillet we are indebted alſo for "A Deſcription of Egypt," collected from his memoirs by the editor of Telliamed, 1743, 4to. or in 2 vols. 12mo.

MAIM, MAIHEM, or *Mayhem*, in law, a wound by which a perſon loſes the uſe of a member that might have been a defence to him; as when a bone is broken, a foot, hand, or other member cut off, or an eye put out; though the cutting off an ear or noſe, or breaking the hinder-teeth, was formerly held to be no maim. A maim by caſtration was anciently puniſhed with death, and other maims with loſs of member for member; but afterwards they were only puniſhed by fine and impriſonment. It is now enacted by the ſtatute 22 & 23 Car. II. that if any perſon, from malice aforethought, ſhall diſable any limb or member of any of the king's ſubjects with an intent to diſfigure him, the offender, with his aiders and abettors, ſhall be guilty of felony without benefit of clergy; though no ſuch attainder ſhall corrupt the blood, or occaſion forfeiture of lands, &c.

MAIMBOURG (LOUIS), born at Nanci in 1610, became a Jeſuit in 1626; and acquired reputation as a teacher, but yet more by the many hiſtories which he publiſhed. The Janſeniſts criticiſed his hiſtory of Arianiſm, and that of the *Iconoclaſtes*; and his hiſtory of Calviniſm, publiſhed in 1681, ſtirred up a violent paper-war againſt him, the operations whereof he left entirely to his enemies, without giving himſelf any trouble offenſively or defenſively. He was degraded by the general of the Jeſuits, on account of his having declared too boldly in favour of the Gallican church againſt the Ultramountains. He retired into the abbey of St. Victor, where he died in 1686. He ought not to be confounded with *Theodore Maimbourg* his couſin; who embraced Calviniſm, afterwards returned to the Romiſh church, returned back to the reformed religion, embraced Socinianiſm, and died at London about the year 1693, after having publiſhed ſome works.

MAIMONIDES (MOSES), or MOSES THE SON OF MAI-

MON, a celebrated rabbi, called by the Jews *the eagle of the doctors*, was born of an illuſtrious family at Cordova in Spain, in 1131. He is commonly named *Moſes Ægyptius*, becauſe he ſettled in Egypt, where he ſpent his whole life in quality of phyſician to the ſultan. Here he opened a ſchool, which was ſoon filled with pupils from all parts, from Alexandria and Damaſcus eſpecially, whoſe proficiency under him ſpread his fame all over the world. He was no leſs eminent in philoſophy, mathematics, and divinity, than in medicine. Caſaubon affirms it may be truly ſaid of him, as Pliny of old ſaid of Diodorus Siculus, that "he was the firſt of his tribe who ceaſed to be a trifler." It would be tedious to enumerate all the works of Maimonides; ſome were written originally in Arabic, but are now extant only in Hebrew tranſlations. "Thoſe (ſays Collier), who deſire to learn the doctrine and the canon law contained in the Talmud, may read Maimonides's compendium of it in good Hebrew, in his book entitled *Iad*; wherein they will find great part of the fables and impertinencies in the Talmud entirely diſcarded. But the *More Nevochim* is the moſt valued of all his works, deſigned to explain the obſcure words, phraſes, metaphors, &c. in ſcripture, which, when literally interpreted, have either no meaning or appear abſurd.

MAIN, an epithet uſually applied by ſailors to whatever is principal, as oppoſed to whatever is inferior or ſecondary. Thus the main land is uſed in contradiſtinction to an iſland or peninſula; and the main-maſt, the main-wale, the main-keel, and the main-hatchway, are in like manner diſtinguiſhed from the fore and mizen maſts, the channel wales, the falſe keel, and the fore and after hatchways, &c.

MAINE, a river of Germany, which riſes in the circle of Franconia, runs by Bamberg, Wurtzburg, Aſchaffenburg, Hanau, and Francfort, and falls into the Rhine at Mentz.

MAINE, or MAYENNE, a department of France which includes the late province of the ſame name. It takes its name from the river Maine, which, ſoon after its junction with the Sarte, falls into the Loire. Laval is the capital.

MAINE AND LOIRE, a department of France, which includes the late province of Anjou. It has its name from two rivers. Angers is the capital.

MAINOUR, MANOUR, or *Meinour* (from the French *manier*, i. e. *manu tractare)*, in a legal ſenſe denotes the thing that a thief taketh away or ſtealeth: As to be taken with the mainour *(Pl. Cor.* fol. 179.), is to be taken with the thing ſtolen about him: And again (fol. 194.) it was preſented, that a thief was delivered to the ſheriff or viſcount together with the mainour: And again, (fol. 186.), if a man be indicted, that he feloniouſly ſtole the goods of another, where, in truth, they are his own goods, and the goods be brought into the court as the mainour; and if it be demanded of him, what he ſaith to the goods, and he diſclaim them; though he be acquitted of the felony, he ſhall loſe the goods: And again (fol. 149.), if the defendant were taken with the manour, and the manour be carried to the court, they, in ancient times, would arraign him upon the manour, without any appeal or indictment. Cowel. See Blackſt. Comment. Vol. iii. 71. Vol. iv. 303.

MAINPRIZE. See *Falſe* IMPRISONMENT. The writ of mainprize, *manucaptio*, is a writ directed to the ſheriff (either generally, when any man is impriſoned for a bailable offence, and bail hath been refuſed; or ſpecially, when the offence or cauſe of commitment is not properly bailable below), commanding him to take ſureties for the priſoner's appearance, uſually called *mainpernors*, and to ſet him at large. Mainpernors differ from bail, in that a man's bail may impriſon, or ſurrender him up before the ſtipulated day of appearance; mainpernors can do neither, but are barely ſureties for his appearance at the day: bail are only ſureties that the parties be anſwerable for the ſpecial matter for which they ſtipulate; mainpernors are bound to produce him to anſwer all charges whatever. See HABEAS *Corpus*.

MAINTENANCE, in law, bears a near relation to BARRETRY; being an officious intermeddling in a ſuit that no way belongs to one, by maintaining or aſſiſting either party with money or otherwiſe, to proſecute or defend it: a practice that was greatly encouraged by the firſt introduction of uſes. This is an offence againſt public juſtice, as it keeps alive ſtrength and contention, and prevents the remedial proceſs of the law into an engine of oppreſſion. And therefore, by the Roman law, it was a ſpecies of the *crimen falſi*, to enter into any confederacy or do any act to ſupport another's law-ſuit, by money, witneſſes, or patronage. A man may, however, maintain the ſuit of his near kinſman, ſervant, or poor neighbour, out of charity and compaſſion, with impunity. Otherwiſe the puniſhment by common law is fine and impriſonment; and by the ſtatute 32 Hen. VIII. c. 9. a forfeiture of 10l.

MAINTENON (MADAME DE), a French lady of extraordinary fortune, deſcended from an ancient family, and whoſe proper name was *Frances Daubigné*, was born in 1635. Her parents by misfortunes being ill able to ſupport her, ſhe fell to the care of her mother's relations; to eſcape which ſtate of dependence, ſhe was induced to marry that famous old buffoon the Abbé Scarron, who ſubſiſted himſelf only on a penſion allowed him by the court for his wit and parts. She lived with him many years, which Voltaire makes no ſcruple to call the happieſt years of her life; but when he died in 1660, ſhe found herſelf as indigent as ſhe was before her marriage. Her friends indeed endeavoured to get her huſband's penſion continued to her, and preſented ſo many petitions to the king about it, all beginning with "The widow Scarron moſt humbly prays your majeſty's, &c." that he was quite weary of them, and has been heard to exclaim, "Muſt I always be peſtered with the widow Scarron?" At laſt, however, through the recommendation of Madame de Monteſpan, he ſettled a much larger penſion on her, with a genteel apology for making her wait ſo long; and afterward made choice of her to take care of the education of the young duke of Maine, his ſon by Madame de Monteſpan. The letters ſhe wrote on this occaſion charmed the king, and were the origin of her advancement; her perſonal merit effected all the reſt. He bought her the lands of Maintenon, the only eſtate ſhe ever had; and, finding her pleaſed with the acquiſition, called her publicly *Madame de Maintenon*; which was of great ſervice to her in her good fortune, by releaſing her from the ridicule attending that of Scarron. Her elevation was to her only a retreat: the king came to her apartment every day after dinner, before and after ſupper, and continued there till midnight: here he did buſineſs with his miniſters, while Madame de Maintenon, employed in reading or needle-work, never ſhowed any deſire to talk of ſtate affairs, and carefully avoided all appearance of cabal or intrigue; ſhe did not even make uſe of her power to digniſy her own relations. About the latter end of the year 1685, Louis XIV. married her, he being then in his 48th and ſhe in her 50th year; and that piety with which ſhe inſpired the king to make her a wife inſtead of a miſtreſs, became by degrees a ſettled diſpoſition of mind. She prevailed on Louis to found a religious community at St. Cyr, for the education of 300 young ladies of quality; and here ſhe frequently retired from that melancholy of which ſhe complains ſo pathetically in one of her letters, and which few ladies will ſuppoſe ſhe ſhould be liable to in ſuch an elevated ſituation. But, as M. Voltaire ſays, if any thing could ſhow the vanity of ambition, it would certainly be this letter. Madame de Maintenon could have no other uneaſineſs than the uniformity of her manner of living with a great king; and

this made her once ſay to the Count Daubigné her brother, "I can hold it no longer; I wiſh I was dead." The anſwer he made to her was, "You have then a promiſe to marry the Almighty!" Louis however died before her in 1715; when ſhe retired wholly to St. Cyr, and ſpent the reſt of her days in acts of devotion; and what is moſt ſurpriſing is, that her huſband left no certain proviſion for her, recommending her only to the duke of Orleans. She would accept no more than a penſion of 80,000 livres, which was punctually paid her till ſhe died in 1719. A collection of her letters has been publiſhed, and tranſlated into Engliſh; from which familiar intercourſes her character will be better known than from any attempt at deſcription.

MAJOR, in the art of war, the name of ſeveral officers of very different ranks and functions.

Major-*general*. See General.

Major *of a Regiment of Foot*, the next officer to the lieutenant-colonel, generally promoted from the eldeſt captain: he is to take care that the regiment be well exerciſed, to ſee it march in good order, and to rally it in caſe of being broke in action: he is the only officer among the infantry that is allowed to be on horſeback in time of action, that he may the more readily execute the colonel's orders.

Major *of a Regiment of Horſe*, as well as foot, ought to be a man of honour, integrity, underſtanding, courage, activity, experience, and addreſs: he ſhould be maſter of arithmetic, and keep a detail of the regiment in every particular: he ſhould be ſkilled in horſemanſhip, and ever attentive to his buſineſs: one of his principal functions is, to keep an exact roſter of the officers for duty: he ſhould have a perfect knowledge in all the military evolutions, as he is obliged by his poſt to inſtruct others, &c.

Town-Major, the third officer in order in a garriſon, and next to the deputy-governor. He ſhould underſtand fortification, and has a particular charge of the guards, rounds, patroles, and ſentinels.

Brigade-Major, is a particular officer appointed for that purpoſe only in camp: he goes every day to head-quarters to receive orders from the adjutant-general: there they write exactly whatever is dictated to them: from thence they go and give the orders, at the place appointed for that purpoſe, to the different majors or adjutants of the regiments which compoſe that brigade, and regulate with them the number of officers and men which each are to furniſh for the duty of the army; taking care to keep an exact roſter, that one may not give more than another; and that each march in their tour: in ſhort, the major of brigade is charged with the particular detail in his own brigade, in much the ſame way as the adjutant-general is charged with the general detail of the duty of the army. He ſends every morning to the adjutant-general an exact return, by battalion and company, of the men of his brigade miſſing at the retreat, or a report expreſſing that none are abſent: he alſo mentions the officers abſent with or without leave. As all orders paſs through the hands of the majors of brigade, they have infinite occaſions of making known their talents and exactneſs.

Major *of Artillery*, is alſo the next officer to the lieutenant-colonel. His poſt is very laborious, as the whole detail of the corps particularly reſts with him; and for this reaſon all the non-commiſſioned officers are ſubordinate to him, as his title of *ſerjeant-major* imports: in this quality they muſt render him an exact account of every thing that comes to their knowledge, either regarding the duty or wants of the artillery and ſoldiers. He ſhould poſſeſs a perfect knowledge of the power of artillery, together with all its evolutions. In the field he goes daily to receive orders from the brigade-major, and communicates them with the parole to his ſuperiors, and then dictates them to the adjutant. He ſhould be a very good mathematician, and be well acquainted with every thing belonging to the train of artillery, &c.

Major *of Engineers*, commonly with us called *Sub-directors*, ſhould be very well ſkilled in military architecture, fortification, gunnery, and mining. He ſhould know how to fortify in the field, to attack and defend all ſorts of poſts, and to conduct the works in a ſiege, &c. See Engineer.

Aid-Major, is on ſundry occaſions appointed to act as major, who has a pre-eminence above others of the ſame denomination. Our horſe and foot-guards have their guidons, or ſecond and third majors.

Serjeant-Major, is a non-commiſſioned officer of great merit and capacity, ſubordinate to the adjutant as he is to the major. See Serjeant.

Drum-Major, is not only the firſt drummer in the regiment, but has the ſame authority over his drummers as the corporal has over his ſquad. He inſtructs them in their different beats; is daily at orders with the ſerjeants, to know the number of drummers for duty. He marches at their head when they beat in a body. In the day of battle, or at exerciſe, he muſt be very attentive to the orders given him, that he may regulate his beats according to the movements ordered.

Fife-Major, is he that plays the beſt on that inſtrument, and has the ſame authority over the fifers as the drum-major has over the drummers. He teaches them their duty, and appoints them for guards, &c.

Major, in law, a perſon who is of age to manage his own affairs. By the civil law a man is not a major till the age of 25 years; in England, he is a major at 21, as in Normandy at 20.

Major, in logic, is underſtood of the firſt propoſition of a regular ſyllogiſm. It is called *major*, becauſe it has a more extenſive ſenſe than the minor propoſition, as containing the principal term. See Logic.

Major, and *Minor*, in muſic, are applied to concords which differ from each other by a ſemi-tone. See Concord. Major-tone is the difference between the fifth and fourth; and major ſemi-tone the difference between the major fourth and the third. The major tone ſurpaſſes the minor tone by a comma.

Major-*Domo*, an Italian term, frequently uſed to ſignify a ſteward or maſter of the houſehold. The title of *major-domo* was formerly given in the courts of princes to three different kinds of officers. 1. To him who took care of what related to the prince's table, or eating; otherwiſe called *cleater*, *præfectus menſæ*, *architriclinus*, *dapifer*, and *princeps coquorum*.—2. Major-domo was alſo applied to the ſteward of the houſehold.—3 The title of major-domo was alſo given to the chief miniſter, or him to whom the prince deputed the adminiſtration of his affairs, foreign and domeſtic, relating to war as well as peace. Inſtances of major-domos in the two firſt ſenſes are frequent in the Engliſh, French, and Norman affairs.

Major (John), a ſcholaſtic divine and hiſtorian, was born at Haldington, in the province of Eaſt Lothian in Scotland. It appears from ſome paſſages in his writings that he reſided awhile both at Oxford and Cambridge. He went to Paris in 1493, and ſtudied in the college of St. Barbe, under the famous John Boulac. Thence he removed to that of Montacute where he began to ſtudy divinity under the celebrated Standouk. In the year 1498 he was entered of the college of Navarre. In 1505 he was created doctor in divinity: returned to Scotland in 1519, and taught theology during ſeveral years in the univerſity of St. Andrew's. But at length, being diſguſted with the quarrels of his countrymen, he went back to

Paris, and reſumed his lectures in the college of Montacute, where he had ſeveral pupils, who afterwards became men of great eminence. About the year 1530 he returned once more to Scotland, and was choſen profeſſor of theology at St. Andrew's, of which he afterwards became provoſt; and there died in 1547, aged 78. His logical treatiſes form one immenſe folio; his commentary on Ariſtotle's phyſics makes another; and his theological works amount to ſeveral volumes of the ſame ſize. Theſe maſſes of crude and uſeleſs diſquiſition were the admiration of his cotemporaries. A work leſs prized in his own age was to make him known to poſterity. His book *De Geſtis Scotorum* was firſt publiſhed at Paris by Badius Aſcenſius in the year 1521. He rejects in it ſome of the fictions of former hiſtorians; and would have had greater merit if he had rejected more. He intermingles the hiſtory of England with that of Scotland; and has incurred the cenſure of ſome partial writers, for giving an authority to the authors of the former nation which he refuſes to thoſe of his own. Bede, Caxton, and Froiſſard, were exceedingly uſeful to him. What does the greateſt honour to this author is, the freedom with which he has cenſured the rapacity and indolence of eccleſiaſtics, and the ſtrain of ridicule with which he treats the pope's ſupremacy. The ſtyle in which he wrote does not deſerve commendation. Biſhop Spotiſwood calls it *Sorbonnic* and *barbarous*.

MAJORCA, an iſland of the Mediterranean, lying between Yvica on the weſt and Minorca on the eaſt. Theſe three iſlands were anciently called *Baleares*, ſuppoſed to be from the ſkill of their inhabitants in ſlinging, for which they were very remarkable. Originally they belonged to the Carthaginians; but during the wars of that people with the Romans they ſeemed to have regained their liberty. In 122 B. C. they were ſubdued by Metellus the Roman conſul, who treated the inhabitants with ſuch cruelty, that out of 30,000 he ſcarce left 1000 alive. He then built two cities on Majorca; one called *Palma*, now *Majorca*, to the eaſt; the other to the weſt, named *Pollentia*, now no longer in being. The iſland continued ſubject to the Romans, and to the nations who over-ran the weſtern part of the empire, for many ages. At laſt it was ſubdued by the Moors about the year 800. By them the iſland was put in a much better condition than it ever was before or ſince. The Moors being very induſtrious, and alſo populous, ſurrounded the whole coaſt with fortifications, that is, with a kind of towers and lines between them; cultivated every ſpot in the iſland that was not either rock or ſand; and had no fewer than 15 great towns, whereas now there are not above three. Neither was it at all difficult for the Mooriſh monarch to bring into the field an army much ſuperior in number to the inhabitants that are now upon it, taking in all ranks, ſexes, and ages. In 1229 the iſland was ſubdued by the king of Arragon, who eſtabliſhed in it a new kingdom, feudatory to that of Arragon, which was again deſtroyed in 1341 by the ſame monarchs; and ever ſince the iſland has been ſubject to Spain, and hath entirely loſt its importance. It is about 60 miles long, and 45 broad. The air is clear and temperate, and, by its ſituation, the heat in ſummer is ſo qualified by the breezes, that it is by far the moſt pleaſant of all the iſlands in the Mediterranean. There are ſome mountains; but the country is generally flat, and of ſuch an excellent ſoil, that it produces great quantities of corn as good in its kind as any in Europe. Oil, wine, and ſalt, are very plentiful, as alſo black cattle and ſheep; but deer, rabbits, and wild fowl abound ſo much, that they alone are ſufficient for the ſubſiſtence of the inhabitants. There are no rivers, but a great many ſprings and wells, as well as ſeveral good harbours. The inhabitants are robuſt, active, and good ſeamen.

MAJORCA, a handſome, large, rich, and ſtrong town, in the iſland of the ſame name, with a biſhop's ſee. It contains about 6000 houſes, and 22 churches, beſides the cathedral. The ſquares, the cathedral, and the royal palace, are magnificent ſtructures. A captain general reſides there, who commands the whole iſland; and there is a garriſon againſt the incurſion of the Moors. It was taken by the Engliſh in 1706; but was retaken in 1715, ſince which time it has been in the hands of the Spaniards. It is ſeated on the ſouth weſt part of the iſland, where there is a good harbour, 70 miles north-eaſt of Yvica, 120 ſouth eaſt of Barcelona, 140 eaſt of Valencia, and 300 from Madrid. E. lon. 2. 55. N. lat. 30. 36.

MAIRAN (JEAN JACQUES D'ORTOUS DE), deſcended from a noble family at Beſiers, was born in that city in 1678, and died at Paris of a defluxion of the lungs on the 20th of February 1771, at the age of 93. He was one of the moſt illuſtrious members of the academy of ſciences and of the French academy. Being early connected with the former ſociety, he, in the year 1741, ſucceeded Fontenelle in the office of ſecretary. This ſtation he filled with the moſt diſtinguiſhed ſucceſs till the year 1744; and, like his predeceſſor, poſſeſſed the faculty of placing the moſt abſtract ſubjects in the cleareſt light; a talent which is very rare, but which appears conſpicuous in all his works. The chief of them are, 1. *Diſſertation ſur la Glace*, the laſt edition of which was printed in 1749, 12mo. This excellent little tract has been tranſlated into German and Italian. 2. *Diſſertation ſur la cauſe de la lumiere des Phoſphores*, 1717, 12mo. 3. *Traité hiſtorique & phyſique de l'Aurore Boreale*, firſt publiſhed in 12mo 1733, and afterwards much enlarged and printed in 4to in 1754. The ſyſtem embraced by the author is liable to be controverted; but the book diſplays great taſte and erudition. 4. *Lettre au Pere Parennin, contenant diverſes queſtions ſur la Chine*, 12mo. This is a very curious work, and is full of that philoſophical ſpirit which characteriſes the author's other publications. 5. A great number of papers in the memoirs of the academy of ſciences (ſince 1719), of which he publiſhed ſome volumes. 6. Several Diſſertations on particular ſubjects, which form only ſmall pamphlets. 7. The *Eloges* of the academicians of the academy of ſciences who died in 1741, 1742, 1743, in 12mo. 1747. Without imitating Fontenelle, the author attained almoſt equal excellence by his talent of diſcriminating characters, appreciating their worth, and giving them their due ſhare of praiſe, without at the ſame time concealing their defects.

Mairan's reputation extended itſelf into foreign countries. He was a member of the imperial academy at Peterſburgh, of the royal academy of London, of the inſtitution at Bologna, of the royal ſocieties of Edinburgh and Upſal, &c. The gentleneſs and ſweetneſs of his manners made him be conſidered as a perfect model of the ſocial virtues. He poſſeſſed that amiable politeneſs, that agreeable gaiety, and that ſteady firmneſs, which never fail to procure love and eſteem. But we muſt add, ſays M. Saverien, that every thing had a reference to himſelf; ſelf-love and a regard to his own reputation were the motives of all his actions. He was deeply affected with cenſure or applauſe, and yet he had many friends. Uniting much gentleneſs of diſpoſition to an ingenious and agreeable expreſſion of countenance, he poſſeſſed the art of inſinuating himſelf into the good graces of others, ſo as to pave the way to elevation and ſucceſs. He was honoured with protection and particular marks of regard by the duke of Orleans the regent, who bequeathed to him his watch in his will. The prince of Conti loaded him with favours: and the chancellor Dagueſſeau, obſerving in him great originality and ingenuity of thought, appointed him prendent of the *Journal des Savans*; a ſtation which he filled very much to the ſatisfaction of the public and of the learned. The private and ſelfiſh views imputed to him by M. Saverien never made him deficient in

what was due to the ſtricteſt probity. An expreſſion of his is remembered which could have proceeded only from ſentiment: "An honeſt man (ſaid he) is one whoſe blood is refreſhed with the recital of a good action." He was ready at repartee. One day he happened to be in company with a gentleman of the gown, and to differ with him in opinion upon ſome point which had no more connection with juriſprudence than with geometry: "Sir (ſaid the magiſtrate, who ſuppoſed that a learned man was a perfect idiot out of his own ſphere), we are not now talking of Euclid or Archimedes."—"No, nor of Cujas nor Barthole!" replied the academician.

MAIRE *(Straits le)*, a paſſage to Cape Horn, ſituated between Terra del Fuego and Staten iſland; which, being diſcovered by Le Maire, obtained his name. It is now, however, leſs made uſe of than formerly, ſhips going round Staten iſland as well as Terra del Fuego.

MAISTRE (Louis Isaac le), better known by the name of *Sacy*, was born at Paris in 1613. His genius very early diſcovered itſelf. After an excellent courſe of ſtudy under the direction of the abbot of St. Cyran, he was raiſed to the prieſthood in 1648, and ſoon after was choſen, on account of his virtues, to be director of the religious of Port Royal des Champs. As this monaſtery bore the reputation of Janſeniſm, their enemies were furniſhed with a pretence for perſecuting them. In 1661 the director was obliged to conceal himſelf; and in 1666 he was committed to the Baſtile. During his confinement he compoſed the book *Figures de la Bible*; in which, according to the Moliniſts, alluſions are made to the ſufferings endured by the Janſeniſts. If we may believe a Jeſuit writer, the gentlemen of Port Royal and thoſe who oppoſed their errors are repreſented in the 92d figure, the former by David, the latter by Saul. Rehoboam in the 116th figure, Jezebel in the 130th, Ahaſuerus in the 148th and 150th, and Darius in the 160th, in the opinion of this author, repreſent Louis XIV. The writer of theſe anecdotes, of which we do not anſwer for the authenticity, adds, that when Sacy wiſhed to reproach his perſecutors, he always did it by means of the holy fathers. If this is the key to thoſe enigmatical portraits and alluſions, which it is pretended are to be found in that book, certain we are it was not diſcovered by the ſpirit of charity. Beſides, it is not certain that Sacy was the author of that book; for it is much more probable that it was compoſed by Nicolas Fontaine his fellow priſoner.

To Sacy's confinement the public are indebted for a French tranſlation of the bible. This work was finiſhed in 1668, the evening before the feaſt of All Saints; on which day he recovered his liberty, after an impriſonment of two years and a half. He was preſented to the king and the miniſter; and all the favour he aſked from them was, that they would ſend ſeveral times a year to examine the ſtate of the priſoners in the Baſtile. Le Maiſtre continued at Paris till 1675, when he retired to Port Royal, which he was obliged to leave in 1679. He went to ſettle at Pompone, where he died January 4th 1684, at the age of 71. From him we have, 1. *La Traduction de la Bible*, with explanations of the ſpiritual and literal meaning taken from the fathers, the greater part of which was done by du Foſſé, Huré, and Tourneux. This is the beſt French tranſlation which has yet appeared, and the moſt eſteemed edition is that of Paris, in 32 volumes 8vo, 1682 and following years. The author tranſlated the New Teſtament three times, becauſe the firſt time the ſtyle of it appeared too much laboured and too refined, and the ſecond too ſimple. A counterfeit of the edition in 32 vols. 8vo, was publiſhed at Bruſſels in 40 vols. 12mo. The beſt editions of this verſion have been publiſhed at Bruſſels, 1700, in 3 vols. 4to; at Amſterdam, under the name of *Paris*, 1711, 8 vols. in 12mo; at Paris, 1713, in 2 vols. 4to; and in 1715, with notes and a concordance, 4 vols. folio. 2. *Une Traduction des Pſeaumes ſelon l'Hebreu & la Vulgate*, in 12mo. 3. *Une Verſion des Homelies de St. Chryſoſtome ſur St. Matthieu*, in 3 vols. 8vo. 4. *La Traduction de l'Imitation de Jeſus Chriſt (ſous le nom de Beuil, Prieur de Saint-Val)*, Paris, 1603, 8vo. 5. *Celle de Phedre*, 12mo, *(ſous le nom de Saint Aubin)*. 6. *De trois Comédies de Terence*, in 12mo. 7. *Des Lettres de Bongars (ſous le nom de Brianville)*. 8. *Du Poeme de St. Proſper ſur les Ingrates*, in 12mo. *en vers & en proſe*. 9. *Les Enluminures de l'Almanach des Jéſuites*, 1654, 12mo. reprinted in 1733. In 1653 there appeared a print repreſenting the overthrow of Janſeniſm anathematiſed by the two powers, and the confuſion of the diſciples of the biſhop of Ypres, who are going to ſeek refuge with the Calviniſts. The monks of Port Royal were greatly provoked at this print, and Sacy thought that he would lower its reputation by means of his *Enluminures*, which Racine has ridiculed in one of his letters. It is indeed very ſtrange that men of taſte and piety ſhould write ſatires to the injury of one another. 10. *Heures de Port-Royal*, in 12mo. 11. *Lettres de Pieté*, Paris, 1690, 2 vols. 8vo.

MAITLAND (Sir Richard), a Scottiſh poet and eminent public character, who flouriſhed during the greateſt part of the 16th century. The ancient name of the family was *Mautalant*; and the firſt who diſtinguiſhed the houſe was an old Sir Richard, famous for his valour, who lived ſome time ſubſequent to the middle of the 13th century. He was then baron or laird of Thirlſtane in Haddingtonſhire. In 1346 the family muſt have been eminent; for in that year John Maitland of Thirlſtane married Agnes daughter of Patrick earl of March. On the 28th January 1432, William Maitland of Thirlſtane obtained from Archibald duke of Touraine and earl of Douglas a grant of the lands of Blyth and others.—William, the father of our poet, and who (while his father John Maitland of Thirlſtane was yet alive) firſt had the title of Lethington, married Martha daughter of George lord Seaton, and was killed at Flodden in 1513.

Sir Richard was born in 1496; was educated at St. Andrew's, and went to France to ſtudy the laws. Upon his return, ſays Mackenzie, he became a favourite of James V. and in the books of ſederunt is marked an extraordinary lord of ſeſſion in 1553. By a letter of James VI. it appears that Sir Richard had ſerved his grandfir, goodfir, goodam, his mother, and himſelf, faithfully in many public offices. He unhappily became blind before 1561, or his 65th year: but, notwithſtanding, he was made a ſenator of the college of juſtice, by the title of lord Lethington, 12th Nov. 1561; and on the 20th Dec. 1562, one of the council and lord privy-ſeal; which laſt office he held till 1567, when he reſigned it in favour of John his ſecond ſon. Sir Richard continued a lord of ſeſſion during all the troubleſome times of the regents in the minority of James VI. till 1584, when he reſigned; and died 20th of March 1586. By Mary his wife, daughter of Thomas Cranſton of Corſly, he had ſeven children, of whom three were ſons: 1. William, the famous ſecretary; 2. Sir John, afterwards lord Thirlſtane and chancellor; and, 3. Thomas, who is the prolocutor with Buchanan in his treatiſe *De Jure Regni*.—Sir Richard is never mentioned by writers but with reſpect, as a man of great talents and virtue. Knox indeed blames him for taking a ſum of money to ſuffer cardinal Beaton to eſcape when impriſoned at Seaton. But Knox (Mr. Pinkerton obſerves) was too vehement, and often blamed without cauſe.—One poem of Sir Richard's was publiſhed in the Evergreen; but no more of his works appeared till they were inſerted in the Collection in 2 vols. publiſhed ſome years ago by Mr. Pinkerton. Beſides poems, he wrote a MS. (formerly, as Dr. Mackenzie ſhows, in the earl of Winton's library), the title

of which was, "The Chronicle and Hiſtorie of the Houſe and Surname of Seaton, unto the moneth of November, in the yeir of God An Thuſand Five Hundereth Fifty Aught yeirs. Collectit, writ, and ſet furth, be Sir Richard de Maitland of Leithingtoun, knicht, doughter-ſone of the ſaid hous." Mackenzie gives an account of it. Mr. Forbes, in the preface to his Deciſions, tells us there is ſtill a MS. of the deciſions from 15th December 1550 till 30th July 1565 by our author, folio, in the advocates' library.

MAITLAND (John), lord Thirlſtane, chancellor of Scotland, was the ſecond ſon of Sir Richard. He was born in the year 1537, educated in Scotland, and was afterwards ſent to France to ſtudy the law. On his return to his native country, he commenced advocate; in which profeſſion his abilities became eminently conſpicuous. In 1567 his father reſigned the privy-ſeal in his favour. This office he kept till 1570; when, for his loyalty to the queen, he loſt the ſeal, and it was given to George Buchanan. He was made a ſenator of the college of juſtice, or lord of ſeſſion, in 1581; ſecretary of ſtate in 1584; and lord high chancellor in 1586. The chancellor's power and influence created him many enemies among the Scottiſh nobility, who made ſeveral attempts to deſtroy him, but without ſucceſs. In 1589 he attended the king on his voyage to Norway, where his bride, the princeſs of Denmark, was detained by contrary wind. The marriage was immediately conſummated, and they returned with the queen to Copenhagen, where they ſpent the enſuing winter. During their reſidence in Denmark the chancellor became intimately acquainted with the celebrated Tycho Brahe. In 1590 he was created lord Maitland of Thirlſtane.—Towards the end of the year 1592 the chancellor incurred the queen's diſpleaſure for refuſing to relinquiſh his lordſhip of Muſſelburgh, which ſhe claimed as being a part of Dunfermline. He abſented himſelf for ſome time from court; but was at length reſtored to favour, and died of a lingering illneſs in the year 1595, much regretted by the king. He bears a high character both for talents and integrity among all hiſtorians. Melville, who writes the *Memoirs*, Mr. Pinkerton obſerves, was his perſonal enemy, ſo muſt not receive much credit in his cenſures of him. Beſide his Scottiſh poetry in the *Maitland Collection*, he wrote ſeveral Latin epigrams, &c. to be found in the *Delicie Poetarum Scotorum*, vol. ii. The chancellor's only ſon, John lord Thirlſtane, was firſt made viſcount and then earl of Lauderdale by James VI. 1624. The earl's ſon was John, the only duke of Lauderdale, and born 1616 at Lethington.

MAITTAIRE (MICHAEL), an eminently learned writer, was born in 1668. Dr. South, canon of Chriſt-church, made him a ſtudent of that houſe, where he took the degree of M. A. March 23, 1696. From 1695 till 1699 he was ſecond maſter of Weſtminſter ſchool; which was afterwards indebted to him for *Græcæ Linguæ Dialecti, in uſum Scholæ Weſtmonaſterienſis*, 1706, 8vo; and for the "Engliſh Grammar, applied to, and exemplified in, the Engliſh Tongue, 1712," 8vo. In 1711 he publiſhed "Remarks on Mr. Whiſton's Account of the Convocation's Proceedings with relation to himſelf, in a Letter to the right reverend Father in God George Lord Biſhop of Bath and Wells," 8vo.; alſo "An Eſſay againſt Arianiſm, and ſome other Hereſies; or a Reply to Mr. William Whiſton's Hiſtorical Preface and Appendix to his Primitive Chriſtianity revived," 8vo. In 1709 he gave the firſt ſpecimen of his great ſkill in typographical antiquities, by publiſhing *Stephanorum Hiſtoria, vitas ipſorum ac libros complectens*, 8vo; which was followed in 1717 by *Hiſtoria Typographorum aliquot Pariſienſium, vitas et libros complectens*, 8vo. In 1719, *Annales Typographici ab artis inventæ origine ad annum* MD, 4to. The ſecond volume, divided into two parts, and continued to the year 1536, was publiſhed at the Hague in 1702; introduced by a letter of John Toland, under the title of *Conjectura veriſimilis de primæ Typographiæ Inventione*. The third volume, from the ſame preſs, in two parts, continued to 1557, and (by an Appendix) to 1664, in 1725. In 1733 was publiſhed at Amſterdam what is uſually conſidered as the fourth volume, under the title of *Annales Typographici ab artis inventæ origine, ad annum* MDCLXIV, *opera Mich. Maittaire, A. M. Editio nova, auctior et emendatior, tomi primi pars poſterior*. In 1741 the work was cloſed at London, by *Annalium Typographicorum Tomus quintus et ultimus, indicem in tomos quatuor præcuntes complectens*; divided, like the two preceding volumes, into two parts. In the intermediate years, Mr. Maittaire was diligently employed on various works of value. In 1713 he publiſhed by ſubſcription *Opera et Fragmenta veterum Poëtarum*, 1713, two volumes in folio: the title of ſome copies is dated 1721. In 1714 he was the editor of a Greek Teſtament, in 2 vols. The Latin writers, which he publiſhed ſeparately, moſt of them with good indexes, came out in the following order: In 1713, *Chriſtus patiens*; *Juſtin*; *Lucretius*; *Phædrus*; *Salluſt*; *Terence*. In 1715, *Catullus*; *Tibullus*; *Propertius*; *Cornelius Nepos*; *Florus*; *Horace*; *Juvenal*; *Ovid*, 3 vols.; *Virgil*. In 1711, *Cæſar's Commentaries*; *Martial*; *Quintus Curtius*. In 1718 and 1725, *Velleius Paterculus*. In 1719, *Lucan*. In 1720, *Bonefonii Carmina*. In 1711 he publiſhed, *Batrachomyomachia Græce ad veterum exemplarium fidem recuſa: Gloſſa Græca; variantibus lectionibus, verſionibus Latinis, commentariis et indicibus illuſtrata*, 8vo. In 1722, *Miſcellanea Græcorum aliquot Scriptorum Carmina, cum verſione Latina et Notis*, 4to. In 1724 he compiled, at the requeſt of Dr. John Freind (at whoſe expence it was printed), an Index to the works of *Aretæus*, to accompany the ſplendid folio edition of that author in 1723. In 1725 he publiſhed an excellent edition of *Anacreon* in 4to, of which no more than 100 copies were printed, and the few errata in each copy corrected by his own hand. A ſecond edition of the like number was printed in 1741, with ſix copies on fine writing paper. In 1726 he publiſhed, *Petri Petiti Medici Pariſienſis in tres priores Aretæi Cappadocis Libros Commentarii, nunc primum editi*, 4to. This learned commentary was found among the papers of Grævius. From 1728 to 1733 he was employed in publiſhing *Marmorum Arundelianorum, Seldenianorum, aliorumque Academiæ Oxonienſi donatorum, una cum Commentariis et Indice, editio ſecunda*, folio; to which an Appendix was printed in 1733. *Epiſtola D. Mich. Maittaire ad D. P. Des Maizeaux, in qua Indicis in Annales Typographicos Methodus explicatur*, &c. is printed in "The Preſent State of the Republic of letters," Auguſt 1733, p. 142. The life of Robert Stephens in Latin, reviſed and corrected by the author, with a new and complete liſt of his works, is prefixed to the improved edition of R. Stephens's Theſaurus, 4 vols. in folio, in 1734. In 1736 appeared *Antiquæ Inſcriptiones duæ*, folio; being a commentary on two large copper tables diſcovered near Heraclea, in the Bay of Tarentum. In 1738 were printed at the Hague *Græcæ Linguæ Dialecti in Scholæ Regiæ Weſtmonaſterienſis uſum recogniti opera Mich. Maittaire*. In 1739 he addreſſed to the empreſs of Ruſſia a ſmall Latin poem, under the title of *Carmen Epinicium Auguſtiſſimæ Ruſſorum Imperatrici ſacrum*. His name not having been printed in the title-page, it is not ſo generally known that he was the editor of Plutarch's *Apophthegmata*, 1741, 4to. The laſt publication of Mr. Maittaire was a volume of poems in 4to, 1742, under the title of *Senilia, ſive Poetica aliquot in argumentis varii generis tentamina*. Mr. Maittaire died in 1747, aged 79. His valuable library, which had been 50 years collecting, was ſold by auction by Meſſrs. Cock and Langford, at the cloſe of the ſame year, and the beginning of the following, taking up in all 44

nights. Mr. Maittaire, it may be added, was patroniſed by the firſt earl of Oxford, both before and after that gentleman's elevation to the peerage, and continued a favourite with his ſon the ſecond earl. He was alſo Latin tutor to Mr. Stanhope, the earl of Cheſterfield's favourite ſon.

MAIZE, or INDIAN *Corn*. See ZEA.

MAKI. See LEMUR.

MALABAR, the name given to a great part of the weſt coaſt of the peninſula, on this ſide of the Ganges, from the kingdom of Baglala to Cape Comorin, or only from the north extremity of the kingdom of Canara as far as Cape Comorin. It is bounded by the mountains of Balligate on the eaſt; by Decan on the north; and on the weſt and ſouth is waſhed by the Indian ſea.

MALACA (anc. geog.), ſurnamed *Fœderatorum* by Pliny; a maritime town of Bætica: A Carthaginian colony according to Strabo; ſo called from *Malach*, ſignifying "ſalt;" a place noted for pickled or ſalted meat. Now *Malaga*, a port town of Grenada in Spain. W. lon. 4. 45. N. lat. 36. 40.

MALACCA, the moſt ſoutherly part of the great peninſula beyond the Ganges, is about 600 miles in length, and contains a kingdom of the ſame name. It is bounded by the kingdom of Siam on the north; by the bay of Siam and the Indian ocean on the eaſt; and by the ſtraits of Malacca, which ſeparate it from the iſland of Sumatra, on the ſouth-weſt. This country is more to the ſouth than any other in the Eaſt Indies; and comprehends the towns and kingdoms of Patan, Pahan, Igohor, Pera, Queda, Borkelon, Ligor; and to the north the town and kingdom of Tanaſſery, where the Portugueſe formerly carried on a great trade. This laſt either does or did belong to the king of Siam. The people of Malacca are in general ſubject to the Dutch, who poſſeſs all the ſtrong places on the coaſt, and compel them to trade on their own terms, excluding all other nations of Europe from having any commerce with the natives.

The Malays are governed by feudal laws. A chief, who has the title of *king* or *ſultan*, iſſues his commands to his great vaſſals, who have other vaſſals in ſubjection to them in a ſimilar manner. A ſmall part of the nation live independent, under the title of *oranicai* or *noble*, and ſell their ſervices to thoſe who pay them beſt; while the body of the nation is compoſed of ſlaves, and live in perpetual ſervitude.

The generality of theſe people are reſtleſs, fond of navigation, war, plunder, emigrations, colonies, deſperate enterpriſes, adventures, and gallantry. They talk inceſſantly of their honour and their bravery; whilſt they are univerſally conſidered by thoſe with whom they have intercourſe, as the moſt treacherous, ferocious people on earth. This ferocity, which the Malays qualify under the name of *courage*, is ſo well known to the European companies who have ſettlements in the Indies, that they have univerſally agreed in prohibiting the captains of their ſhips who may put into the Malay iſlands, from taking on board any ſeamen from that nation, except in the greateſt diſtreſs, and then on no account to exceed two or three. It is not in the leaſt uncommon for an handful of theſe horrid ſavages ſuddenly to embark, attack a veſſel by ſurpriſe, maſſacre the people, and make themſelves maſter of her. Malay batteaux, with 24 or 30 men, have been known to board European ſhips of 30 or 40 guns, in order to take poſſeſſion of them, and murder with their poniards great part of the crew. Thoſe who are not ſlaves go always armed: they would think themſelves diſgraced if they went abroad without their poniards, which they call *crit*. As their lives are a perpetual round of agitation and tumult, they cannot endure the long flowing garments in uſe among the other Aſiatics. Their habits are exactly adapted to their ſhapes, and loaded with a multitude of buttons, which faſten them cloſe to their bodies.

The country poſſeſſed by the Malays is in general very fertile. It abounds with odoriferous woods, ſuch as the aloes, the ſandal, and the caſſia. The ground is covered with flowers of the greateſt fragrance, of which there is a perpetual ſucceſſion throughout the year. There are abundance of mines of the moſt precious metals, ſaid to be richer even than thoſe of Brazil or Peru, and in ſome places are mines of diamonds. The ſea alſo abounds with excellent fiſh, together with ambergris, pearls, and thoſe delicate bird-neſts ſo much in requeſt in China, formed in the rocks with the ſpawn of fiſhes and the foam of the ſea, by a ſpecies of ſmall-ſized ſwallow peculiar to thoſe ſeas. Theſe are of ſuch an exquiſite flavour, that the Chineſe for a long time purchaſed them for their weight in gold, and ſtill buy them at an exceſſive price. See BIRDS-*Neſt*.

Notwithſtanding all this plenty, however, the Malays are miſerable. The culture of the lands, abandoned to ſlaves, is fallen into contempt. Theſe wretched labourers, dragged inceſſantly from their ruſtic employments by their reſtleſs maſters, who delight in war and maritime enterpriſes, have never time or reſolution to give the neceſſary attention to the labouring of their grounds; of conſequence the lands for the moſt part are uncultivated, and produce no kind of grain for the ſubſiſtence of the inhabitants. The ſago tree indeed ſupplies in part the defect of grain. It is a ſpecies of the palm-tree, which grows naturally in the woods to the height of about 20 or 30 feet; its circumference being ſometimes from five to ſix. Its ligneous bark is about an inch in thickneſs, and covers a multitude of long fibres, which being interwoven one with another envelop a maſs of a gummy kind of meal. As ſoon as this tree is ripe, a whitiſh duſt, which tranſpires through the pores of the leaves, and adheres to their extremities, indicates that the trees are in a ſtate of maturity. The Malays then cut them down near the root, divide them into ſeveral ſections, which they ſplit into quarters: they then ſcoop out the maſs of mealy ſubſtance, which is enveloped by and adheres to the fibres; they dilute it in pure water, and then paſs it through a ſtraining bag of fine cloth, in order to ſeparate it from the fibres. When this paſte has loſt part of its moiſture by evaporation, the Malays throw it into a kind of earthen veſſel of different ſhapes, where they allow it to dry and harden. Their paſte is wholeſome nouriſhing food, and preſerves for many years.

MALACCA, the capital of the country of the ſame name, is ſituated in a flat country cloſe to the ſea. The walls and fortifications are founded on a ſolid rock, and are carried up to a great height; the lower part of them is waſhed by the ſea at every tide, and on the land-ſide is a wide canal or ditch, cut from the ſea to the river, which makes it an iſland. In 1641 it was taken from the Portugueſe by the Dutch, ſince which time it has continued in their poſſeſſion. In this city there are a great many broad ſtreets; but they are very badly paved. The houſes are tolerably well built, and ſome of them have gardens behind or on one ſide. The inhabitants conſiſt of a few Dutch, many Malayans, Moors, Chineſe, and other Indians, who are kept in awe by a fortreſs, which is ſeparated from the city by a river, and by good walls and baſtions, as well as by ſtrong gates, and a draw-bridge that is on the eaſtern ſide. The city is well ſituated for trade and navigation. E. lon. 102. 2. N. lat. 2. 12.

MALACHI, or the prophecy of MALACHI, a canonical book of the Old Teſtament, and the laſt of the 12 leſſer prophets. Malachi propheſied about 300 years before Chriſt, reproving the Jews for their wickedneſs after their return from Babylon, charging them with rebellion, ſacrilege, adultery, profaneneſs, and infidelity; and condemning the prieſts for being ſcandalouſly careleſs in their miniſtry: at the ſame time not forgetting to encourage the pious few who in that corrupt age maintained their integrity. This prophet diſtinctly points at the Meſſiah, who was ſuddenly to come to his temple, and

to be introduced by Elijah the prophet, that is, by John the Baptiſt, who came in the ſpirit and power of Elias, or Elijah.

MALACIA, in medicine, is a ſuppoſed languiſhing diſorder incident to pregnant women, in which they long ſometimes for one kind of food and ſometimes for another, and eat it with extraordinary greedineſs.

MALACOPTERYGEOUS, among ichthyologiſts, an appellation given to ſuch fiſhes as have the rays of their fins bony, but not pointed or ſharp at the extremities like thoſe of ancanthopterygeous fiſhes.

MALACOSTOMOUS FISHES, thoſe deſtitute of teeth in the jaws, called in Engliſh *leather-mouthed*, as the tench, carp, bream, &c.

MALAGA, an ancient, rich, and ſtrong town of Spain, in the kingdom of Grenada, with two caſtles, a biſhop's ſee, and a good harbour, which renders it a place of conſiderable commerce. The advantage of this commerce, according to M. Bourgoanne, is entirely in favour of Spain, but almoſt without any to its navigation: of 842 veſſels which arrived at this port in 1782, from almoſt every commercial nation, ſcarcely 100 were Spaniſh, even reckoning the ſhips of war which anchored there. The Engliſh, who are in poſſeſſion of the greateſt part of the trade, carry thither woollens and great quantities of ſmall ware; the Dutch carry ſpice, cutlery ware, laces, ribbons, thread, &c. Theſe nations, thoſe of the north, and Italy, export to the amount of two millions and a half of piaſtres in wines, fruits, ſumach, pickled anchovies, oil, &c. and all they carry thither amounts only to about a million and a half. The balance would be ſtill more advantageous for Malaga if the ſilk and wool of the kingdom of Grenada were exported from this port; but theſe are employed in the country where they are produced. The ſtreets of Malaga are narrow, but there are ſome good ſquares; and the cathedral church is a ſuperb building, ſaid to be as large as St. Paul's. The only other building of note is the biſhop's palace; which is a large edifice, but looks inſignificant from its being ſituated near the other. Its prelate enjoys a revenue of 16,000l. ſterling. Malaga is ſeated on the Mediterranean ſea, at the foot of a craggy mountain. E. lon. 4. 56. N. lat. 6. 51.

MALAGRIDA (GABRIEL), an Italian Jeſuit, was choſen by the general of the order to conduct miſſions into Portugal. To great eaſe and fluency of ſpeech, for which he was indebted to enthuſiaſm, he added the moſt ardent zeal for the intereſt of the ſociety to which he belonged. He ſoon became the faſhionable director; and every one, ſmall or great, placed himſelf under his conduct. He was reſpected as a ſaint, and conſulted as an oracle. When a conſpiracy was formed by the duke d'Aveiro againſt the king of Portugal, it is aſſerted by the enemies of the ſociety, that three Jeſuits, among whom was Malagrida, were conſulted concerning the meaſure. They add (what is very improbable), that it was decided by theſe caſuiſts, that it was only a venial crime to kill a king who perſecuted the ſaints. At that time the king of Portugal, ſpurred on by a miniſter who had no favour for the Jeſuits, openly declared himſelf againſt them, and ſoon after baniſhed them from his kingdom. Only three of them were apprehended, Malagrida, Alexander, and Mathos, who were accuſed of having approved his murder. But either the trial could not be proceeded in without the conſent of the pope, which was not granted, or no proof could be got ſufficient to condemn Malagrida; and therefore the king was obliged to deliver him to the Inquiſition, as being ſuſpected of having formerly advanced ſome raſh propoſitions which bordered on hereſy. Two publications which he acknowledged, and which give the fulleſt indications of complete inſanity, were the foundation of theſe ſuſpicions. The one was written in Latin, and entitled *Tractatus de vita et imperio Antichriſti*; the other in Portugueſe, under the title of the "Life of St. Anne, compoſed with the aſſiſtance of the bleſſed Virgin Mary and her moſt holy Son." They are full of extravagance and abſurdity.—This enthuſiaſt pretended to have the gift of miracles. He confeſſed before the judges of the Inquiſition, that God himſelf had declared him his ambaſſador, apoſtle, and prophet; that he was united to God by a perpetual union; and that the Virgin Mary, with the conſent of Jeſus Chriſt and of the whole Trinity, had declared him to be her ſon. In ſhort, he confeſſed, as is pretended, that he felt in the priſon, at the age of 72, ſome emotions very uncommon at that period of life, which at firſt gave him great uneaſineſs, but that it had been revealed to him by God that theſe emotions were only the natural effect of an involuntary agitation wherein there was the ſame merit as in prayer. It was for ſuch extravagancies that this unfortunate wretch was condemned by the Inquiſition: but his death was haſtened by a viſion which he eagerly revealed. Upon occaſion of the death of the marquis de Tancourt, commander in chief of the province of Eſtremadura, mournful and continued diſcharges were made in honour of him by the caſtle of Liſbon, and by all the forts on the banks of the Tagus. Theſe being heard by Malagrida in his dungeon, he inſtantly ſuppoſed, from their extraordinary nature, and from their happening during the night, that the king was dead. The next day he demanded an audience from the members of the Inquiſition: which being granted, he told them that he had been ordered by God to ſhow the miniſter of the holy office that he was not a hypocrite, as was pretended; for the king's death had been revealed to him, and he had ſeen in a viſion the torments to which his majeſty was condemned for having perſecuted the religious of his order. This was ſufficient to accelerate his puniſhment: he was burnt on the 21ſt of September 1761; not as the accomplice of a parricide, but as a falſe prophet, for which he deſerved to be confined in Bedlam rather than tied to the ſtake. The acts of impiety whereof he was accuſed were nothing more than extravagancies proceeding from a miſtaken devotion and an overheated brain.

MALDEN, a town of Eſſex, 37 miles from London, ſituated on an eminence at the conflux of the Chelmer and Pant or Blackwater, where they enter the ſea. It was the firſt Roman colony in Britain, and the ſeat of ſome of the old Britiſh kings. It was beſieged, plundered, and burnt by queen Boadicea; but the Romans repaired it. It was again ruined by the Danes, but rebuilt by the Saxons. It is a populous corporation, governed by two bailiffs, ſix aldermen, 18 headboroughs or capital burgeſſes, a ſteward, recorder, and above 400 commonalty and burgeſſes, who have all a vote for its members of parliament. It has a convenient haven on an arm of the ſea for veſſels of 400 tons; and drives a good trade in coal, iron, corn, and deals. It formerly had three, now only two, pariſh-churches. Here is a large library for the uſe of the miniſter and the clergy of the neighbouring pariſhes, who generallly reſide here on account of the unwholeſomeneſs of the air where their churches are. Here is a grammar-ſchool, a ſmall church, ſchool, and a workhouſe where the poor weave ſack-cloth. The cuſtom of Borough Engliſh is kept up here. It has a market on Saturdays, and a fair on the 18th of September. A little beyond it begins Blackwater bay, famous for the Walfleet oyſters. The channel called Malden-water is navigable to the town. King Edward the elder (of the Saxon race) reſided here whilſt he built Witham and Hertford caſtles. On the weſt ſide of the town are the remains of a camp.

MALALEUCA, the CAYPUTI TREE: a genus of the polyandria order, belonging to the polyadelphia claſs of plants. There is but one ſpecies, viz. the leucodendrum, a native of the Eaſt Indies and South-Sea iſlands. Mr. Forſter relates that leucodendra were found in the iſland of New Caledonia:

they were black at the root; but had a bark perfectly white and loose, with long narrow leaves like our willows. The leaves are extremely fragrant and aromatic; and Rumphius tells us, that from them the natives of the Moluccas make the oil called *cayputi*. This oil is commended as a nervous medicine, and as being useful in some cardialgies. The dose is four or five drops in some convenient liquor.

MALDIVIA ISLANDS, a cluster of small islands in the Indian ocean, 500 miles south-west of the continent of the island of Ceylon. They are about 1000 in number, and are very small; extending from the second degree of south latitude to the seventh degree of north latitude. They are generally black low lands, surrounded by rocks and sands. The natives are of the same complexion with the Arabians, profess the Mahometan religion, and are subject to one sovereign. The channels between the islands are very narrow, and some of them are fordable. They produce neither rice, corn, nor herbage; but the natives live upon cocoa-nuts and other fruits, roots and fish. They have little or nothing to barter with, unless the shells called *cowrys*, or *blackmoor's teeth*, with which they abound; and these serve instead of small coin in many parts of India.

MALDONAT (JOHN), a Spanish Jesuit born in 1534, was accused of heresy, and of procuring a fraudulent will in seducing the president de St. André at Paris to bequeath his estate to the Jesuits. Peter Gondi acquitted him of the first charge, and the Parliament of Paris of the other. He retired after these troubles to Bourges, but went to Rome by order of pope Gregory XIII. to take care of the publication of the Septuagint; and there, finishing his commentary on the gospels in 1582, he died in the beginning of the following year. He wrote, besides, Commentaries on Jeremiah, Baruch, Ezekiel, and Daniel; a treatise on the sacraments, on grace, on original sin; and several other pieces printed at Paris in 1677, in folio. His style is clear, lively, and easy. He does not servilely follow the scholastic divines; but is pretty free, and sometimes singular, in his sentiments.

MALE, among zoologists, that sex of animals which has the parts of generation situated externally. See SEX and GENERATION. The term *male* has also, from some similitude to that sex in animals, been applied to several inanimate things; thus we say, a male flower, a male screw, &c. See MAS *Planta*, MASCULUS *Flos*, and SCREW; also FEMALE and FLOS.

MALEBRANCHE (NICHOLAS), an eminent French metaphysician, the son of Nicholas Malebranche, secretary to the French king, was born in 1638, and admitted into the congregation of the oratory in 1660. He at first applied himself to the study of languages and history; but afterwards meeting with Des Cartes's *Treatise of Man*, he gave himself up entirely to the study of philosophy. In 1699 he was admitted an honorary member of the Royal Academy of Sciences at Paris. Notwithstanding he was of a delicate constitution, he enjoyed a pretty good state of health till his death, which happened in 1715, at the age of 77. Father Malebranche read little, but thought a great deal. He despised that kind of philosophy which consists only in knowing the opinions of other men, since a person may know the history of other men's thoughts without thinking himself. He could never read ten verses together without disgust. He meditated with his windows shut, in order to keep out the light, which he found to be a disturbance to him. His conversation turned upon the same subjects as his books; but was mixed with so much modesty and deference to the judgment of others, that it was extremely and universally desired. His books are famous; particularly his *Recherche de la Verité*, i. e. "Search after truth:" his design in which is, to point to us the errors in which we are daily led by our senses, imagination, and passions; and to prescribe a method for discovering the truth, which he does, by starting the notion of seeing all things in God. And hence he is led to think and speak merely of human knowledge, either as it lies in written books, or in the book of nature, compared with that light which displays itself from the ideal world; and by attending to which, with pure and defecate minds, he supposes knowledge to be most easily had. The fineness of this author's sentiments, together with his fine manner of expressing them, made every body admire his genius and abilities; but he has generally passed for a visionary philosopher. Mr. Locke, in his examination of Malebranche's opinion of seeing all things in God, styles him "an acute and ingenious author;" and tells us, that there are "a great many very fine thoughts, judicious reasonings, and uncommon reflections, in his *Recherche*." But Mr. Locke, in that piece, endeavours to refute the chief principles of his system. He wrote many other pieces besides that we have mentioned, all tending some way or other to confirm his main system, established in the *Recherche*, and to clear it from the objections which were brought against it, or from the consequences which were deduced from it: and if he has not attained what he aimed at in these several productions, he has certainly shown great abilities and a vast force of genius.

MALHERBE (FRANCIS DE), the best French poet of his time, was born at Caen about the year 1556, of a noble and ancient family. He quitted Normandy at 17 years of age; and went into Provence, where he attached himself to the family of Henry Angouleme, the natural son of king Henry II. and was in the service of that prince till he was killed by Altoviti in 1586. At length cardinal de Perron, being informed of his merit and abilities, introduced him to Henry IV. who took him into his service. After that monarch's death, queen Mary de Medicis settled a pension of 500 crowns upon our poet, who died at Paris in 1628. The best and most complete edition of his poetical works is that of 1666, with Menage's remarks. Malherbe so far excelled all the French poets who preceded him, that Boileau considers him as the father of French poetry: but he composed with great difficulty, and put his mind on the rack in correcting what he wrote. He was a man of a singular humour, blunt in his behaviour, and without religion. When the poor used to promise him, that they would pray to God for him, he answered them, that "he did not believe they could have any great interest in heaven, since they were left in such a bad condition upon earth; and that he should be better pleased if the duke de Luyne, or some other favourite, had made him the same promise." He would often say that "the religion of gentlemen was that of their prince." During his last sickness he had much ado to resolve to confess to a priest; for which he gave this facetious reason, that "he never used to confess but at Easter." And some few moments before his death, when he had been in a lethargy two hours, he awaked on a sudden to reprove his landlady, who waited on him, for using a word that was not good French; saying to his confessor, who reprimanded him for it, that "he could not help it, and he would defend the purity of the French language to the last moment of his life."

MALICE, in ethics and law, is a formed design of doing mischief to another; it differs from hatred. In murder, it is malice makes the crime; and if a man, having a malicious intent to kill another, in the execution of his malice kills a person not intended, the malice shall be connected to his person, and he shall be adjudged a murderer. The words *ex malitia præcogitata* are necessary to an indictment of murder, &c. And this *malitia præcogitata*, or *malice prepense*, may be either express or implied in law. Express malice is, when one, with a sedate, deliberate mind, and formed design, kills another; which formed design is evidenced by external circumstances discovering that intention; as lying in wait, antecedent menaces, former grudges, and concerted schemes to do him some bodily

harm. Beſides, where no malice is expreſſed, the law will imply it; as where a man wilfully poiſons another, in ſuch a deliberate act the law preſumes malice, though no particular enmity can be proved. And if a man kills another ſuddenly, without any, or without a conſiderable provocation, the law implies malice; for no perſon, unleſs of an abandoned heart, would be guilty of ſuch an act upon a ſlight or no apparent cauſe.

MALIGNANT, among phyſicians, a term applied to diſeaſes of a very dangerous nature, and generally infectious; ſuch are the dyſentery, hoſpital-fever, &c. in their worſt ſtages. Malignity, among phyſicians, ſignifies much the ſame with contagion. See CONTAGION.

MALL, SEA-MALL, or *Sea-mew*, in ornithology. See LARUS.

MALLARD, in ornithology. See ANAS.

MALLEABLE, a property of metals whereby they are capable of being extended under the hammer.

MALLENDERS. See FARRIERY.

MALLEOLI, in the ancient art of war, were bundles of combuſtible materials, ſet on fire to give light in the night, or to annoy the enemy: when they were employed for the latter purpoſe they were ſhot out of a bow, or fixed to a javelin, and thus thrown into the enemies' engines, ſhips, &c. in order to burn them. Pitch was always a principal ingredient in the compoſition. The malleoli had alſo the name of *pyroboli*.

MALLET or MALLOCH (DAVID), an Engliſh poet, but a Scotſman by birth, was born in that country about 1700. By the penury of his parents, he was compelled to be janitor of the high ſchool at Edinburgh; but he ſurmounted the diſadvantages of his birth and fortune; for, when the duke of Montroſe applied to the college of Edinburgh for a tutor to educate his ſons, Malloch was recommended. When his pupils went abroad, they were entruſted to his care; and having conducted them through their travels, he returned with them to London. Here, reſiding in their family, he naturally gained admiſſion to perſons of high rank and character, and began to give ſpecimens of his poetical talents. In 1733 he publiſhed a poem on Verbal Criticiſm, on purpoſe to make his court to Pope. In 1740 he wrote a Life of lord Bacon, which was then prefixed to an edition of his works; but with ſo much more knowledge of hiſtory than of ſcience, that, when he afterwards undertook the Life of Marlborough, ſome were apprehenſive leſt he ſhould forget that Marlborough was a general, as he had forgotten that Bacon was a philoſopher. The old ducheſs of Marlborough aſſigned in her will this taſk to Glover and Mallet, with a reward of 1000l. and a prohibition to inſert any verſes. Glover is ſuppoſed to have rejected the legacy with diſdain, ſo that the work devolved upon Mallet; who had alſo a penſion from the late duke of Marlborough to promote his induſtry, and who was continually talking of the diſcoveries he made, but left not when he died any hiſtorical labours behind him. When the prince of Wales was driven from the palace, and kept a ſeparate court by way of oppoſition, to increaſe his popularity by patronizing literature, he made Mallet his under-ſecretary, with a ſalary of 200l. a year.—Thomſon likewiſe had a penſion; and they were aſſociated in the compoſition of the Maſque of Alfred, which in its original ſtate was played at Cliefden in 1740. It was afterwards almoſt wholly changed by Mallet, and brought upon the ſtage of Drury-lane in 1751, but with no great ſucceſs. He had before publiſhed two tragedies: Eurydice, acted at Drury-lane in 1731; and Muſtapha, acted at the ſame theatre in 1739. It was dedicated to the prince his maſter, and was well received, but never was revived. His next work was Amyntor and Theodora (1747), a long ſtory in blank verſe; in which there is copiouſneſs and elegance of language, vigour of ſentiment, and imagery well adapted to take poſſeſſion of the fancy. In 1753 his maſque of Britannia was acted at Drury-lane, and his tragedy of Elvira in 1763; in which year he was appointed keeper of the book of entries for ſhips in the port of London. In the beginning of the laſt war, when the nation was exaſperated by ill ſucceſs, he was employed to turn the public vengeance upon Byng, and wrote a letter of accuſation under the character of a Plain Man. The paper was with great induſtry circulated and diſperſed; and he for his ſeaſonable intervention had a conſiderable penſion beſtowed upon him, which he retained to his death. Towards the end of his life he went with his wife to France; but after a while, finding his health declining, he returned alone to England, and died in April 1765. He was twice married, and by his firſt wife had ſeveral children. One daughter, who married an Italian of rank named Cileſia, wrote a tragedy called Almida, which was acted at Drury-lane. His ſecond wife was the daughter of a nobleman's ſteward, who had a conſiderable fortune, which ſhe took care to retain in her own hands. His ſtature was diminutive, but he was regularly formed; his appearance, till he grew corpulent, was agreeable, and he ſuffered it to want no recommendation that dreſs could give it. His converſation was elegant and eaſy.

MALLET (Edme) was born at Melun in 1713, and enjoyed a curacy in the neighbourhood of his native place till 1751, when he went to Paris to be profeſſor of theology in the college of Navarre, of which he was admitted a doctor. Boyer, the late biſhop of Mirepoix, was at firſt much prejudiced againſt him; but being afterwards undeceived, he conferred upon him the ſee of Verdun as a reward for his doctrine and morals. Janſeniſm had been imputed to him by his enemies with this prelate; and the Gazette which went by the name of *Eccleſiaſtical*, accuſed him of impiety. Either of theſe imputations was equally undeſerved by the Abbé Mallet: as a Chriſtian, he was grieved at the diſputes of the French Church; and as a philoſopher, he was aſtoniſhed that the government had not from the very beginning of thoſe diſſenſions impoſed ſilence on both parties. He died at Paris in 1755, at the age of 42. The principal of his works are, 1. *Principes pour la lecture des Poetes*, 1745, 12mo. 2 vols. 2. *Eſſai ſur l'Etude des Belles-Lettres*, 1747, 12mo. 3. *Eſſai ſur les bienſeances oratoires*, 1753, 12mo. 4. *Principes pour la lecture des Orateurs*, 1753, 12mo. 3 vols. 5. *Hiſtoire des Guerres civiles de France ſous les regnes de Francois II. Charles IX. Henri III. & Henri IV.* tranſlated from the Italian of d'Avila. In Mallet's works on the Poets, Orators, and the Belles-Lettres, his object is no more than to explain with accuracy and preciſion the rules of the great maſters, and to ſupport them by examples from authors ancient and modern. The ſtyle of his different writings, to which his mind bore a great reſemblance, was neat, eaſy, and unaffected. But what muſt render his memory eſtimable, was his attachment to his friends, his candour, moderation, gentleneſs, and modeſty. He was employed to write the theological and belles-lettres articles in the *Encyclopédie*; and whatever he wrote in that dictionary was in general well compoſed. Abbé Mallet was preparing two important works when the world was deprived of him by death. The firſt was *Une Hiſtoire generale de nos Guerres depuis le commencement de la Monarchie*; the ſecond, *Une Hiſtoire du Concile de Trente*, which he intended to ſet in oppoſition to that of Father Paul tranſlated by Father le Courayer.

MALLET, a large kind of hammer made of wood; much uſed by artificers who work with a chiſel, as ſculptors, maſons, and ſtone-cutters, whoſe mallet is ordinarily round; and by carpenters, joiners, &c. who uſe it ſquare. There are ſeveral ſorts of mallets uſed for different purpoſes on ſhip-board. The calking-mallet is chiefly employed to drive the oakum into the

ſeams of a ſhip, where the edges of the planks are joined to each other in the ſides, deck, or bottom. The head of this mallet is long and cylindrical, being hooped with iron to prevent it from ſplitting in the exerciſe of calking. There is alſo the ſerving mallet, uſed in ſerving the rigging, by binding the ſpun-yarn more firmly about it than could poſſibly be done by hand, which is performed in the following manner: The ſpun-yarn being previouſly rolled up in a large ball or clue, two or three turns of it are paſſed about the rope, and about the body of the mallet, which for this purpoſe is furniſhed with a round channel in its ſurface, that conforms to the convexity of the rope intended to be ſerved. The turns of the ſpun-yarn being ſtrained round the mallet, ſo as to confine it firmly to the rope, which is extended above the deck, one man paſſes the ball continually about the rope, whilſt the other, at the ſame time, winds on the ſpun-yarn by means of the mallet, whoſe handle acting as a lever ſtrains every turn about the rope as firm as poſſible.

MALLEVILLE (Claud de), a French poet, born at Paris, was one of the firſt members of the French academy, and gained a prize from Voiture and other ingenious men. He became ſecretary to M. de Baſſompierre, to whom he performed important ſervices while he was in priſon; and with the rewards he received for them he purchaſed the place of ſecretary to the king. He was likewiſe ſecretary to the French academy, and died in 1647. He wrote ſonnets, ſtanzas, elegies, epigrams, ſongs, madrigals, and a paraphraſe on ſome of the Pſalms. His ſonnets are moſt eſteemed.

MALLICOLLO, one of the new Hebrides iſlands in the South-ſea, and the moſt conſiderable of them all next to *Eſpiritu Santo*. It is 18 leagues long from ſouth-eaſt to north-weſt; its greateſt breadth, which is at the ſouth-eaſt end, is eight leagues; the north-weſt end is two-thirds its breadth, and narrower in the middle one-third. This contraction is occaſioned by a wide and deep bay on the ſouth-weſt ſide. It appears to be very fertile, and well inhabited; the land on the ſea-coaſt is rather low, and lies with a greater ſlope from the hills which are in the middle of the iſland; lat. 16 deg. 28 min. ſouth; 167 deg. 56 min. eaſt. On inquiring of the natives the name of this iſland, they were anſwered that it was Mallicollo, which has a near reſemblance to Manicollo, the name which Quiros received for it 160 years before. He did not indeed viſit the iſland, but had his intelligence from the natives.

The ſouth coaſt, which was moſt attentively examined by captain Cook, is luxuriantly clothed with wood and other vegetables, from the ſea-ſhore to the very ſummits of the hills. To the north-weſt the country is leſs woody, but more agreeably interſected by lawns, ſome of which appeared to be cultivated. The vegetable productions of this country ſeemed to be in great variety; cocoa nuts, bread-fruit, bananas, ſugar-canes, yams, eddoes, and turmeric: but captain Cook thought the fruits here not ſo good as at the Society and Friendly Iſles. Hogs, and common poultry, are their domeſtic animals; and as the frequent ſqueaking of pigs was heard in the woods, it was concluded that the former are in conſiderable numbers here. A brace of Taheitian puppies was given them with a view to ſtock the country with that ſpecies of animal: theſe they received with ſtrong ſigns of ſatisfaction. The woods appeared to be inhabited by many ſpecies of birds. Here was caught a ſhark, which meaſured nine feet in length, on which the ſhip's company feaſted with great reliſh: this ſhark, when cut open, was found to have the bony point of an arrow ſticking in its head, having been ſhot quite through the ſkull. The wound was healed ſo perfectly, that not the ſmalleſt veſtige of it appeared on the outſide: a piece of the wood ſtill remained ſticking to the bony point, as well as a few fibres with which it had been tied on; but both the wood and the fibres were ſo rotted, as to crumble into duſt at the touch. Two large reddiſh fiſh of the ſea-bream kind were likewiſe caught, on which moſt of the officers and ſome of the petty-officers dined the next day. The night following every one who had eaten of them was ſeized with violent pains in the head and bones, attended with a ſcorching heat all over the ſkin, and numbneſs in the joints; even ſuch hogs and dogs as had partaken of theſe fiſh gave ſtrong ſymptoms of being poiſoned: one hog, who had eaten of the garbage, ſwelled to a great ſize and died at night: ſeveral dogs were affected in the ſame manner; they groaned moſt piteouſly, had violent retchings, and could hardly drag their limbs along. Theſe fiſh were ſuppoſed to have been of the ſame ſort with thoſe which Quiros mentions to have produced ſimilar effects on board his ſhip, and which he calls *pargos*, which is the Spaniſh name for the ſea-bream. Perhaps theſe fiſh are not always poiſonous; but, like many ſpecies in the Weſt and Eaſt Indies, may acquire that quality by feeding on poiſonous vegetables: which concluſion is ſupported by the circumſtance of the inteſtines having been found to be more poiſonous than the reſt. The effects of this poiſon on the officers continued for near a fortnight, during which time their pains returned every night, their teeth were looſe, and their gums and palate excoriated.

The natives of Mallicollo are deſcribed as the moſt ugly, ill-proportioned people imaginable, and in every reſpect different from the other iſlanders in the South-Sea: they are of a very dark colour, and diminutive ſize; with long heads, flat faces, and monkey countenances; their hair, in general, black or brown, ſhort and curly, but not quite ſo ſoft and woolly as that of a negro. Their beards are very ſtrong, criſp, and buſhy, and generally black and ſhort. But what ſerves greatly to increaſe their natural deformity is a cuſtom which they have of wearing a belt, or cord, round their waiſt: this rope is as thick as a man's finger; and is tied ſo tight round their belly, that it would be fatal to a perſon unaccuſtomed from infancy to ſuch an unnatural ligature; for it cuts ſuch a deep notch acroſs the navel, that the belly ſeems in a manner divided, one part being above and the other below the rope. The men go quite naked, except a piece of cloth or leaf uſed as a wrapper. Moſt other nations invent ſome kind of covering from motives of ſhame; but here a roll of cloth, continually faſtened to the belt, rather diſplays than conceals, and is the oppoſite of modeſty. Beſides having the flat broad noſe and projecting cheek-bones of a negro, and a very ſhort forehead, many increaſed their natural uglineſs by painting their faces and breaſts with a black colour. Some few had a ſmall cap on the head made of matted-work. They wear bracelets of white and black ſhells, which preſs the upper arm ſo cloſely, that they ſeem to have been put on when the wearer was very young: this tends, as well as the belt, to reduce the Mallicolleſe to that ſlender ſhape which characteriſes them. The depreſſion of their foreheads is ſuppoſed to be artificial, as the heads of infants may be ſqueezed into any kind of form.

The firſt natives that were ſeen carried clubs in their hands, and waded into the water, carrying green boughs, the univerſal ſign of peace. In a day's time they ventured to come within a few yards of the ſhip's boat, which was ſent out; when they dipped their hands into the ſea, and, gathering ſome water in their palms poured it on their heads. The officers in the boat, in compliance with their example, did the ſame, with which the Indians appeared to be much pleaſed. They repeated the word *tomarr* or *tomarro*, continually; which ſeemed to be an expreſſion among them equivalent to *tayo* among the Society-Iſlands. The greater part were now armed with bows

and arrows, and a few with ſpears. At length they ventured near the ſhip, and received a few preſents of Taheitian cloth, which they eagerly accepted, and handed up their arrows in exchange, ſome of which were pointed with wood and ſome with bone, and daubed with a black gummy ſtuff which was ſuppoſed to be poiſoned; but its effects were tried on a dog without producing any dangerous ſymptoms. They continued about the ſhip, talking with great vociferation, but at the ſame time in ſuch a good-humoured manner as was very entertaining. On looking ſteadfaſtly at one of them, he began to chatter with great fluency, and "grinned horribly a ghaſtly ſmile." Some continued about the ſhip till midnight: finding, however, at length, that they were but little noticed, for the captain wanted to get rid of them, they returned on ſhore, where the ſound of ſinging and beating their drums was heard all night. Mr. Forſter ſuppoſes there may be 50,000 inhabitants on this extenſive iſland, which contains more than 600 ſquare miles. "We ought (ſays he) to figure to ourſelves this country as one extenſive foreſt: they have only begun to clear and plant a few inſulated ſpots, which are loſt in it like ſmall iſlands in the Pacific Ocean." Perhaps, if we could ever penetrate through the darkneſs which involves the hiſtory of this nation, we might find that they have arrived in the South Sea much later than the natives of the Friendly and Society Iſlands: ſo much at leaſt is certain, that the latter appear to be a race totally diſtinct from the former; their form, their language, and their manners, ſtrongly mark this difference. The natives on ſome parts of New Guinea and Papua ſeem to correſpond, in many particulars, with what has been obſerved of the Mallicolleſe. They differ likewiſe very widely from the light-coloured inhabitants of the South Sea, by keeping their bodies entirely free of punctures. Whatever theſe people ſaw they coveted: but they never repined at a refuſal. The looking-glaſſes which were given them were highly eſteemed, and they took great pleaſure in viewing themſelves; ſo that theſe ugly people ſeemed to have more conceit than the beautiful nation at O-Taheitee and the Society Iſlands. Early the next morning the natives came off to the ſhip in their canoes, and four or five of them went on board without any arms. They ſoon became familiar, and, with the greateſt eaſe, climbed up the ſhrouds to the maſt-head: when they came down, the captain took them into his cabin, and gave them medals, ribbands, nails, and pieces of red baize. They appeared the moſt intelligent of any nation that had been ſeen in the South Sea: they readily underſtood the meaning conveyed by ſigns and geſtures; and in a few minutes taught the gentlemen of the ſhip ſeveral words in their language, which appeared to be wholly diſtinct from that general language of which ſo many dialects are ſpoken at the Society Iſlands, the Marqueſas, Friendly Iſles, Eaſter Iſland, and New Zealand. Their language was not difficult to pronounce, but contained more conſonants than any of them. Mr. Forſter, and ſome of the gentlemen from the ſhip, went on ſhore, and converſed with the natives, who with great good-will ſat down on the ſtump of a tree to teach them their language. They were ſurpriſed at the readineſs of their gueſts to remember, and ſeemed to ſpend ſome time in pondering how it was poſſible to preſerve the ſound by ſuch means as pencils and paper. They were not only aſſiduous in teaching, but had curioſity enough to learn the language of the ſtrangers, which they pronounced with ſuch accuracy, as led their inſtructors to admire their extenſive faculties and quick apprehenſion. Obſerving their organs of ſpeech to be ſo flexible, they tried the moſt difficult ſounds in the European languages, and had recourſe to the compound Ruſſian *ſhtch*, all of which they pronounced at the firſt hearing without the leaſt difficulty. They preſently learned the Engliſh numerals, which they repeated rapidly on their fingers; ſo that what they wanted in perſonal beauty was amply compenſated to them in acuteneſs of underſtanding. They expreſs their admiration by hiſſing like a gooſe.

Their muſic is not remarkable either for harmony or variety, but ſeemed to be of a more lively turn than that at the Friendly Iſlands. Their behaviour to their viſitants was, in general, harmleſs, but cautious: they gave them no invitation to ſtay among them; for they ſeemed not to reliſh the proximity of ſuch powerful people, being probably accuſtomed to acts of violence and outrage from their neighbours. "In ſome of their countenances (ſays Mr. Forſter) we thought we could trace a miſchievous, ill-natured diſpoſition; but we might miſtake jealouſy for hatred."

Very few women were ſeen, but thoſe few were no leſs ugly than the men: they were of ſmall ſtature, and their heads, faces, and ſhoulders, were painted red. Thoſe who were grown up, and probably married, had ſhort pieces of a kind of cloth, or rather matting, round their waiſts, reaching nearly to their knees; the reſt had only a ſtring round the middle, with a wiſp of ſtraw; and the younger ones, from infancy to the age of ten years, went ſtark naked, like the boys of the ſame age. The women were not obſerved to have any finery in their ears or round their necks and arms, it being faſhionable in this iſland for the men only to adorn themſelves; and wherever this cuſtom prevails the other ſex is commonly oppreſſed, deſpiſed, and in a ſtate of ſervility. Here the women were ſeen with bundles on their backs, which contained their children; the men ſeemed to have no kind of regard for them. None of them came off to the ſhip, and they generally kept at a diſtance when any party landed from the boat. They perforate the cartilage of the noſe between the noſtrils, and thruſt therein a piece of white ſtone about an inch and a half long, which is bent like the curvature of a bow. The houſes here are, like thoſe of the other iſles, rather low, and covered with a palm-thatch. Some were incloſed or walled round with boards, and the entrance to theſe was by a ſquare hole at one end.

Their weapons are bows and arrows, and a club about two feet and a half in length, made of the cauſuarina wood, and commonly knobbed at one end, and well poliſhed. This weapon they hang on their right ſhoulder, from a thick rope made of a kind of graſs. It appeared to be preſerved for cloſe engagements, after having emptied the quiver. On the left wriſt they wear a circular wooden plate, neatly covered, and joined with ſtraw, about five inches in diameter, upon which they break the violence of the recoiling bow-ſtring, and preſerve their arm unhurt. Their arrows are made of a ſort of reed, and are ſometimes armed with a long ſharp point made of the red-wood, and ſometimes with a very hard point made of bone: and theſe points are all covered with a ſubſtance which was ſuppoſed to be poiſoned. Indeed the people themſelves confirmed theſe ſuppoſitions, by making ſigns to the gentlemen of the ſhip not to touch the point, and giving them to underſtand that if they were pricked by them they would die: they are very careful of them themſelves, and keep them always wrapt up in a quiver. Some of theſe arrows are armed with two or three points each, with ſmall prickles on the edge to prevent the arrow from being drawn out of the wound. Repeated and effectual trials of the virulence of this poiſon were made upon dogs, but they gave no ſigns of being hurt by it.

Their food ſeems to be principally vegetables, ſince they apply themſelves to huſbandry. As hogs and fowls are bred here, the natives, doubtleſs, feaſt ſometimes on pork and poultry: and as they have canoes, it may be ſuppoſed that they draw a part of their ſubſiſtence from the ocean. The greateſt number of canoes that were ſeen along-ſide the ſhip at one time did not exceed 10, or, according to Mr. Forſter, 14, and no more than four or five people in each: they were ſmall, of

indifferent workmanſhip, and without ornament; but provided with an outrigger.

After ſome ſlight indications of a hoſtile intention on the part of the natives, which they had ſhown in their canoes whilſt about the ſhip, captain Cook, with a party of marines in two boats, landed in the face of 400 or 500 Indians who were aſſembled on the ſhore. Though they were all armed with bows and arrows, clubs and ſpears, they made not the leaſt oppoſition; on the contrary, ſeeing the captain advance alone, unarmed, with only a green branch in his hand, one of them, who ſeemed to be a chief, giving his bow and arrows to another, met him in the water, bearing alſo a green branch. When they met, the branches were exchanged; and the chief led the captain by the hand up to the crowd, to whom he immediately diſtributed preſents: in the mean time the marines were landed, and drawn up upon the beach. The captain then made ſigns that he wanted wood, and they by ſigns gave him permiſſion to cut down the trees. A ſmall pig was preſently brought, and preſented to the captain, who in return gave the bearer a piece of cloth. It was expected, from this inſtance, that an exchange of proviſions for various articles of merchandiſe would take place: but theſe expectations proved fallacious: no more pigs were procured, and only about half a dozen cocoa-nuts, and a ſmall quantity of freſh water. As theſe iſlanders were poſſeſſed of hogs as well as fowls, their backwardneſs to part with either might be owing to the little eſtimation in which they held ſuch articles as were tendered in barter; for they ſet no value on any nails, or any other kind of iron-tools, and held all the gew-gaws of finery equally cheap. They would now then exchange an arrow for a piece of cloth, but very ſeldom would part with a bow. After ſending on board what wood had been cut, the party all embarked, and the natives diſperſed. When the ſhip was about to leave this iſland, captain Cook gives the following relation: "When the natives ſaw us under ſail, they came off in canoes, making exchanges with more confidence than before, and giving ſuch extraordinary proofs of their honeſty as ſurpriſed us. As the ſhip at firſt had freſh way through the water, ſeveral of the canoes dropped aſtern after they had received goods, and before they had time to deliver theirs in return: inſtead of taking advantage of this, as our friends at the Society Iſlands would have done, they uſed their utmoſt efforts to get up with us, and deliver what they had already been paid for. One man in particular followed us a conſiderable time, and did not reach us till it was calm, and the thing was forgotten. As ſoon as he came along-ſide, he held up the article, which ſeveral on board were ready to buy; but he refuſed to part with it till he ſaw the perſon to whom he had before ſold it, and to him he gave it. The perſon, not knowing the man again, offered him ſomething in return, which he refuſed; and ſhowing him what had been given before, at length made him ſenſible of the nice ſenſe of honour which had actuated this Indian."

MALLOW, a manor, and alſo a borough town in the county of Cork, and province of Munſter in Ireland, about 118 miles from Dublin. It was incorporated by charter in 1688, and ſends two members to parliament. It is pleaſantly ſituated on the north bank of the Blackwater, over which there is an excellent ſtone-bridge. Here is alſo a good church, a market-houſe, and barracks for a troop of horſe. Not far diſtant is a fine ſpring of a moderately tepid water, which burſts out of the bottom of a fine limeſtone rock, and approaches the neareſt in all its qualities to the hot-well waters of Briſtol of any that has been yet diſcovered in this kingdom, which brings a reſort of good company there frequently in the ſummer months, and has cauſed it to be called the *Iriſh Bath*. Mallow is a poſt town, and has five fairs.

MALLOW, in botany. See MALVA.

Marſh-MALLOW. See ALTHÆA.

Indian-MALLOW. See SIDA.

MALMSBURY, a town of Wiltſhire, 95 miles from London. It ſtands on a hill, with ſix bridges over the river Avon at the bottom; with which, and a brook that runs into it, it is in a manner encompaſſed. It formerly had walls and a caſtle, which were pulled down to enlarge the abbey, which was the biggeſt in Wiltſhire, and its abbots ſat in parliament. The Saxon king Athelſtan granted the town large immunities, and was buried under the high altar of the church, and his monument ſtill remains in the nave of it. The memory of Aldhelm, its firſt abbot, who was the king's great favourite, and whom he got to be canonized after his death, is ſtill kept up by a meadow near this town, called Aldhelm's mead. By charter of king William III. the corporation conſiſts of an alderman, who is choſen yearly, 12 capital burgeſſes, and 4 aſſiſtants, landholders and commoners. Here is an alms-houſe for 4 men and 4 women, and near the bridge an hoſpital for lepers, where it is ſuppoſed there was formerly a nunnery. This town drives a conſiderable trade in the woollen manufactory; has a market on Saturday, and three fairs. It has ſent members to parliament ever ſince the 26th of Edward I.

William of MALMSBURY. See WILLIAM.

MALO (St.), a ſea-port of France, in the department of Morbihan, and lately an epiſcopal ſee of the province of Bretagne. It has a large harbour, difficult of acceſs on account of the rocks that ſurround it: and is a trading place of great importance, defended by a ſtrong caſtle. It was bombarded by the Engliſh in 1693, but without ſucceſs. In 1758 they landed in Cancalle bay, went to the harbour by land, and burnt above 100 ſhips. St. Malo is ſeated on an iſland, united to the main land by a cauſeway, 17 miles north-weſt of Dol, and 205 weſt of Paris. W. lon. 1. 57. N. lat. 48. 39.

MALO, *Maclou*, or *Malout*, (Saint), the ſon of a gentleman in Great Britain, and couſin to St. Magloire, was educated in a monaſtery in Ireland, and afterwards choſen biſhop of Gui-Caſtel, a dignity which his humility prevented him from accepting. The people wiſhing to compel him, he went into Brittany, and put himſelf under the direction of a holy anchoret called Aaron, in the neighbourhood of Aleth. Some time after, about the year 541, he was choſen biſhop of that city, and there cultivated piety and religion with great ſucceſs. He afterwards retired to a ſolitude near Xaintes, where he died November 15, 565. From him the city of St. Malo derives its name; his body having been carried thither, after the reduction of Aleth to a ſmall village called *Guidulet* or *Guichalet*, and the transference of the epiſcopal ſee to St. Malo.

MALOUIN (PAUL-JACQUES), born at Caen in 1701, was profeſſor of medicine in the royal college of Paris, phyſician in ordinary to the queen, and a member of the Royal Society of London, and of the Academy of Sciences of Paris. Theſe ſtations were a proper reward for his very extenſive information in medicine and chemiſtry; and his amiable and ſteady character procured him many friends and protectors. He was very unlike ſome modern phyſicians, who put little truſt in medicine; and was greatly diſpleaſed to hear any ill ſpoken of his profeſſion. He obſerved one day to a young man who took this liberty, that all great men had reſpected medicine: *Ah!* ſaid the young fellow, *you muſt at leaſt except from the liſt one Moliere. But then*, inſtantly replied the doctor, *you ſee he is dead*. He is ſaid to have believed the certainty of his art as firmly as a mathematician does that of geometry. Having preſcribed a great many medicines for a celebrated man of letters, who followed his directions exactly, and was cured, Malouin eagerly embraced him, ſaying, *You deſerve to be ſick*. As he valued the rules of medicine ſtill more on his own ac-

count than on that of others, he obſerved, eſpecially in the latter part of his life, a very auſtere regimen. He ſtrictly practiſed the preſervative part of medicine, which is much more certain in its effects than the reſtorative. To this regimen Malouin was indebted for what many philoſophers have deſired in vain, a healthy old age and an eaſy death. He was a ſtranger to the infirmities of age; and died at Paris of an apoplexy, the 3d of January 1778, in the 77th year of his age. By his will he left a legacy to the faculty of medicine, upon condition of their holding a public meeting every year for the purpoſe of giving the public an account of his labours and diſcoveries. Malouin was economical, but at the ſame time very diſintereſted. After two years of very lucrative practice, he left Paris and went to Verſailles, where he ſaw very few patients, obſerving that he had *retired to the court*. His principal works are, 1. *Traité de Chimie*, 1734, 12mo. 2. *Chimie medicinale*, 2 vols. 12mo. 1755; a book full of curious obſervations, and written in a chaſte and well adapted ſtyle. He had the character of a laborious chemiſt; and he was a well-informed and even a diſtinguiſhed one for the age in which he lived: but his knowledge of chemiſtry, it muſt be confeſſed, was very imperfect, compared with the ſtate of the ſcience in the preſent age, in which it has aſſumed a new face that probably will not be the laſt. 3. Some of the Arts in the Collection publiſhed by the Academy of Sciences on the arts and profeſſions. A circumſtance which happened at a meeting of the academy does as much honour to his heart, as any of his works do to his underſtanding. A new treatiſe on the art of baking, wherein ſome of Malouin's ideas were combated, was read by M. Parmentier before his fellows, among whom was the old doctor. The young academician, who knew how eaſily ſelf-love is hurt, was afraid to meet his looks: but no ſooner was the reading finiſhed, than Malouin went up to him, and, embracing him, "Receive my reſpects (ſaid he), you have ſeen farther into the ſubject than I did." 4. He was likewiſe the author of the chemical articles in the *Encyclopédie*.

Of the ſame family was *Charles* MALOUIN, who graduated as a doctor of medicine in the univerſity of Caen, and died in 1718 in the flower of his age. He publiſhed a Treatiſe on Solids and Fluids, Paris 1718, 12mo.

MALPAS, a town of Cheſhire, 166 miles from London. It ſtands on a high hill, not far from the river Dee, on the borders of Shropſhire; has a grammar-ſchool, and an hoſpital, and had formerly a caſtle. It is called in Latin *Mala Platea*, i. e. "Ill Street," and was, for the ſame reaſon by the Normans called *Mal Pas*; but its three ſtreets, of which it chiefly conſiſts, are now well paved; and here is a benefice rich enough to ſupport two rectors, who officiate alternately in its ſtately church. It has a good market on Mondays, and three fairs in the year.

MALPIGHI (MARCELLUS), an eminent Italian phyſician and anatomiſt in the 17th century. He ſtudied under Maſſari and Mariano. The duke of Tuſcany invited him to Piſa, to be profeſſor of phyſic there. In this city he contracted an intimate acquaintance with Borelli, to whom he aſcribed all the diſcoveries he had made. He went back to Bologna, the air of Piſa not agreeing with him. Cardinal Antonio Pignatelli, who had known him while he was legate at Bologna, being choſen pope in 1691, under the name of *Innocent XII.* immediately ſent for him to Rome, and appointed him his phyſician. But this did not hinder him from purſuing his ſtudies, and perfecting his works, which have immortalized his memory. He died in 1694; and his works, with his life written by himſelf prefixed, were firſt collected and printed at London, in folio, 1667.

MALPIGHIA, BARBADOES CHERRY; a genus of the trigynia order, belonging to the decandria claſs of plants; and in the natural method ranking under the 23d order, *Tribilatæ*. The calyx is pentaphyllous, with melliferous pores on the outſide at the baſe. There are five petals, roundiſh, and unguiculated: the berry unilocular, and triſpermous. There are eight or ten ſpecies, all of them ſhrubby evergreens of the warm parts of America, riſing with branchy ſtems from 8 or 10 to 15 or 20 feet high, ornamented with oval and lanceolate entire leaves, and large pentapetalous flowers, ſucceeded by red, cherry-ſhaped, eatable berries, of an acid and palatable flavour; and which, in the Weſt Indies, where they grow naturally, are uſed inſtead of cherries. Three of the ſpecies are reared in our gardens, and make a fine variety in the ſtove. They retain their leaves all the year round; and begin to flower about the end of autumn, continuing in conſtant ſucceſſion till the ſpring; after which they frequently produce and ripen their fruit, which commonly equals the ſize of a ſmall cherry. The flowers are of a pale red or purple colour. Theſe plants are propagated by ſeed, which muſt be ſown in ſpring, in pots of rich earth: then plunge them in a hot-bed; and when the plants are three or four inches high, prick them in ſeparate ſmall pots, give water, and plunge them in the bark-bed of the ſtove; where after they have remained a year or two, they may be placed in any part of it. They may even be placed in the open air during a month or two of the hotteſt weather in ſummer; but muſt be carefully ſupplied with water during the whole year.

MALPLAQUET, a village of the Netherlands, in Hainault, famous for a moſt bloody battle fought here on the 11th of September 1709, between the French under old marſhal Villars, and the allies commanded by prince Eugene and the duke of Marlborough. The French army amounted to 120,000 men; and were poſted behind the woods of La Marte and Taniers, in the neighbourhood of Malplaquet. They had fortified their ſituation in ſuch a manner with lines, hedges, and trees laid acroſs, that they ſeemed to be quite inacceſſible. In this ſituation they expected certain victory; and even the common ſoldiers were ſo eager to engage, that they flung away the bread which had been juſt given them, though they had taken no ſuſtenance for a whole day before. The allied army began the attack early in the morning, being favoured by a thick fog. The chief fury of their impreſſion was made upon the left of the enemy; and with ſuch ſucceſs, that, notwithſtanding their lines and barricadoes, the French were in leſs than an hour driven from their entrenchments. But on the enemy's right the combat was ſuſtained with much greater obſtinacy. The Dutch, who carried on the attack, drove them from their firſt line; but were repulſed from the ſecond with great ſlaughter. The Prince of Orange, who headed that attack, perſiſted in his efforts with incredible perſeverance and intrepidity, though two horſes had been killed under him, and the greater part of his officers ſlain and diſabled. At laſt, however, the French were obliged to yield up the field of battle; but not till after having ſold a dear-bought victory. Villars being dangerouſly wounded, they made an excellent retreat under the conduct of Boufflers, and took poſt near Queſnoy and Valenciennes. The conquerors took poſſeſſion of the field of battle, on which above 20,000 of their beſt troops lay dead. The loſs of the French, it is ſaid, did not exceed 8000; and marſhal Villars confidently aſſerted, that, if he had not been diſabled, he would have gained an undoubted victory.

MALT denotes barley cured, or prepared to fit it for making a potable liquor, under a denomination of *beer* or *ale*. See BREWING.

MALT *Liquors* have different names as well as different virtues, properties, and uſes, both from the different manners of preparing the malt; whence they are diſtinguiſhed into *pale* and *brown*; and from the different manners of preparing or brewing the liquors themſelves; whence they are divided into *beer* and *ale*, *ſtrong* and *ſmall*, *new* and *old*.

Malt drinks are either pale or brown, as the malt is more or leſs dried on the kiln; that which is the ſlendereſt dried tingeing the liquor leaſt in brewing, and therefore being called *pale*; whereas that higher dried, and as it were roaſted, makes it of a higher colour. A mixture of both theſe makes an amber colour; whence ſeveral of theſe liquors take their name.

Now it is certain, the pale malt has moſt of the natural grain in it, and is therefore the moſt nouriſhing; but, for the ſame reaſon, it requires a ſtronger conſtitution to digeſt it. Thoſe who drink much of it are uſually fat and ſleek in their blood, but are often cut off by ſudden fevers; or, if they avoid this, they fall early into a diſtempered old age.

The brown malt makes a drink much leſs viſcid, and fitter to paſs the ſeveral ſtrainers of the body; but, if very ſtrong, it may lead on to the ſame inconveniencies with the pale: though a ſingle debauch wears off much more eaſily in the brown.

Dr. Quincy obſerves, that the beſt pale malt liquors are thoſe brewed with hard waters, as thoſe of ſprings and wells, becauſe the mineral particles, wherewith theſe waters are impregnated, help to prevent the coheſions of thoſe drawn from the grain, and enable them to paſs the proper ſecretions the better; as the viſcid particles of the grain do likewiſe defend theſe from doing the miſchief they might otherwiſe occaſion. But ſofter waters ſeem beſt ſuited to draw out the ſubſtance of high-dried malts, which retain many fiery particles in their contexture, and are therefore beſt loſt in a ſmooth vehicle.

For the differences in the preparation of malt liquors, they chiefly conſiſt in the uſe of hops, as in beer; or in the more ſparing uſe of them, as in ale.

The difference made by hops is beſt diſcovered from the nature and quality of the hops themſelves: theſe are known to be a ſubtle grateful bitter; in their compoſition, therefore, with this liquor, they add ſomewhat of an alkaline nature, *i. e.* particles that are ſublime, active, and rigid. By which means, the ropy viſcid parts of the malt are more divided and ſubtilized, and are therefore not only rendered more eaſy of digeſtion and ſecretion in the body, but alſo, while in the liquor, they prevent it from running into ſuch coheſions as would make it ropy, vapid, and ſour.

For want of this, in unhopped drinks, that clammy ſweetneſs, which they retain after working, ſoon turns them acid and unfit for uſe; which happens ſooner or later in proportion to the ſtrength they receive from the malt, and the comminution that it has undergone by fermentation.

It is a common opinion, that ale is more diuretic than beer; that is, liquor leſs hopped more than that with a greater quantity of hops in it: which may hold in ſome conſtitutions; becauſe ale being more ſmooth, ſoftening, and relaxing, where urine is to be promoted by enlarging the paſſage, as in thin, dry conſtitutions, this is the moſt likely to effect it. But, where the promoting of urine is to be done by attenuating and breaking the juices, and rendering them more fluid, it is certainly beſt anſwered by thoſe drinks which are well hopped.

As to the diſpute, whether or not hops tend to breed the ſtone; it is too long to enter upon here. Quincy is of opinion, there is but little reaſon for the affirmative ſide of the queſtion; and, in the general, makes no ſcruple to ſay, that for one conſtitution damaged by beer, there are numbers ſpoiled by ale. This laſt manifeſtly ſouls the glands, ſtuffs the veſſels with ſlime and viſcidity, makes the body unwieldy and corpulent, and paves the way for cachexies, jaundice, aſthmas, and at laſt incurable dropſies. The urinary paſſages, alſo, which it is ſuppoſed to clear, will in time be filled by it with ſlough and matter of as ill conſequence as gravel.

The different ſtrengths of malt liquors alſo make their effects different. The ſtronger they are, the more viſcid parts they carry into the blood: and though the ſpirituous parts make theſe imperceptible at firſt; yet when thoſe are evaporated, which will be in a few hours, the other will be ſenſibly felt by pains in the head, nauſeouſneſs at the ſtomach, and laſſitude or liſtleſſneſs to motion. This thoſe are the moſt ſenſible of who have experienced the extremes of drinking theſe liquors and wines; for a debauch of wine they find much ſooner worn off, and they are much more lively and brisk afterwards, than after fuddling malt liquors, whoſe viſcid remains will be long before they be ſhaken off.

Malt liquors therefore are, in general, the more wholeſome for being ſmall; *i. e.* of ſuch a ſtrength as is liable to carry a ſmall degree of warmth into the ſtomach, but not ſo great as to prevent their being proper diluters of the neceſſary food. Indeed, in robuſt people, or thoſe who labour hard, the viſcidities of the drink may be broken into convenient nouriſhment; but in perſons of another habit and way of living, they ſerve rather to promote obſtructions and ill humours.

The age of malt liquors is the laſt thing by which they are rendered more or leſs wholeſome. Age ſeems to do nearly the ſame thing as hops; for thoſe liquors which are longeſt kept are certainly the leaſt viſcid; age breaking the viſcid parts, and by degrees rendering them ſmaller, and fitter for ſecretion.

But this is always determined according to their ſtrength; in proportion to which, they will ſooner or later come to their full perfection as well as decay; for, when ale or beer is kept till its particles are broken and comminuted as far as they are capable, then it is that they are beſt; and, beyond this, they will be continually on the decay, till the finer ſpirits are entirely eſcaped, and the remainder becomes vapid and ſour.

Malt *Diſtillery*. This is an extenſive article of trade, and by which very large fortunes are made. The art is to convert fermented malt liquors into a clear inflammable ſpirit, which may be either ſold for uſe in the common ſtate of a proof ſtrength, that is, the ſame ſtrength with French brandy; or is rectified into that purer ſpirit uſually ſold under the name of *ſpirit of wine*; or made into compound cordial waters, by being diſtilled again from herbs and other ingredients. See Brewing and Wash.

To brew with malt in the moſt advantageous manner, it is neceſſary, 1. That the ſubject be well prepared; 2. That the water be ſuitable and duly applied; and, 3. That ſome certain additions be uſed, or alterations made, according to the ſeaſon of the year, and the intention of the operator: and by a proper regulation in theſe reſpects, all the fermentable parts of the ſubject will thus be brought into the tincture, and become fit for fermentation.

The due preparation of the ſubject conſiſts in its being juſtly malted and well ground. When the grain is not ſufficiently malted, it is apt to prove hard, ſo that the water can have but very little power to diſſolve its ſubſtance; and if it be too much malted, a part of the fermentable matter is loſt in that operation. The harder and more flinty the malt is, the finer it ought to be ground; and in all caſes, when intended for diſtillation, it is adviſable to reduce it to a kind of finer or coarſer meal. When the malt is thus ground, it is found by experience that great part of the time, trouble, and expence of the brewing is ſaved by it, and yet as large a quantity of ſpirit will be produced; for thus the whole ſubſtance of the malt may remain mixed among the tincture, and be fermented and diſtilled among it. This is a particular that very well deſerves the attention of the malt diſtiller as that trade is at preſent carried on; for the diſpatch of the buſineſs, and the quantity of ſpirit procured, is more attended to than the purity or perfection of it.

The ſecret of this matter depends upon the thoroughly,

mixing or briſkly agitating and throwing the meal about, firſt in cold and then in hot water, and repeating this agitation after the fermentation is over; when the thick turbid waſh being immediately committed to the ſtill already hot and dewy with working, there is no danger of burning, unleſs by accident, even without the farther trouble of ſtirring, which in this caſe is found needleſs, though the quantity be ever ſo large, provided that requiſite care and cleanlineſs be uſed; and thus the buſineſs of brewing and fermenting may very commodiouſly be performed together, and reduced to one ſingle operation. Whatever water is made choice of, it muſt ſtand in a hot ſtate upon the prepared malt, eſpecially if a clear tincture be deſired; but a known and very great inconvenience attends its being applied too hot, or too near to a ſtate of boiling, or even ſcalding with regard to the hand. To ſave time in this caſe, and to prevent the malt running into lumps and clods, the beſt way is to put a certain meaſured quantity of cold water to the malt firſt; the malt is then to be ſtirred very well with this, ſo as to form a ſort of thin uniform paſte or pudding; after which the remaining quantity of water required may be added in a ſtate of boiling, without the leaſt danger of making what, in the diſtillers language, is called a *pudden*.

In this manner the due and neceſſary degree of heat in the water, for the extracting all the virtues of the malt, may be hit upon very expeditiouſly, and with a great deal of exactneſs, as the heat of boiling water is a fixed ſtandard which may be let down to any degree by a proportionate mixture of cold water, due allowances being made for the ſeaſon of the year, and for the temperature of the air.

This little obvious improvement, added to the method juſt above hinted for the reducing brewing and fermentation to one operation, will render it practicable to very conſiderable advantage, and the ſpirit improved in quality as well as quantity.

A much more profitable method than that uſually practiſed for the fermenting malt for diſtillation, in order to get its ſpirit, is the following: Take ten pounds of malt reduced to a fine meal, and three pounds of common wheat-meal: add to theſe two gallons of cold water, and ſtir them well together; then add five gallons of water, boiling hot, and ſtir all together again. Let the whole ſtand two hours, and then ſtir it again; and when grown cold, add to it two ounces of ſolid yeaſt, and ſet it by looſely covered in a warmiſh place to ferment.

This is the Dutch method of preparing what they call the *waſh for malt ſpirit*, whereby they ſave much trouble and procure a large quantity of ſpirit: thus commodiouſly reducing the two buſineſſes of brewing and fermenting to one ſingle operation. In England the method is to draw and maſh for ſpirit as they ordinarily do for beer, only inſtead of boiling the wort, they pump it into large coolers, and afterwards run it into their fermenting backs, to be there fermented with yeaſt. Thus they beſtow twice as much labour as is neceſſary, and loſe a large quantity of their ſpirit by leaving the groſs bottoms out of the ſtill for fear of burning.

All ſimple ſpirits may be conſidered in the three different ſtates of low wines, proof ſpirit, and alcohol, the intermediate degrees of ſtrength being of leſs general uſe; and they are to be judged of only according as they approach to or recede from theſe. Low wines at a medium contain a ſixth part of pure inflammable ſpirit, five times as much water as ſpirit neceſſarily ariſing in the operation with a boiling heat. Proof goods contain about one half of the ſame totally inflammable ſpirit; and alcohol entirely conſiſts of it.

Malt low-wines, prepared in the common way, are exceedingly naufeous; they have, however, a natural vinoſity or pungent agreeable acidity, which would render the ſpirit agreeable to the palate were it not for the large quantity of the groſs oil of the malt that abounds in it. When this oil is detained in ſome meaſure from mixing itſelf among the low wines, by the ſtretching a coarſe flannel over the neck of the ſtill, or at the orifice of the worm, the ſpirit becomes much purer in all reſpects; it is leſs fulſome to the taſte, leſs offenſive to the ſmell, and leſs milky to the eye. When theſe low wines, in the rectification into proof-ſpirits, are diſtilled gently, they leave a conſiderable quantity of this groſs fetid oil behind them in the ſtill along with the phlegm; but if the fire be made fierce, this oil is again raiſed and brought over with the ſpirit; and being now broken ſomewhat more fine, it impregnates it in a more naufeous manner than at firſt. This is the common fault both of the malt diſtiller and of the rectifier; the latter, inſtead of ſeparating the ſpirit from this naſty oil, which is the principal intent of his proceſs, attends only to the leaving the phlegm in ſuch quantity behind, that the ſpirit may be of a due ſtrength as proof or marketable goods, and brings over the oil in a worſe ſtate than before. To this inattention to the proper buſineſs of the proceſs, it is owing, that the ſpirit, after its ſeveral rectifications, as they are miſ-called, is often found more ſtinking than when delivered out of the hands of the malt diſtiller. All this may be prevented by the taking more time in the ſubſequent diſtillations, and keeping the fire low and regular; the ſudden ſtirring of the fire, and the haſty way of throwing on the freſh fuel, being the general occaſion of throwing up the oil by ſpurts, where the fire in general, during the proceſs, has not been ſo large as to do that miſchief.

The uſe of a balneum mariæ, inſtead of the common ſtill, would effectually prevent all this miſchief, and give a purer ſpirit in one rectification than can otherwiſe be procured in ten, or indeed, according to the common methods, at all.

Malt low wine, when brought to the ſtandard of proof ſpirit, loſes its milky colour, and is perfectly clear and bright, no more oil being contained in it than is perfectly diſſolved by the alcohol, and rendered miſcible with that proportion of phlegm, which is about one half the liquor: its taſte alſo is cleaner, though not more pleaſant; there being leſs of the thick oil to hang on the tongue than its own form; which is not the caſe in the low wines, where the oil being undiſſolved, adheres to the mouth in its own form, and does not paſs lightly over it.

When proof-ſpirit of malt is diſtilled over again, in order to be rectified into alcohol, or, as we uſually call it, ſpirits of wine, if the fire be raiſed at the time when the faints begin to fall off, a very conſiderable quantity of oil will be raiſed by it, and will run in the viſible form of oil from the noſe of the worm. This is not peculiar to malt ſpirit; but the French brandy ſhows the ſame phenomenon, and that in ſo great a degree, that half an ounce of this oil may be obtained from a ſingle piece of brandy.

Malt ſpirit, more than any other kind, requires to be brought into the form of alcohol before it can be uſed internally, eſpecially as it is now commonly made up in the proof ſtate, with as much of this naufeous and viſcous oil as will give it a good crown of bubbles. For this reaſon it ought to be reduced to an alcohol, or totally inflammable ſpirit, before it is admitted into any of the medicinal compoſitions. If it be uſed without this previous caution, the odious taſte of the malt oil will be diſtinguiſhed among all the other flavours of the ingredients.

Malt ſpirit, when it has once been reduced to the true form of an alcohol, is afterwards more fit for all the curious internal uſes than even French brandy; it being after this purification a more uniform, hungry, taſteleſs, and impregnable ſpirit, than any other ſpirits which we eſteem ſo much finer.

A pure ſpirit being thus procured, ſhould be kept carefully

in veſſels of glaſs or ſtone, well ſtopped, to prevent the evaporation of any of its volatile part. If preſerved in caſks, it is apt to impregnate itſelf very ſtrongly with the wood. The quantity of pure alcohol obtainable from a certain quantity of malt, differs according to the goodneſs of the ſubject, the manner of the operation, the ſeaſon of the year, and the ſkilfulneſs of the workmen; according to which variations, a quarter of malt will afford from eight or nine to thirteen or fourteen gallons of alcohol. This ſhould encourage the malt diſtiller to be careful and diligent in his buſineſs, as ſo very large a part of his profit depends wholly on the well conducting his proceſſes.

After every operation in this buſineſs, there remains a quantity of faints, which in their own coarſe ſtate ought never to be admitted into the pure ſpirit; theſe are to be ſaved together, and large quantities of them at once wrought into alcohol. It is eaſy to reduce theſe to ſuch a ſtate that they will ſerve for lamp-ſpirits. Their diſagreeable flavour being corrected by the adding of aromatics during the diſtillations, the reducing them into a perfect and pure alcohol is practicable, but not without ſuch difficulties as render it ſcarce worth the trader's while. One way of doing it is by diſtilling them from water into water, and that with a very ſlow fire. By this means a pure alcohol may be made out of the foulſt faints.

The malt diſtiller always gives his ſpirit a ſingle rectification *per ſe*, in order to purify it a little, and make it up proof; but in this ſtate it is not to be reckoned fit for internal uſes, but ſerves to be diſtilled into geneva and other ordinary compound ſtrong waters for the vulgar.

The Dutch, who carry on a great trade with malt ſpirit, never give it any farther rectification than this; and it is on this account that the malt ſpirit of England is in general ſo much more in eſteem. The Dutch method is only to diſtil the waſh into low wines, and then to full proof ſpirit; they then directly make it into geneva, or elſe ſend it as it is to Germany, Guinea, and the Eaſt-Indies, for the Dutch have little notion of our rectification. Their ſpirit is by this means rendered very foul and coarſe, and is rendered yet more nauſeous by the immoderate uſe they make of rye-meal. Malt ſpirit, in its unrectified ſtate, is uſually found to have the common bubble proof, as the malt diſtiller knows that it will not be marketable without it.

The whole matter requiſite to this is, that it have a conſiderable portion of the groſs oil of the malt well broke and mixed along with it: this gives the rectifier a great deal of trouble if he will have the ſpirit fine; but in the general run of the buſineſs, the rectifier does not take out this oil, but breaks it finer, and mixes it fatter in by alkaline ſalts, and diſguiſes its taſte by the addition of certain flavouring ingredients. The ſpirit loſes in theſe proceſſes the vinoſity it had when it came out of the hands of the malt diſtiller, and is in all reſpects worſe, except in the diſguiſe of a mixed flavour.

The alkaline ſalts uſed by the rectifier deſtroying the natural vinoſity of the ſpirit, it is neceſſary to add an extraneous acid in order to give it a new one. The acid they generally uſe is the ſpiritus nitri dulcis; and the common way of uſing it is the mixing it to the taſte with the rectified ſpirit: this gives our malt ſpirit, when well rectified, a flavour ſomewhat like that of French brandy, but this ſoon flies off; and the better method is to add a proper quantity of Glauber's ſtrong ſpirit of nitre to the ſpirit in the ſtill. The liquor in this caſe comes over impregnated with it, and the acid being more intimately mixed, the flavour is retained.

Malt-*Bruiſer*, or *Bruiſing-mill*. It has been found by repeated experiments, that bruiſing malt is a more advantageous method than the old one of grinding and flouring. By bruiſing, there is not only leſs waſte, but the malt is alſo better fitted for giving out all its virtues. It has lately, therefore, become a practice to ſqueeze malt between rollers, by means of a proper apparatus, of which various conſtructions have been invented. As the beſt contrivance of this ſort is ſaid to be the bruiſing-mill of Mr. Winlaw, we have given a figure of it in Plate II, where AAAA is the frame; B, the large cylinder or roller; C, the ſmall one; D, the hopper; E, the ſhoe; F, the frame that ſupports the hopper; G, a fly-wheel; H, the windlaſs. To uſe this engine, it is directed to ſcrew the large roller up to the ſmall one, and not to feed too faſt from the ſhoe, which is regulated by pins that have ſtrings fixed to them. It is evident, that when two ſmooth ſurfaces are oppoſed to each other at a diſtance which can be regulated at pleaſure, neither grain nor any other ſimilar ſubſtance can paſs between them without being bruiſed. This being the principle on which the bruiſing-mill acts, the mealy ſubſtance, which is the eſſential part of malt, is entirely removed from the ſkin or huſk which contains it, and all the virtues of the malt are with eaſe extracted by the water in a manner ſuperior to what is effected when the grain is only cut by grinding. The operation is at the ſame time ſo expeditiouſly performed, that two men can with eaſe bruiſe a buſhel of malt in a minute.—By the ſame engine may alſo be bruiſed oats and beans for horſes. A great part of the corn given theſe animals, it is well known, is ſwallowed whole, and often paſſes through them in the ſame ſtate; in which caſe, they cannot receive any nouriſhment from the grains that are unbroken: but when bruiſed in this engine, it eaſes maſtication; and every grain being prepared for nutrition, a much leſs quantity will of courſe be found to be ſufficient. For bruiſing beans, the two regulating ſcrews muſt be unſcrewed a little; and the fly-wheel requires to be then ſet in motion with the hand, on account that the rollers are then a little ſpace apart, and will not turn each other before the beans come between them.

Malt-*Tax*, is the ſum of 750,000l. raiſed every year by parliament ſince 1697, by a duty of 6d. on the buſhel of malt, and a proportionable ſum on certain liquors, ſuch as cyder and perry, which might otherwiſe prevent the conſumption of malt. This is under the management of the commiſſioners of the exciſe; and is indeed itſelf no other than the annual exciſe. In 1760, an additional perpetual exciſe of 3d. per buſhel was laid upon malt; and in 1763, a proportional exciſe was laid upon cyder and perry, but new-modelled in 1766. See Excise.

MALTA, a celebrated iſland of the Mediterranean, ſituated between the 15th and 16th degrees of eaſt longitude, and between the 35th and 36th degrees of north latitude. It is about 19 or 20 leagues in length, nine or ten in breadth, and 60 in circumference. Anciently it was called *Melita*; and is ſuppoſed by Cluverius, from its ſituation and other particulars, to be the Hiperia mentioned by Homer, whence the Pheaces were afterwards driven by the Phenicians, and retired into Scheria and the iſland of Corfu; which is the more probable, as the ancient poet places the mountain Melita in that iſland. He has likewiſe brought ſome probable arguments to prove, that Melita or Malta is the ancient *Ogygia*; in which the famed nymph *Calypſo*, daughter of the Ocean and Thetis, received the ſhipwrecked Ulyſſes, and detained him ſeven years.

The moſt ancient poſſeſſors of Malta, of whom we have any certain account, were the Carthaginians; from whom it was taken by the Romans: and yet during the whole time that it continued under the power of theſe polite nations it was almoſt entirely barren. The ſoil was partly ſandy and partly rocky, having ſcarcely any depth of earth; and withal ſo ſtony, that it was hardly capable of producing corn or any other grain except cummin, and ſome ſeeds of a ſimilar nature. Its chief products were figs, melons, honey, cotton, and ſome few other fruits and commodities which the inhabi-

tants exchanged for corn; and in this barren ſtate it ſeems to have continued till it came into the poſſeſſion of the Malteſe knights. It laboured alſo under great ſcarcity of water and fuel: upon all which accounts it was till that time but thinly inhabited, there being only about 30 or 40 boroughs or other villages ſcattered about, and no city except the capital, called alſo *Malta*, and the town and fort of St. Angelo, which defended the harbour: ſo that the whole number of its inhabitants did not exceed 12,000, including women and children; the greateſt part of whom were very indigent.

According to an ancient tradition, Malta was firſt poſſeſſed by an African prince named *Battus*, an enemy to queen Dido; from whom it was taken by the Carthaginians, as may be juſtly inferred from ſeveral Punic inſcriptions to be ſeen on ſtone-pillars and other monuments yet ſtanding. From the Carthaginians it paſſed to the Romans, who made themſelves maſters of it at the ſame time that they ſubdued the iſland of Sicily. Theſe were driven out by the Arabs in the year 878; who were driven out of it in their turn by Roger the Norman, earl of Sicily, who took poſſeſſion of it in 1190: from which time it continued under the dominion of the Sicilian princes till the time of Charles V. when it fell under his power, along with Naples and Sicily. To cover the iſland of Sicily from the Turks, Charles gave the iſland to the *knights of Rhodes*, ſince that time called *knights of Malta*.

The origin and hiſtory of theſe knights is given under the article *Knights of* MALTA and RHODES. Here it is ſufficient to obſerve, that in 1530, the knights of Rhodes having been expelled from that iſland by Soliman the Turkiſh ſultan, and deſtitute of an habitation, accepted, though not without ſome reluctance on account of its barrenneſs, the offer made them by Charles V. of the iſland of Malta. The grand maſter having cauſed his two large carracks, the galleys of the order, and a good number of other tranſport-ſhips, laden with great quantities of arms, ammunition, and troops, to be got ready, he and his knights embarked in the former, with all the effects, records, and treaſure belonging to the order, and the reſt in the latter. In their paſſage they ſuffered very much by a violent ſtorm; in which one of their galleys ſplit upon a rock, and one of the carracks was run aground by the violence of the waves, after having broke her three anchors. She ſtuck ſo faſt, that they expected every moment to ſee her ſplit in pieces; when providentially a contrary wind diſengaged her without damage. This event was counted as a lucky omen, and on the 26th of October that year all the company were ſafely landed.

At the firſt landing of the Malteſe knights, they found themſelves obliged to lodge in a very poor town or borough at the foot of the hill on which ſtands the caſtle of St. Angelo, and where their only habitations were fiſhermen's huts. The grand-maſter, with the principal knights, took poſſeſſion of the caſtle, where the accommodations were ſomewhat better; though theſe were very mean, and out of repair. Three days after, he took poſſeſſion of the city, which was formerly called *Malta*, but ſince that time hath taken the name of the *Notable City*; and after that of the whole iſland of Malta, and the neighbouring one of Gofa.

Hiſtory has eminently recorded the valorous deeds of the Malteſe, in their long and obſtinate ſtruggles with the Turks. The four months' ſiege of Malta, which concluded every thing of importance in its hiſtory, will be for ever memorable on account of that extraordinary diſplay of the moſt generous and heroic valour by which the knights, ſo few in number, were enabled to baffle the moſt vigorous efforts which could be made to ſubdue them by Muſtapha, the moſt powerful monarch in the world. The power of the Turks began about this time to be ſo much circumſcribed, that they ceaſed to be formidable to the Chriſtian nations, and the knights of Malta had no longer an opportunity of exerting their proweſs as formerly. They have remained ever ſince in quiet poſſeſſion of their iſland, of which the beſt deſcription we have met with is that given by Mr. Brydone.

"The approach of the iſland (ſays he) is very fine, although the ſhore is rather low and rocky. It is everywhere made inacceſſible to an enemy by an infinite number of fortifications. The rock, in many places, has been ſloped into the form of a glacis, with ſtrong parapets and intrenchments running behind it.—On getting aſhore we found ourſelves in a new world indeed.—The ſtreets (of Valetta) crowded with well-dreſſed people, who have all the appearance of health and affluence; and we were conducted by the Engliſh conſul to an inn, which had more the appearance of a palace.

"After dinner we went to viſit the principal villas of the iſland; particularly thoſe of the grand-maſter and the general of the galleys, which lie contiguous to one another. Theſe are nothing great or magnificent; but they are admirably contrived for a hot climate, where, of all things, ſhade is the moſt deſirable. The orange-groves are indeed very fine, and the fruit they bear ſuperior to any thing of the kind in Spain or Portugal.

"The aſpect of the country is far from being pleaſing: the whole iſland is a great rock of very white free-ſtone; and the ſoil that covers this rock is in moſt places not more than five or ſix inches deep; yet, what is ſingular, we found their crop in general was exceedingly abundant. They account for it from the copious dews that fall during the ſpring and ſummer months; and pretend likewiſe that there is a moiſture in the rock below the ſoil, that is of great advantage to the corn and cotton, keeping its roots perpetually moiſt and cool; without which ſingular quality, they ſay, they could have no crop at all, the heat of the ſun being ſo exceedingly violent.—The whole iſland produces corn only ſufficient to ſupply its inhabitants for five months or little more; but the crop they moſt depend upon is the cotton. They begin to ſow it about the middle of May, and continue till the middle of June; and the time of reaping is in the month of October and beginning of November.

"They pretend that the cotton produced from this plant, which is ſown and reaped in four months, is of a much ſuperior quality to that of the cotton-tree. I compared them; but I cannot ſay I found it ſo: this is indeed the fineſt; but that of the cotton-tree is by much the ſtrongeſt texture. The plant riſes to the height of a foot and an half; and is covered with a number of nuts or pods full of cotton: theſe, when ripe, they are at great pains to cut off every morning before ſun-riſe; for the heat of the ſun immediately turns the cotton yellow; which indeed we ſaw from thoſe pods they ſave for ſeed.

"They manufacture their cotton into a great variety of ſtuffs. Their ſtockings are exceedingly fine. Some of them, they aſſured us, had been ſold for ten ſequins a pair. Their coverlets and blankets are eſteemed all over Europe. Of theſe the principal manufactures are eſtabliſhed in the little iſland of Gozzo, where the people are ſaid to be more induſtrious than thoſe of Malta, as they are more excluded from the world, and have fewer inducements to idleneſs. Here the ſugar-cane is ſtill cultivated with ſucceſs, though not in any conſiderable quantity.

"The Malteſe oranges certainly deſerve the character they have of being the fineſt in the world. The ſeaſon continues for upwards of ſeven months, from November till the middle of June; during which time thoſe beautiful trees are always covered with abundance of delicious fruit. Many of them are of the red kind, much ſuperior, in my opinion, to the others, which are rather too luſcious. They are produced, I am told, from the common orange-bud, ingrafted on the

pomegranate ſtock. The juice of this fruit is as red as blood, and of a fine flavour. The greateſt part of their crop is ſent in preſents to the different courts of Europe, and to the relations of the chevaliers.

The induſtry of the Malteſe in cultivating their little iſland is inconceivable. There is not an inch of ground loſt in any part of it: and where there was not ſoil enough, they have brought over ſhips and boats loaded with it from Sicily, where there is plenty and to ſpare. The whole iſland is full of incloſures of free-ſtone, which give the country a very uncouth and barren aſpect; and in ſummer reflects ſuch a light and heat, that it is exceedingly diſagreeable and offenſive to the eyes. The incloſures are very ſmall and irregular, according to the inclination of the ground. This, they ſay, they are obliged to obſerve, notwithſtanding the deformity it occaſions; otherwiſe the floods, to which they are ſubject, would ſoon carry off their ſoil.

"The iſland is covered over with country-houſes and villages, beſide ſeven cities, for ſo they term them; but there are only two, the Valetta, and Citta Vecchia, that by any means deſerve that appellation. Every little village has a noble church, elegantly finiſhed, and adorned with ſtatues of marble, rich tapeſtry, and a large quantity of ſilver-plate.

"The city of Valetta has certainly the happieſt ſituation that can be imagined. It ſtands upon a peninſula between two of the fineſt ports in the world, which are defended by almoſt impregnable fortifications. That on the ſouth ſide of the city is the largeſt. It runs about two miles into the heart of the iſland; and is ſo very deep, and ſurrounded by ſuch high grounds and fortifications, that they aſſured us the largeſt ſhips of war might ride here in the moſt ſtormy weather, almoſt without a cable.

"This beautiful baſon is divided into five diſtinct harbours, all equally ſafe, and each capable of containing an immenſe number of ſhipping. The mouth of the harbour is ſcarcely a quarter of a mile broad, and is commanded on each ſide by batteries that would tear the ſtrongeſt ſhip to pieces before ſhe could enter. Beſides this, it is fronted by a quadruple battery, one above the other, the largeſt of which is a *fleur d'eau*, or on a level with the water. Theſe are mounted with about 80 of their heavieſt artillery: ſo that this harbour, I think, may really be conſidered as impregnable; and indeed the Turks have ever found it ſo, and I believe ever will.

"The harbour on the north ſide of the city, although they only uſe it for fiſhing, and as a place of quarantine, would, in any other part of the world, be conſidered as ineſtimable. It is likewiſe defended by very ſtrong works; and in the centre of the baſon is an iſland on which they have built a caſtle and a lazaret.

"The fortifications of Malta are indeed a moſt ſtupendous work. All the boaſted catacombs of Rome and Naples are a trifle to the immenſe excavations that have been made in this little iſland. The ditches, of a vaſt ſize, are all cut out of the ſolid rock. Theſe extend for a great many miles, and raiſe our aſtoniſhment to think that ſo ſmall a ſtate has ever been able to make them.

"One ſide of the iſland is ſo completely fortified by nature, that there was nothing left for art. The rock is of a great height, and abſolutely perpendicular from the ſea for ſeveral miles. It is very ſingular, that on this ſide there are ſtill the veſtiges of ſeveral ancient roads, with the tracks of carriages worn deep in the rocks. Theſe roads are now terminated by the precipice, with the ſeas beneath; and ſhow, to a demonſtration, that this iſland has formerly been of a much larger ſize than it is at preſent; but the convulſion that occaſioned its diminution is probably much beyond the reach of any hiſtory or tradition. It has been often obſerved, notwithſtanding the very great diſtance of mount Ætna, that this iſland has generally been more or leſs affected by its eruptions; and they think it probable, that on ſome of theſe occaſions a great part of it may have been ſhaken into the ſea.

"One half of mount Ætna is clearly diſcovered from Malta. They reckon the diſtance near 200 Italian miles. And the people of Malta affirm, that, in great eruptions of the mountain, their whole iſland is illuminated, and from the reflection in the water there appears a great track of fire all the way from Malta to Sicily. The thundering of the mountain is likewiſe diſtinctly heard.

"We made an expedition through the iſland in coaches drawn by one mule each; the only kind of vehicle the iſland affords. The catacombs, not far from the ancient city of Melita, are a great work; they are ſaid to extend for 15 miles under-ground. Many people, they aſſure us, have been loſt in them by advancing too far; the prodigious number of branches making it next to impoſſible to find the way out again. The great ſource of water that ſupplies the city of Valetta takes its riſe near to this place; and there is an aqueduct, compoſed of ſome thouſand arches, that conveys it from thence to the city. The whole of this immenſe work was finiſhed at the private expence of one of the grand-maſters.

"Not far from the old city there is a ſmall church dedicated to St. Paul; and juſt by the church a miraculous ſtatue of the ſaint, with a viper on his hand; ſuppoſed to be placed on the very ſpot where the houſe ſtood in which he was received after his ſhipwreck on the iſland, and where he ſhook the viper off his hand into the fire without being hurt by it: at which time the Malteſe aſſure us, the ſaint curſed all the venomous animals of the iſland, and baniſhed them for ever. Whether this be the cauſe of it or not, the fact is certain, that there are no venomous animals in Malta. They aſſured us, that vipers had been brought from Sicily, and died almoſt immediately on their arrival.

"Adjoining to the church is the celebrated grotto in which the ſaint was impriſoned. It is looked upon with the utmoſt reverence and veneration; and if the ſtories they tell of it be true, it is well entitled to it all. It is exceedingly damp, and produces (I believe by a kind of petrifaction from the water) a whitiſh kind of ſtone, which, they aſſure us, when reduced to powder, is a ſovereign remedy in many diſeaſes, and ſaves the lives of thouſands every year. There is not a houſe in the iſland that is not provided with it: and they tell us there are many boxes of it ſent annually, not only to Sicily and Italy, but likewiſe to the Levant, and to the Eaſt Indies; and (what is conſidered as a daily ſtanding miracle) notwithſtanding this perpetual conſumption, it has never been exhauſted, nor even ſenſibly diminiſhed; the ſaint always taking care to ſupply them with a freſh quantity the day following. I taſted ſome of it, and believe it is a very harmleſs thing. It taſtes like exceeding bad magneſia, and, I believe, has pretty much the ſame effects. They give about a tea-ſpoonful of it to children in the ſmall-pox and in fevers. It produces a copious ſweat about an hour after, and, they ſay, never fails to be of ſervice. It is likewiſe eſteemed a certain remedy againſt the bite of all venomous animals. There is a very fine ſtatue of St. Paul, in the middle of this grotto, to which they aſcribe great powers.

"The grand-maſter of the knights of Malta is more abſolute, and poſſeſſes more power, than moſt ſovereign princes. His titles are, *ſerene highneſs* and *eminence*; and his houſehold attendance and court are all very princely. As he has the diſpoſal of all lucrative offices, he makes of his councils what he pleaſes: beſides, in all the councils that compoſe the juriſdiction of this little nation, he himſelf preſides, and has two votes. He has the diſpoſal of 21 commanderies, and one priory, every five years; and as there is always a number of expectants, he is

very much courted. He is choſen by a committee of 21; which committee is nominated by the ſeven nations, three out of each nation. The election muſt be over within three days of the death of the former grand-maſter; and, during theſe three days, there is ſcarce a ſoul that ſleeps at Malta: all is cabal and intrigue; and moſt of the knights are maſked, to prevent their particular attachments and connections from being known: the moment the election is over, every thing returns to its former channel.

"The land-force of Malta is equal to the number of men in the iſland fit to bear arms. They have about 500 regulars belonging to the ſhips of war; and 150 compoſe the guard of the prince. The two iſlands of Malta and Gozzo contain about 150,000 inhabitants. The men are exceeding robuſt and hardy. I have ſeen them row for 10 or 12 hours without intermiſſion, and without even appearing to be fatigued. Their ſea-force conſiſts of 4 galleys, 3 galliots, 4 ſhips of 60 guns, and a frigate of 36, beſides a number of the quick-ſailing little veſſels called *ſcampavias* (literally *runaways*). Their ſhips, galleys, and fortifications, are not only well ſupplied with excellent artillery, but they have likewiſe invented a kind of ordnance of their own, unknown to all the world beſides. For we found, to our no ſmall amazement, that the rocks were not only cut into fortifications, but likewiſe into artillery, to defend theſe fortifications, being hollowed out, in many places, into the form of immenſe mortars. The charge is ſaid to be about a barrel of gunpowder, over which they place a large piece of wood, made exactly to fit the mouth of the chamber. On this they heap a great quantity of cannon-balls, ſhells, or other deadly materials; and when an enemy's ſhip approaches the harbour, they fire the whole into the air: and they pretend it produces a very great effect; making a ſhower for 200 or 300 yards round, that would ſink any veſſel.

"Notwithſtanding the ſuppoſed bigotry of the Malteſe, the ſpirit of toleration is ſo ſtrong, that a moſque has been lately built for their ſworn enemies the Turks. Here the poor ſlaves are allowed to enjoy their religion in peace. It happened lately that ſome idle boys diſturbed them during their ſervice; they were immediately ſent to priſon and ſeverely puniſhed. The police indeed is much better regulated than in the neighbouring countries, and aſſaſſinations and robberies are very uncommon; the laſt of which crimes the grand-maſter puniſhes with the utmoſt ſeverity. He is ſaid to be much more relaxed with regard to the firſt.

"Perhaps Malta is the only country in the world where duelling is permitted by law. As their whole eſtabliſhment is originally founded on the wild and romantic principles of chivalry, they have ever found it too inconſiſtent with thoſe principles to aboliſh duelling; but they have laid it under ſuch reſtrictions as greatly to leſſen its danger. Theſe are curious enough. The duelliſts are obliged to decide their quarrel in one particular ſtreet of the city; and if they preſume to fight any where elſe, they are liable to the rigour of the law. But, what is not leſs ſingular, but much more in their favour, they are obliged, under the moſt ſevere penalties, to put up their ſwords when ordered to do ſo by a *woman*, a *prieſt*, or a *knight*. Under theſe limitations, in the midſt of a great city, one would imagine it almoſt impoſſible that a duel could ever end in blood: however, this is not the caſe: a croſs is always painted oppoſite to the ſpot where a knight has been killed, in commemoration of his fall. We counted about 20 of theſe croſſes.

"About three months ago (Mr. Brydone's letter is dated June 7, 1770), two knights had a diſpute at a billiard-table. One of them, after giving a great deal of abuſive language, added a blow; but, to the aſtoniſhment of all Malta (in whoſe annals there is not a ſimilar inſtance), after ſo great a provocation, he abſolutely refuſed to fight his antagoniſt. The challenge was repeated, and he had time to reflect on the conſequences; but ſtill he refuſed to enter the liſts. He was condemned to make the *amende honorable* in the great church of St. John for 45 days ſucceſſively; then to be confined in a dungeon, without light, for five years; after which he is to remain a priſoner in the caſtle for life. The unfortunate young man who received this blow is likewiſe in diſgrace, as he has not had an opportunity of wiping it out in the blood of his adverſary.

"The horſe-races of Malta are of a very uncommon kind. They are performed without either ſaddle, bridle, whip, or ſpur; and yet the horſes are ſaid to run full ſpeed, and to afford a great deal of diverſion. They are accuſtomed to the ground for ſome weeks before; and although it is entirely over rock and pavement, there are very ſeldom any accidents. They have races of aſſes and mules performed in the ſame manner four times every year. The rider is only furniſhed with a machine like a ſhoemaker's awl, to prick on his courſer if he is lazy.

"As Malta is an epitome of all Europe, and an aſſemblage of the younger brothers, who are commonly the beſt, of its firſt families, it is probably one of the beſt academies for politeneſs in this part of the globe: beſides, where every one is entitled by law as well as cuſtom to demand ſatisfaction for the leaſt breach of it, people are under a neceſſity of being very exact and circumſpect, both with regard to their words and actions."

Knights of MALTA, otherwiſe called *Hoſpitalers of St. John of Jeruſalem*, a religious military order, whoſe reſidence is in the iſland of Malta, ſituated in the Mediterranean ſea, upon the coaſt of Africa. The Knights of Malta, ſo famous for defending Chriſtendom, had their riſe as follows:

Some time before the journey of Godfrey of Bouillon into the Holy Land, ſome Neapolitan merchants, who traded in the Levant, obtained leave of the caliph of Egypt to build an houſe for thoſe of their nation who came thither on pilgrimage, upon paying an annual tribute. Afterwards they built two churches, and received the pilgrims with great zeal and charity. This example being followed by others, they founded a church in honour of St. John, and an hoſpital for the ſick; whence they took the name of *Hoſpitalers*. A little after Godfrey of Bouillon had taken Jeruſalem, in 1099, they began to be diſtinguiſhed by black habits and a croſs with eight points; and, beſides the ordinary vows, they made another, which was to defend the pilgrims againſt the inſults of the infidels. This foundation was completed in 1104, in the reign of Baldwin; and ſo their order became military, into which many perſons of quality entered, and changed the name of *hoſpitalers* into that of *knights*.

When Jeruſalem was taken, and the Chriſtians loſt their power in the Eaſt, the knights retired to Acre or Ptolemais, which they defended valiantly in 1290. Then they followed the king of Cyprus, who gave them Limiſſon in his dominions, where they ſtayed till 1310. That ſame year they took Rhodes, under the grand-maſter Foulques de Villaret, a Frenchman; and next year defended it againſt an army of Saracens: ſince which the grand-maſters have uſed theſe four letters, F. E. R. T. i. e. *Fortitudo ejus Rhodum tenuit*; and the order was from thence called *knights of Rhodes*.

In 1522, Soliman having taken Rhodes, the knights retired into Candia, and thence into Sicily. In 1530 Charles V. gave them the iſland of Malta, to cover his kingdom of Sicily from the Turks. In 1566, Soliman beſieged Malta; but it was gallantly defended by the grand-maſter John de Valette Pariſot, and the Turks obliged to quit the iſland with great loſs.

The knights conſiſted of eight different languages or nations, of which the Engliſh were formerly the ſixth; but at preſent they are but ſeven, the Engliſh having withdrawn

themſelves. The firſt is that of Provence, whoſe chief is grand commendator of religion: the ſecond of Auvergne, whoſe chief is mareſchal of the order: the third of France, whoſe chief is grand-hoſpitaler: the fourth, of Italy; and their chief, admiral: the fifth, of Arragon; and their chief, grand-conſervator: the ſixth, of Germany; and their chief, grand-bailiff of the order: the ſeventh, of Caſtile; and their chief grand-chancellor. The chief of the Engliſh was grand-commander of the cavalry.

None are admitted into this order but ſuch as are of noble birth both by father and mother's ſide for four generations, excepting the natural ſons of kings and princes The knights are of two ſorts; thoſe who have a right to be candidates for the dignity of grand-maſter, called *grand-croſſes*; and thoſe who are only *knights aſſiſtants*, who are taken from good families. They never marry; yet have continued from 1090 to the preſent time.

The order conſiſts of three eſtates; the knights, chaplains, and ſervants at arms. There are alſo prieſts who officiate in the churches: friar-ſervants, who aſſiſt at the offices; and *donnes*, or *demi-croſſes*; but theſe are not reckoned as conſtituent parts of the body. This diviſion was made in 1130, by the grand-maſter Raimond du Puy.

The government of the order is mixed, being partly monarchical, and partly ariſtocratical. The grand-maſter is ſovereign, coins money, pardons criminals, and gives the places of grand priors, bailiffs, knights, &c. The ordinary council is compoſed of the grand-maſter and the grand-croſſes. Every language has ſeveral grand priories, and every priory a certain number of commanderies.

The knights are received into this order, either by undergoing the trials preſcribed by the ſtatutes, or by diſpenſation. The diſpenſations are obtained either by the pope's brief, or by a general chapter of the order, and are granted in caſe of ſome defect as to the nobility of their pedigree, eſpecially on the mother's ſide. The knights are received, either as of age, under minority, or pages to the grand-maſter. They muſt be 16 years old complete before they are received; they enter into the noviciate at 17, and are profeſſed at 18. They ſometimes admit infants of one year old; but the expence is about 4000 livres. The grand-maſter has 16 pages who ſerve him, from 12 to 16 years of age. The knights wear on the left-ſide of their cloak or waiſtcoat a croſs of white waxed cloth, with eight points, which is their true badge; that of gold being only for ornament. When they go to war againſt the Turks, they wear a red caſſock, with a great white croſs before and behind, without points, which are the arms of the religion. The ordinary habit of the grand-maſter is a ſort of caſſock of tabby-cloth, tied about with a girdle, at which hangs a great purſe, to denote the charitable inſtitution of the order. Over this he wears a velvet gown; and on the left ſide a white croſs with eight points. His yearly revenue is 10,000 ducats. He acknowledges the kings of Spain, and both the Sicilies, as his protectors; and is obliged, by his agreement with the emperor Charles V. to ſuppreſs pirates.

MALTON, a town of the north-riding of Yorkſhire ſeated on the river Derwent, over which there is a good ſtone-bridge. It is compoſed of two towns, the New and the Old; and is well inhabited, accommodated with good inns, and ſends two members to parliament. W. lon. 0. 30. N. lat. 54. 8.

MALVA, the MALLOW: A genus of the polyandria order, belonging to the monadelphia claſs of plants; and in the natural method ranking under the 37th order, *Columniferæ*. The calyx is double; the exterior one triphyllous; the arilli numerous and monoſpermous. There are 24 ſpecies; conſiſting of herbaceous perennials, biennials, and annuals, for medical, economical, and ornamental uſes; riſing with erect ſtalks from about half a yard to 10 or 12 feet high, garniſhed with large, roundiſh, lobated leaves, and quinquepetalous flowers. They are all eaſily and plentifully raiſed from ſeed.

The leaves of the common mallow are reckoned the firſt of the four emollient herbs: they were formerly in ſome eſteem as food, for looſening the belly; at preſent, decoctions of them are ſometimes employed in dyſenteries, heat, and ſharpneſs of urine; and, in general, for obtunding acrimonious humours: their principal uſe is in emollient glyſters, cataplaſms, and fomentations. The leaves enter the officinal decoction for glyſters, and a conſerve is prepared from the flowers.

Several ſpecies of malva, macerated like hemp, afford a thread ſuperior to hemp for ſpinning, and which is ſaid to make more beautiful cloths and ſtuffs than even flax. Theſe ſpecies are the criſpa, Peruviana, and Mauriſiana. From the former, which affords ſtronger and longer fibres, cords and twine have alſo been made. From the malvæ, likewiſe, a new ſort of paper has been fabricated by M. de l'Iſle. On this invention, Meſſ. Lavoiſier, Sage, and Berthollet, in name of the *Academie des Sciences*, obſerve, That "it is not probable the paper made by M. de l'Iſle will be ſubſtituted for that made from rags, either for the purpoſe of printing or writing. Yet paper from the mallows may be uſed for theſe purpoſes, if we can judge from a volume printed on it preſented to the academy. The great utility of M. de l'Iſle's invention is for furniture, which conſumes a great quantity of rags; and his papers have a natural hue, much more ſolid than can be given by colouring matter, and this hue may ſerve as a ground for other drawings. M. de l'Iſle ſhould, we think, be encouraged to purſue his experiments, which, we have reaſon to expect, may be in the end very uſeful: by his zeal, activity, and knowledge, he will probably contribute to render the art of making paper more perfect: in this art he is much engaged; and his attempts, which he has ſhown to the academy, merit its praiſes."

MALVERN, GREAT and LITTLE, (with the *Chace* and the *Hills*); two towns of Worceſterſhire, in which were formerly two abbeys, about three miles aſunder. Since the diſſolution nothing remains of the abbey of *Great Malvern* but the gateway of the abbey, and church, now parochial. Part of it was a religious cell for hermits before the Conqueſt; and the greateſt part, with the tower, built in the reign of William the Conqueror. Its outward appearance is very ſtriking. It is 171 feet in length, 63 in breadth, and 63 in height. In it are ten ſtalls; and it is ſuppoſed to have been rebuilt in the year 1171. The nave only remains in part, the ſide aiſles being in ruins. The windows have been beautifully enriched with painted glaſs, and in it are remains of ſome very ancient monuments. *Little Malvern* ſtands in a cavity of the hills, which are great lofty mountains, riſing like ſtairs, one higher than another, for about ſeven miles, and divide this county from Herefordſhire. There is a ditch here very much admired. On the hills are two medicinal ſprings, called *holy wells*, one good for the eyes, and the other for cancers. Henry VII. his queen, and his two ſons prince Arthur and prince Henry, were ſo delighted with this place, that they beautified the church and windows, part of which remain, though mutilated. In the lofty ſouth windows of the church are the hiſtorical paſſages of the Old Teſtament; and in the north windows the pictures of the holy family, the nativity and circumciſion of our Saviour, the adoration of the ſhepherds and the kings, his preſentation in the temple, his baptiſm, faſting, and temptation, his miracles, his laſt ſupper with his diſciples, his prayer in the garden, his paſſion, death, and burial, his deſcent into hell, his reſurrection and aſcenſion, and the

coming of the Holy Ghoſt. The hiſtory of our Saviour's paſſion is painted differently in the eaſt window of the choir, at the expence of Henry VII. whoſe figure is therefore often repreſented, as is that of his queen. In the weſt window is a noble piece of the day of judgment, not inferior to the paintings of Michael Angelo. *Malvern Chace* contains 7115 acres in Worceſterſhire (beſides 241 acres called the Prior's Land), 619 in Herefordſhire, and 103 in Glouceſterſhire. *Malvern Hills* run from north to ſouth, the higheſt point 1313 feet above the ſurface of the Severn at Hanley, and appear to be of lime-ſtone and quartz. On the ſummit of theſe hills is a camp with a treble ditch, imagined to be Roman, and is ſituated on the Herefordſhire ſide of the hills.

MALVEZZI (Virgilio marquis de), an Italian gentleman, born at Bologna, acquired great reputation by his learning and writings. He was well verſed in polite literature, muſic, law, phyſic, and the mathematics. He ſerved alſo in a diſtinguiſhed poſt in the army of Philip IV. king of Spain, and was employed by him in ſome important negotiations. He died at Bologna in the year 1654, leaving ſeveral works in Spaniſh and Italian. Among the latter are his Diſcourſes on the Firſt Book of Tacitus: this work has been tranſlated into Engliſh.

MALUS, in botany. See Pyrus.

MAMALUKES, the name of a dynaſty that reigned in Egypt.

MAMBRUN (Peter), an ingenious and learned French Jeſuit, born in the dioceſe of Clermont, in the year 1581. He was one of the moſt perfect imitators of Virgil in Latin poetry, and his poems are of the ſame ſpecies: Thus he wrote *Eclogues*; *Georgics*, or four books on the culture of the ſoul and the underſtanding; together with a heroic poem entitled *Conſtantine, or Idolatry overthrown*. He ſhowed alſo great critical abilities in a Latin *Peripatetical diſſertation on epic poetry*. He died in 1661.

MAMERTINI, a mercenary band of ſoldiers which paſſed from Campania into Sicily at the requeſt of Agathocles. When they were in the ſervice of Agathocles, they claimed the privilege of voting at the election of magiſtrates at Syracuſe, and had recourſe to arms to ſupport their unlawful demands. The ſedition was appeaſed by the authority of ſome leading men, and the Campanians were ordered to leave Sicily. In their way to the coaſt they were received with great kindneſs by the people of Meſſana, and ſoon returned perfidy for hoſpitality. They conſpired againſt the inhabitants, murdered all the males in the city, married their wives and daughters, and rendered themſelves maſters of the place. After this violence they aſſumed the name of Mamertini, and called their city Mamertum, or Mamertium, from a provincial word which in their language ſignified *martial* or *warlike*. The Mamertines were afterwards defeated by Hiero, and totally diſabled to repair their ruined affairs.

MAMMÆ, in anatomy, the breaſts of a female.

MAMMALIA, in natural hiſtory, the firſt claſs of animals in the Linnæan ſyſtem, divided into ſeven orders. See Zoology.

MAMMEA, Mammee *Tree:* a genus of the monogynia order, belonging to the polyandria claſs of plants; and in the natural method ranking with thoſe of which the order is doubtful. The corolla is tetrapetalous: the calyx diphyllous; the berry very large and tetraſpermous. There are two ſpecies; both of them large evergreen trees of the hot parts of America and Aſia, and retained here in hot-houſes for variety; both of them adorned with large, oval, oblong, ſtiff leaves, and large quadripetalous flowers, ſucceeded by large, round, eatable fruit, of a moſt exquiſitely rich flavour. They are propagated by ſeed, which is to be ſowed in ſmall pots of light earth, and plunged in the bark-bed, where they will ſoon come up: give gentle waterings, and about Auguſt tranſplant them into ſeparate pots a ſize larger, plunging them into the bark-bed, and giving ſhade and water till freſh-rooted. In this country they muſt never be taken out of the ſtove.

MAMMON, the god of riches, according to ſome authors; though others deny that the word ſtands for ſuch a deity, and underſtand by it only *riches* themſelves. Our Saviour ſays, We *cannot ſerve God and mammon*: that is, be religious and worldly-minded at the ſame time. Our poet Milton, by poetic licence, makes Mammon to be one of the fallen angels, and gives us his character in the following lines:

> Mammon, the leaſt erected ſpirit that fell
> From heav'n: for ev'n in heav'n his looks and thoughts
> Were always downward bent; admiring more
> The riches of heav'n's pavement, trodden gold,
> Than aught divine or holy elſe enjoy'd
> In beatific viſion: by him firſt
> Man alſo, and by his ſuggeſtion taught,
> Ranſack'd the centre, and with impious hands
> Rifled the bowels of their mother earth
> For treaſures better hid. Soon had his crew
> Open'd into the hill a ſpacious wound,
> And digg'd out ribs of gold. Let none admire
> That riches grow in hell; that ſoil may beſt
> Deſerve the precious bane.

MAMMOTH, or Mammuth, the name of a huge animal now unknown, to which are ſaid to have belonged thoſe tuſks, bones, and ſkeletons of vaſt magnitude, which have been frequently found in different parts of Siberia, as well in the mountains as the valleys; likewiſe in Ruſſia, Germany, and North America. Many ſpecimens of them may be ſeen in the imperial cabinet at Peterſburgh; in the Britiſh, Dr. Hunter's, and the late Sir Aſhton Lever's muſeums, and in that of the royal ſociety. A deſcription of the mammoth is given by Müller, in the *Recueil des Voyages du Nord*. "This animal (he ſays) is four or five yards high, and about 30 feet long. His colour is greyiſh: his head is very long, and his front very broad. On each ſide, preciſely under the eyes, there are two horns, which he can move and croſs at pleaſure. In walking he has the power of extending and contracting his body to a great degree." Iſbrandes Ides gives a ſimilar account; but he is candid enough to acknowledge that he never knew any perſon who had ſeen the mammoth alive. Mr Pennant, however, thinks it "more than probable that it ſtill exiſts in ſome of thoſe remote parts of the vaſt new continent impenetrated yet by Europeans. Providence (he adds) maintains and continues every created ſpecies; and we have as much aſſurance that no race of animals will any more ceaſe while the earth remaineth, than *ſeed-time and harveſt, cold and heat, ſummer and winter, day and night*." The Ohio Indians have a tradition handed down from their fathers reſpecting theſe animals: "That in ancient times a herd of them came to the Big-bone Licks, and began an univerſal deſtruction of the bears, deer, elks, buffaloes, and other animals which had been created for the uſe of the Indians: that the Great Man above, looking down and ſeeing this, was ſo enraged, that he ſeized his lightning, deſcended to the earth, ſeated himſelf upon a neighbouring mountain on a rock, on which his ſeat and the print of his feet are ſtill to be ſeen, and hurled his bolts among them till the whole were ſlaughtered, except the big bull who, preſenting his forehead to the ſhafts, ſhook them off as they fell; but at length miſſing one, it wounded him in the ſide; whereupon, ſpringing round, he bounded over the Ohio, the Wabaſh, the Illinois, and finally over the great lakes, where he is living at this day."

Several eminent naturaliſts, as Sir Hans Sloane, Gmelin, Daubenton, and Buffon, are of opinion that theſe prodigious bones and tuſks are really the bones and tuſks of elephants, and many modern philoſophers have held the mammoth to be as fabulous as the centaur. The great difference in ſize they endeavour to account for as ariſing from difference in age, ſex, and climate; and the cauſe of their being found in thoſe northern parts of the world where elephants are no longer natives, nor can even long exiſt, they preſume to have ariſen from hence; that, in the great revolutions which have happened in the earth, the elephants, to avoid deſtruction, have left their native country, and diſperſed themſelves wherever they could find ſafety. Their lot has been different. Some in a longer and others in a ſhorter time after their death, have been tranſported to great diſtances by ſome vaſt inundations. Thoſe, on the contrary, which ſurvived, and wandered far to the north, muſt neceſſarily have fallen victims to the rigour of the climate. Others, without reaching to ſo great a diſtance, might be drowned, or periſh with fatigue. In the year 1767, Dr. Hunter, with the aſſiſtance of his brother Mr. J. Hunter, had an opportunity of inveſtigating more particularly this part of natural hiſtory, and has evidently proved, that theſe foſſil bones and tuſks are not only larger than the generality of elephants, but that the tuſks are more twiſted, or have more of the ſpiral curve, than elephants teeth; and that the thigh and jaw bones differ in ſeveral reſpects from thoſe of the elephant: but what put the matter beyond all diſpute was the ſhape of the grinders, which clearly appeared to belong to a carnivorous animal, or at leaſt to an animal of the mixed kind; and to be totally different from thoſe of the elephant, which is well known not to be of the carnivorous, but graminivorous kind, both by the form of its grinders, and by its never taſting animal food.—Some have ſuppoſed theſe foſſil bones to belong to the hippopotamus or river-horſe; but there are many reaſons againſt this ſuppoſition, as the hippopotamus is even much ſmaller than the elephant, and has ſuch remarkably ſhort legs, that his belly reaches within three or four inches of the ground.

North America ſeems to be the quarter where the remains in queſtion moſt abound. On the Ohio, and in many parts farther north, tuſks, grinders, and ſkeletons of unparalleled magnitude, which can admit of no compariſon with any animal at preſent known, are found in vaſt numbers, ſome lying on the ſurface of the earth, and ſome a little below it. A Mr. Stanley, taken priſoner by the Indians near the mouth of the Taniſſee, relates, as Mr. Jefferſon informs us, that after being tranſferred through ſeveral tribes, from one to another, he was at length carried over the mountains weſt of the Miſſouri to a river which runs weſtwardly; that theſe bones abounded there; and that the natives deſcribed to him the animal to which they belonged as ſtill exiſting in the northern parts of their country; from which deſcription he judged it to be an elephant. Bones of the ſame kind have been lately found ſome feet below the ſurface of the earth, in ſalines opened on the North Holſton, a branch of the Taniſſee, about the latitude of 36½° north. Inſtances are mentioned of like animal remains found in the more ſouthern climates of both hemiſpheres: but Mr. Jefferſon obſerves, "they are either ſo looſely mentioned, as to leave a doubt of the fact; ſo inaccurately deſcribed, as not to authoriſe the claſſing them with the great northern bones; or ſo rare, as to found a ſuſpicion that they have been carried thither as curioſities from more northern regions. So that, on the whole, there ſeem to be no certain veſtiges of the exiſtence of this animal farther ſouth than the ſalines laſt mentioned. It is remarkable (continues he) that the tuſks and ſkeletons have been aſcribed by the naturaliſts of Europe to the elephant, while the grinders have been given to the hippopotamus or river-horſe. Yet it is acknowledged, that the tuſks and ſkeletons are much larger than thoſe of the elephant, and the grinders many times greater than thoſe of the hippopotamus, and eſſentially different in form. Wherever theſe grinders are found, there alſo we find the tuſks and ſkeleton; but no ſkeleton of the hippopotamus nor grinders of the elephant. It will not be ſaid that the hippopotamus and elephant came always to the ſame ſpot, the former to depoſit his grinders, and the latter his tuſks and ſkeleton. For what became of the parts not depoſited there? We muſt agree, then, that theſe remains belong to each other; that they are of one and the ſame animal; that this was not a hippopotamus, becauſe the hippopotamus had no tuſks nor ſuch a frame, and becauſe the grinders differ in their ſize as well as in the number and form of their points. That it was not an elephant, I think aſcertained by proofs equally deciſive. I will not avail myſelf of the authority of the celebrated anatomiſt, Mr. J. Hunter, who, from an examination of the form and ſtructure of the tuſks, has declared they were eſſentially different from thoſe of the elephant; becauſe another anatomiſt, D'Aubenton, equally celebrated, has declared, on a like examination, that they are preciſely the ſame. Between two ſuch authorities I will ſuppoſe this circumſtance equivocal. But, 1. The ſkeleton of the mammoth (for ſo the incognitum has been called) beſpeaks an animal of five or ſix times the cubic volume of the elephant, as M. de Buffon has admitted. 2. The grinders are five times as large, are ſquare, and the grinding ſurface ſtudded with four or five rows of blunt points: whereas thoſe of the elephant are broad and thin, and their grinding ſurface flat. 3. I have never heard an inſtance, and ſuppoſe there has been none, of the grinder of an elephant being found in America. 4. From the known temperature and conſtitution of the elephant, he could never have exiſted in thoſe regions where the remains of the mammoth have been found. The elephant is a native only of the torrid zone and its vicinities: if, with the aſſiſtance of warm apartments and warm clothing, he has been preſerved in life in the temperate climates of Europe, it has only been for a ſmall portion of what would have been his natural period, and no inſtance of his multiplication in them has ever been known. But no bones of the mammoth, as I have before obſerved, have been ever found further ſouth than the ſalines of the Holſton, and they have been found as far north as the arctic circle. Thoſe, therefore, who are of opinion that the elephant and mammoth are the ſame, muſt believe, 1. That the elephant known to us can exiſt and multiply in the frozen zone: or, 2. That an internal fire may once have warmed thoſe regions, and ſince abandoned them, of which, however, the globe exhibits no unequivocal indications: or, 3. That the obliquity of the ecliptic, when theſe elephants lived, was ſo great as to include within the tropics all thoſe regions in which the bones are found; the tropics being, as is before obſerved, the natural limits of habitation for the elephant. But if it be admitted that this obliquity has really decreaſed, and we adopt the higheſt rate of decreaſe yet pretended, that is, of one minute in a century, to tranſfer the northern tropic to the arctic circle would carry the exiſtence of theſe ſuppoſed elephants 250,000 years back; a period far beyond our conception of the duration of animal bones left expoſed to the open air, as theſe are in many inſtances. Beſides, though theſe regions would then be ſuppoſed within the tropics, yet their winters would have been too ſevere for the ſenſibility of the elephant. They would have had, too, but one day and one night in the year; a circumſtance to which we have no reaſon to ſuppoſe the nature of the elephant fitted. However, it has been demonſtrated, that if a variation of obliquity in the ecliptic takes place at all, it is vibratory, and never exceeds the limits of nine degrees, which is not ſufficient to bring theſe bones within the tropics. One of

theſe hypotheſes, or ſome other equally arbitrary and inadmiſſible to cautious philoſophy, muſt be adopted to ſupport the opinion that theſe are the bones of the elephant. For my own part, I find it eaſier to believe that an animal may have exiſted, reſembling the elephant in his tuſks and general anatomy, while his nature was in other reſpects extremely different. From the 30th degree of ſouth latitude to the 30th of north, are nearly the limits which nature has fixed for the exiſtence and multiplication of the elephant known to us. Proceeding thence northwardly to 36½ degrees, we enter thoſe aſſigned to the mammoth. The further we advance north, the more their veſtiges multiply as far as the earth has been explored in that direction; and it is as probable as otherwiſe, that this progreſſion continues to the pole itſelf, if land extends ſo far. The centre of the frozen zone, then, may be the acme of their vigour, as that of the torrid is of the elephant. Thus nature ſeems to have drawn a belt of ſeparation between theſe two tremendous animals, whoſe breadth indeed is not preciſely known, though at preſent we may ſuppoſe it about 6½ degrees of latitude; to have aſſigned to the elephant the regions ſouth of theſe confines, and thoſe north to the mammoth, founding the conſtitution of the one in her extreme of heat, and that of the other in the extreme of cold. When the Creator has therefore ſeparated their nature as far as the extent of the ſcale of animal life allowed to this planet would permit, it ſeems perverſe to declare it the ſame, from a partial reſemblance of their tuſks and bones. But to whatever animal we may aſcribe theſe remains, it is certain that ſuch a one has exiſted in America, and that it was the largeſt of all terreſtrial beings of which any traces have been known to appear.

MAMRE, an Amorite, brother of Aner and Eſchol, and friend of Abraham (Gen. xiv. 13.). It was with theſe three perſons, together with his own and their domeſtics, that Abraham purſued and overcame the kings after their conqueſt of Sodom and Gomorrah. This Mamre, who dwelt near Hebron, communicated his name to great part of the country round about. Hence we read (ch. xiii. 18. xxiii. 17, &c.), that Abraham dwelt in Mamre and in the plain of Mamre. But it is obſerved, that what we tranſlate the *plain*, ſhould be rendered the *oak*, of Mamre, becauſe the word *elon* ſignifies an *oak* or *tree of a long duration*. Sozomen tells us, that this tree was ſtill extant, and famous for pilgrimages and annual feaſts, even in Conſtantine's time; that it was about ſix miles diſtant from Hebron; that ſome of the cottages which Abraham built were ſtill ſtanding near it; and that there was a well likewiſe of his digging, whereunto both Jews, Chriſtians and Heathens did at certain ſeaſons reſort, either out of devotion or for trade, becauſe there was held a great mart. To theſe ſuperſtitions Conſtantine the Great put a ſtop.

MAN, the head of the animal creation, is a being who feels, reflects, thinks, contrives, and acts; who has the power of changing his place upon the earth at pleaſure; who poſſeſſes the faculty of communicating his thoughts by means of ſpeech; and who has dominion over all other creatures on the face of the globe. Animated and enlightened by a ray from the Divinity, he ſurpaſſes in dignity every material being. He ſpends leſs of his time in ſolitude, than in ſociety and in obedience to thoſe laws which he himſelf has framed.

In the *Syſtema Naturæ*, MAN (*Homo*) is ranked as a diſtinct genus of the order *Primates* or "Chiefs," belonging to the *Mammalia* claſs of animals, or thoſe which nouriſh their young by means of lactiferous teats or paps. Of this genus he is the only ſpecies; and denominated *Sapiens*, as being endowed with wiſdom far ſuperior to, or rather in excluſion of, all other animals.—He *varies*, from climate, education, and habits; and the following varieties, excluſive of *wild men*†, are enumerated by Linnæus:

α *Americans*. "Of copper-coloured complexion, choleric conſtitution, and remarkably erect."—Their hair is black, lank, and coarſe; their noſtrils are wide; their features harſh, and the chin is ſcantily ſupplied with beard. Are obſtinate in their tempers, free and ſatisfied with their condition; and are regulated in all their proceedings by traditional cuſtoms.—Paint their ſkin with red ſtreaks.

β *Europeans*. "Of fair complexion, ſanguine temperament, and brawny form."—The hair is flowing, and of various ſhades of brown; the eyes are moſtly blue.—They are of gentle manners, acute in judgment, of quick invention, and governed by fixed laws.—Dreſs in cloſe veſtments.

γ *Aſiatics*. "Of ſooty complexion, melancholic temperament, and rigid fibre."—The hair is ſtrong, black, and lank; the eyes are dark brown.—They are of grave, haughty, and covetous manners; and are governed by opinions.—Dreſs in looſe garments

δ *Africans*. "Of black complexion, phlegmatic temperament, and relaxed fibre."—The hair is black and frizzly; the ſkin ſoft and ſilky; the noſe flat; the lips are thick; and the female has a natural apron, and long lax breaſts.—They are of crafty, indolent, and careleſs diſpoſitions, and governed in their actions by caprice.—Anoint the ſkin with greaſe.

ε *Monſters*. Of theſe there are ſeveral varieties; the firſt and ſecond of which, in the following liſt, are occaſioned by peculiarity of climate, while the reſt are produced by artificial management. 1. *Alpini*: The inhabitants of the northern mountains: they are ſmall in ſtature, active and timid in their diſpoſition. 2. *Patagonici*: The Patagonians of South America; of vaſt ſize, and indolent in their manners. 3 *Monorchides*: The Hottentots; having one teſticle extirpated. 4. *Imberbes*: Moſt of the American nations; who eradicate their beards and the hair from every part of the body except the ſcalp. 5. *Macrocephali*: The Chineſe; who have their heads artificially forced into a conical form. 6. *Plagiocephali*: The Canadian Indians; who have the fore part of their heads flattened, when young, by compreſſion.

The following arrangement of the varieties in the human ſpecies is offered by Dr. Gmelin as more convenient than that of Linnæus:

1. White, a: (*Hom. Albus.*) Formed by the rules of ſymmetrical elegance and beauty; or at leaſt what we conſider as ſuch.—This diviſion includes almoſt all the inhabitants of Europe; thoſe of Aſia on this ſide of the Oby, the Caſpian, Mount Imaus, and the Ganges; likewiſe the natives of the north of Africa, of Greenland, and the Eſquimaux.

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* In the early editions of Linnæus, the *Troglodytes* was added as another ſpecies; but is now more properly ranked under the genus *Simia*. See SIMIA.

† HOMINES *Feri*; deſcribed as walking on all fours, as being dumb, and as covered with hair.—1. A youth found in Lithuania, in 1661, reſembling a bear. 2. A youth found in Heſſe, in 1544, reſembling a wolf. 3. A youth in Ireland reſembling a ſheep, (*Tulp. Obſ.* iv. 9.) 4. A youth in Bamberg reſembling an ox, (*Camerarius.*) 5. A wild youth found in 1724 in Hanover. 6. Wild boys found in 1719 in the Pyrenees. 7. A wild girl found in 1717 in Overyſel. 8. A wild girl found in 1731 in Champagne. 9. A wild lad found near Leyden, (*Boerhaave.*)—Theſe inſtances of wild men and their ſimilitudes, according to Mr. Kerr, are partly to be attributed to impoſture, and in part to exaggeration: Moſt probably (he thinks) idiots who had ſtrayed from their friends, and who reſembled the above animals only in imitating their voices.

b, Brown: *(Hom. Badius.)* Of a yellowiſh brown colour; has ſcanty hairs, flat features, and ſmall eyes.—This variety takes in the whole inhabitants of Aſia not included in the preceding diviſion.

c, Black: (*Hom. Niger.*) Of black complexion; has frizzly hair, a flat noſe, and thick lips.—The whole inhabitants of Africa, excepting thoſe of its more northern parts.

d, Copper-coloured: (*Hom. Cupreus.*) The complexion of the ſkin reſembles the colour of copper not burniſhed.—The whole inhabitants of America, except the Greenlanders and Eſquimaux.

e, Tawny: *(Hom. Fuſcus.)* Chiefly of a dark blackiſh-brown colour; having a broad noſe, and harſh coarſe ſtraight hair.—The inhabitants of the Southern iſlands, and of moſt of the Indian iſlands.

The following is Linnæus's deſcription of *Man*, as tranſlated by Mr. Kerr:

"The body, which ſeldom reaches ſix feet in height, is erect, and almoſt naked, having only ſome ſcattered diſtant hairs, except in ſome ſmall ſpots to be afterwards noticed, and when firſt born is entirely naked. The head is ſhaped like an egg; the ſcalp being long, and covered with hair; the forehead broad; the top of the head flat; and the hind-head protuberant. The face is naked, having the brow or forehead flattened and quadrangular; the temples are compreſſed, with peaked angles pointing upwards and backwards towards the hairy ſcalp. The eye-brows are prominent, and covered with hairs which, ſhedding outwards, cover each other like tiles; and between the inner extremities of the two eye-brows there is a ſmooth, ſhallow furrow or depreſſion, in a line with the noſe. The upper eye-lid is moveable, but the lower one hardly moves, and both are planted at their edges with a row of ſtiff recurved hairs, named *eye-laſhes*. The eye-balls are round, having no ſuſpending muſcle as in thoſe of moſt quadrupeds; the pupil, or opening of the ſight, is circular; and the eye has no *membrana nictitans*. The upper parts of the cheeks are prominent, ſoftiſh, and coloured with a red bluſh; their outer parts flattened; the lower parts are hollowed, lax, and expanſile. The noſe is prominent, and compreſſed at the ſides; its extremity or point is higher than the reſt, and blunt; the noſtrils are oval, open downwards, with thickened edges, and are hairy on their inſides. The upper lip is almoſt perpendicular, and is furrowed on the middle, from the diviſion between the noſtrils to the edge of the lip; the under lip is erect, thicker and more prominent than that above; both have a ſmooth red protuberance, ſurrounding the mouth at their edges. The chin is prominent, blunt, and gibbous. In males, the face all round the mouth is covered with hair, called the *beard*, which firſt appears about puberty in patches on the chin. The teeth in both jaws may be diſtinguiſhed into three orders; the *fore teeth* are erect, parallel, and wedge-like, of the kind named *inciſors*, or *cutting teeth*; they ſtand cloſe to each other, and are more equal and rounder than in other animals; the *tuſks*, called in man *eye-teeth* and *corner-teeth*, of which there is only one on each ſide of the fore-teeth in each jaw, are a little longer than the fore-teeth, but much leſs ſo than in other animals, and they are placed cloſe to the other teeth; the *grinders*, of which there are five on each ſide in both jaws, are blunt, and divided on their upper ſurface into pointed eminences; but theſe are not ſo remarkable as in other animals. The ears are placed on the ſides of the head, are of an oblong rounded figure, with a ſemilunar bend on their anterior edges; they lie flat to the head, are naked, arched at the margin on their upper and poſterior edges, and are thicker and ſoft at the under extremities.

"The trunk of the body conſiſts of the neck, breaſt, back, and belly. The neck is roundiſh, and ſhorter than the head; its vertebræ, or chine bones, are not, as in moſt animals, connected by a ſuſpenſory ligament; the nape is hollowed; the throat, immediately below the chin, is hollowed at its upper part, and protuberant in the middle a little lower down. The breaſt is ſomewhat flattened both before and behind; on the fore-part there is a cavity or depreſſion where it joins with the neck; the arm-pits are hollow and hairy; the pit of the ſtomach is flat: on the breaſt are two diſtant, round, protuberant mammæ, or dugs, each having a cylindrical obtuſe wrinkly projecting nipple, which is ſurrounded by a darker coloured circle called the *areola*. The back is flat, having protuberances on each ſide at the ſhoulder-blades, with a furrow or depreſſion between them. The abdomen or belly is large and protuberant, with a hollow at the navel; the epigaſtric region, or ſituation of the ſtomach, is flat; the hypogaſtric regions, or ſides of the belly, are protuberant; the groin flattiſh and hollowed. The pubes is hairy; the pelvis, or baſin, is wider above, and grows narrower below. The male parts are external and looſe; the penis cylindrical; the ſcrotum roundiſh, lax, and wrinkled, being divided in the middle by a longitudinal ridge or ſmooth line, which extends along the whole perinæum. The female parts are compreſſed and protuberant, having labia, nymphæ, clytoris, and hymen; and, in adults, ſecreting the catamenia. There is no external tail.

"The limbs conſiſt of arms and hands inſtead of fore-legs; and of thighs, legs, and feet. The arms are placed at a diſtance from each other; they are round, and about a foot in length from the joint of the ſhoulder to the elbow; the fore-arm, or cubit, contains two bones, and is obtuſely prominent; the *ulna*, which forms the principal thickneſs of the member, is round, and ſomewhat flattened on the inſide. The hands are broad, flat, and rounded; convex on the outſide or back of the hand, and concave on the inſide or palm. Each hand has five fingers, one of which, named the *thumb*, is ſhorter and thicker than the reſt, and is placed at ſome diſtance from them; the others are near each other, and placed parallel, the outer or *little finger* being the ſmalleſt; the ſecond, named *index* or *fore-finger*, and the fourth, called the *ring-finger*, are next in length and in ſize; and the third, or *middle-finger*, is the longeſt; the point of this laſt, when the arm and hand hang down, reaches to the middle of the thigh. The nails are rounded and oval, being flatly arched, or convex upwards, and each has a ſemilunar whitiſh mark at the root or lower extremity.

"The lower limbs are placed cloſe together, having brawny muſcular haunches and ſwelling fleſhy hips; the knees are obtuſe, bend forwards, and have hollow hams behind. The legs, which are nearly of the ſame length with the thighs, are of a muſcular make behind, where they ſwell out into what is called the *calf*; they are lean, and free of fleſh on the ſhins or fore-parts, and taper downwards to the ancles, which have hard hemiſpherical projections on each ſide, named the *ankle-bones* or *malleoli*. The heel is thick, prominent, and gibbous, being longer and broader than in other animals, for giving a firm ſupport to the body; it joins immediately with the ſole of the foot. The feet are oblong, convex above, and flattened on the ſoles, which have a tranſverſe hollow about the middle. Each foot has five toes, ſomewhat bent downwards, and gibbous or ſwelled underneath at their extremities; they are all placed cloſe together, the inner or great-toe being thicker and ſomewhat ſhorter than the reſt; the ſecond and third are nearly of equal length; and the fourth and fifth are ſhorter than the others, the laſt mentioned or little toe being the ſhorteſt and ſmalleſt. The toe-nails reſemble thoſe on the fingers, which are already deſcribed.

"Thus man differs from the other animals in his erect poſture and naked ſkin, having a hairy ſcalp, being furniſhed with hair on the eye-brows and eye-laſhes, and having, when arrived

at puberty, the pubes, breaſt, arm-pits, and the chin of the males, covered with hair. His brain is larger than that of any other animal, even the moſt enormous: he is provided with an *uvula*, and has organs of ſpeech. His face is placed in the ſame parallel line with his body: he has a projecting compreſſed noſe, and a prominent chin. His feet in walking reſt on the heel. He has no tail; and laſtly, the ſpecies is diſtinguiſhed from other animals by ſome peculiarities of the female conſtitution, which have been already mentioned."

Anatomiſts have employed much pains in the ſtudy of the material part of man, and of that organization which determines his place in the animal creation. From tracing and combining his different external parts; from obſerving that his body is in ſome places covered with hair; that he can walk upon his hands and his feet at the ſame time, in the manner of quadrupeds; that, like certain animals which hold their food in their paws, he has two clavicles; that the female brings forth her young alive, and that her breaſts are ſupplied with milk: from theſe circumſtances we might be led to aſſign man a place in the claſs of viviparous quadrupeds. But, in our opinion, ſuch an arrangement would be defective, arbitrary, and abſurd. Man is not a quadruped: of all the animals, he alone can ſupport himſelf, continually and without reſtraint, in an erect poſture (that is, with his head and body in a vertical line upon his legs). In this majeſtic and dignified attitude, he can change his place, ſurvey this earth which he inhabits, and turn his eyes towards the vault of heaven. By a noble and eaſy gait, he preſerves an equilibrium in the ſeveral parts of his body, and tranſports himſelf from one place to another with different degrees of celerity. To man alone nature has denied a covering; but ſtill he is her maſter-piece, the laſt work which came from the hands of the Almighty Artiſt, the ſovereign and the chief of animals, a world in miniature, the centre which connects the univerſe together. The form of his body, the organs whereof are conſtructed in ſuch a manner as to produce a much greater effect than thoſe of other animals, announces his power. Every thing demonſtrates the excellence of his nature, and the immenſe diſtance placed by the bounty of the Creator between man and beaſt. Man is a reaſonable being; brute animals are deprived of that noble faculty. The weakeſt and moſt ſtupid of the human race is able to manage the moſt ſagacious quadruped; he commands it, and makes it ſubſervient to his uſe. The operations of brutes are purely the effect of mechanical impulſe, and continue always the ſame; human works are varied without end, and infinitely diverſified in the manner of execution. The ſoul of man is free, independent, and immortal. He is fitted for the ſtudy of ſcience, and the cultivation of art; he has the excluſive privilege of examining every thing which has exiſtence, and of holding communication with his fellow-creatures by language, by particular motions of the body, and by marks and characters mutually agreed upon. Hence ariſes that phyſical pre-eminence which he enjoys over all animals; and hence that power which he poſſeſſes over the elements, and (ſo to ſpeak) over nature itſelf. Man, therefore, is unequalled in his kind; but the individuals thereof differ greatly from one another in figure, ſtature, colour, manners, and diſpoſitions. The globe which man inhabits is covered with the productions of his induſtry and the works of his hands: it is his labour, in ſhort, which gives a value to the whole terreſtrial maſs.

The hiſtory of man is an object of attention highly intereſting, whether we conſider him in the different periods of his life, or take a view of the varieties of the ſpecies, or examine the wonderful organization of his frame. We ſhall, therefore, attempt to give a ſhort ſketch of him in theſe different points of view; referring occaſionally to other parts of the work for more particular details.

Nothing (ſays M. Buffon) exhibits ſuch a ſtriking picture of our weakneſs, as the condition of an infant immediately after birth. Incapable of employing its organs, it needs aſſiſtance of every kind. In the firſt moments of our exiſtence, we preſent an image of pain and miſery, and are more weak and helpleſs than the young of any other animal. At birth, the infant paſſes from one element to another: When it leaves the gentle warmth of the tranquil fluid by which it was completely ſurrounded in the womb of the mother, it becomes expoſed to the impreſſions of the air, and inſtantly feels the effects of that active element. The air acting upon the olfactory nerves, and upon the organs of reſpiration, produces a ſhock ſomething like ſneezing, by which the breaſt is expanded, and the air admitted into the lungs. In the mean time, the agitation of the diaphragm preſſes upon the viſcera of the abdomen, and the excrements are thus for the firſt time diſcharged from the inteſtines, and the urine from the bladder. The air dilates the veſicles of the lungs, and, after being rarefied to a certain degree, is expelled by the ſpring of the dilated fibres reacting upon this rarefied fluid. The infant now reſpires; and articulates ſounds, or cries.

Moſt animals are blind for ſome days after birth. Infants open their eyes to the light the moment they come into the world; but they are dull, fixed, and commonly blue. The new-born child cannot diſtinguiſh objects, becauſe he is incapable of fixing his eyes upon them. The organ of viſion is yet imperfect; the cornea is wrinkled; and perhaps the retina is too ſoft for receiving the images of external objects, and for communicating the ſenſation of diſtinct viſion. At the end of forty days, the infant begins to hear and to ſmile. About the ſame time it begins to look at bright objects, and frequently to turn its eyes towards the window, a candle, or any light. Now likewiſe it begins to weep; for its former cries and groans were not accompanied with tears. Smiles and tears are the effect of two internal ſenſations, both of which depend on the action of the mind. Thus they are peculiar to the human race, and ſerve to expreſs mental pain or pleaſure; while the cries, motions, and other marks of bodily pain and pleaſure, are common to man and moſt of the other animals. Conſidering the ſubject as metaphyſicians, we ſhall find that pain and pleaſure are the univerſal power which ſets all our paſſions in motion.

The ſize of an infant born at the full time is commonly twenty-one inches; and that *fœtus*, which nine months before was an imperceptible bubble, now weighs ten or twelve pounds, and ſometimes more. The head is large in proportion to the body; and this diſproportion, which is ſtill greater in the firſt ſtage of the fœtus, continues during the period of infancy. The ſkin of a new-born child is of a reddiſh colour, becauſe it is ſo fine and tranſparent as to allow a ſlight tint of the colour of the blood to ſhine through. The form of the body and members is by no means perfect in a child ſoon after birth; all the parts appear to be ſwollen. At the end of three days, a kind of jaundice generally comes on, and at the ſame time milk is to be found in the breaſts of the infant, which may be ſqueezed out by the fingers. The ſwelling decreaſes as the child grows up.

The liquor contained in the amnios leaves a viſcid whitiſh matter upon the body of the child. In this country we have the precaution to waſh the new-born infant only with warm water; but it is the cuſtom with whole nations inhabiting the coldeſt climates, to plunge their infants into cold water as ſoon as they are born without their receiving the leaſt injury. It is even ſaid that the Laplanders leave their children in the ſnow till the cold has almoſt ſtopped their reſpiration, and then plunge them into a warm bath. Among theſe people, the children are alſo waſhed thrice a day during the firſt year of their life. The inhabitants of northern countries are perſuaded that the

cold bath tends to make men ſtronger and more robuſt, and on that account accuſtom their children to the uſe of it from their infancy. The truth is, that we are totally ignorant of the power of habit, or how far it can make our bodies capable of ſuffering, of acquiring, or loſing.

The child is not allowed to ſuck as ſoon as it is born; but time is given for diſcharging the liquor and ſlime from the ſtomach, and the *meconium* or excrement, which is of a black colour, from the inteſtines. As theſe ſubſtances might ſour the milk, a little diluted wine mixed with ſugar is firſt given to the infant, and the breaſt is not preſented to it before ten or twelve hours have elapſed.

The young of quadrupeds can of themſelves find the way to the teat of the mother: it is not ſo with man. The mother, in order to ſuckle her child, muſt raiſe it to her breaſts; and, at this feeble period of life, the infant can expreſs its wants only by cries.

New-born children have need of frequent nouriſhment. During the day, the breaſt ought to be given them every two hours, and during the night as often as they awake. At firſt they ſleep almoſt continually; and they ſeem never to awake but when pretſed by hunger or pain. Sleep is uſeful and refreſhing to them; and it ſometimes becomes neceſſary to employ narcotic doſes, proportioned to the age and conſtitution of the child, for the purpoſe of procuring them repoſe. The common way of appeaſing the cries of children is by rocking them in the cradle; but this agitation muſt be very gentle, otherwiſe a great riſk is run of confuſing the infant's brain, and of producing a total derangement. It is neceſſary to their being in good health, that their ſleep be long and natural. It is poſſible, however, that they may ſleep too much, and thereby endanger their conſtitution. In that caſe, it would be proper to take them out of the cradle, and awaken them by a gentle motion, or by preſenting ſome bright object to their eyes. At this age we receive the firſt impreſſions from the ſenſes, which, without doubt, are more important during the reſt of life than is generally imagined. Great care ought to be taken to place the cradle in ſuch a manner that the child ſhall be directly oppoſite to the light: for the eyes are always directed towards that part of the room where the light is ſtrongeſt; and, if the cradle be placed ſideways, one of them, by turning towards the light, will acquire greater ſtrength than the other, and the child will ſquint. For the two firſt months, no other food ſhould be given to the child but the milk of the nurſe; and, when it is of a weak and delicate conſtitution, this nouriſhment alone ſhould be continued during the third or fourth month. A child, however robuſt and healthful, may be expoſed to great danger and inconvenience, if any other aliment is adminiſtered before the end of the firſt month. In Holland, Italy, Turkey, and the whole Levant, the food of children is limited to the milk of the nurſe for a whole year. The ſavages of Canada give their children ſuck for four, five, and ſometimes even ſeven years. In this country, as nurſes generally have not a ſufficient quantity of milk to ſatisfy the appetite of their children, they commonly ſupply the want of it by panada, or other light preparations.

The teeth uſually begin to appear about the age of ſeven months. The cutting of theſe, although a natural operation, does not follow the common laws of nature, which acts continually on the human body without occaſioning the ſmalleſt pain or even producing any ſenſation. Here a violent and painful effort is made, accompanied with cries and tears. Children at firſt loſe their ſprightlineſs and gaiety; they become ſad, reſtleſs, and fretful. The gums are red, and ſwelled; but they afterwards become white, when the preſſure of the teeth is ſo great as to ſtop the circulation of the blood. Children apply their fingers to their mouth, that they may remove the irritation which they feel there. Some relief is given, by putting into their hands a bit of ivory or of coral covered with leather, or of ſome other moderately hard body, with which they rub the gums at the affected part. This preſſure, being oppoſed to that of the teeth, calms the pain for a moment, contributes to make the membrane of the gum thinner, and facilitates its rupture. Nature here acts in oppoſition to herſelf; and an inciſion of the gum muſt ſometimes take place, to allow a paſſage to the tooth.

When children are allowed to cry too long and too often, ruptures are ſometimes occaſioned by the efforts they make. Theſe may eaſily be cured by the ſpeedy application of bandages; but if this remedy has been too long delayed, the diſeaſe may continue through life. Children are very much ſubject to worms. Some of the bad effects occaſioned by theſe animals might be prevented by giving them a little wine now and then, for fermented liquors have a tendency to prevent their generation.

Though the body is very delicate in the ſtate of infancy, it is then leſs ſenſible of cold than at any other part of life. The internal heat appears to be greater: the pulſe in children is much quicker than in adults; from which we are certainly entitled to infer, that the internal heat is greater in the ſame proportion. For the ſame reaſon, it is evident that ſmall animals have more heat than large ones; for the beating of the heart and of the arteries is always quicker in proportion to the ſmallneſs of the animal. The ſtrokes of the heart in a ſparrow ſucceed one another ſo rapidly that they can ſcarcely be counted.

Till three years of age, the life of a child is very precarious. In the two or three following years, it becomes more certain; and at ſix or ſeven years of age, a child has a better chance of living than at any other period of life. From the bills of mortality publiſhed at London, it appears, that of a certain number of children born at the ſame time, one half of them die the three firſt years: according to which, one half of the human race are cut off before they are three years of age. But the mortality among children is not nearly ſo great every where as in London. *M. Dupré de Saint Maur*, from a great number of obſervations made in France, has ſhown that half of the children born at the ſame time are not extinct till ſeven or eight years have elapſed.

Among the cauſes which have occaſioned ſo great a mortality among children, and even among adults, the ſmall-pox may be ranked as the chief. But luckily the means of alleviating by inoculation the fatal effects of this terrible ſcourge are now univerſally known. See INOCULATION.

Children begin learning to ſpeak about the age of twelve or fifteen months. In all languages, and among every people, the firſt ſyllables they utter are *ba, ba, ma, ma, pa, pa, taba, abada:* nor ought this to excite any ſurpriſe, when we conſider that theſe ſyllables are the ſounds moſt natural to man, becauſe they conſiſt of that vowel, and thoſe conſonants, the pronunciation of which requires the ſmalleſt exertion in the organs of ſpeech. Some children at two years of age articulate diſtinctly, and repeat whatever is ſaid to them; but moſt children do not ſpeak till the age of two years and a half, or three years, and often later.

The life of man and of other animals is meaſured only from the moment of birth: they enjoy exiſtence, however, previous to that period, and begin to live in the ſtate of a fœtus. The period of infancy, which extends from the moment of birth to about twelve years of age, has juſt now been conſidered.

The period of infancy is followed by that of adoleſcence. This begins, together with puberty, at the age of twelve or fourteen, and commonly ends in girls at fifteen, and in boys at eighteen, but ſometimes not till twenty-one, twenty-three, and twenty-five years of age. According to its etymology (being

derived from the Latin word *adoleſcentia)*, it is completed when the body has attained its full height. Thus, puberty accompanies adoleſcence, and precedes youth. This is the ſpring of life; this is the ſeaſon of pleaſures, of loves, and of graces: but, alas! this ſmiling ſeaſon is of ſhort duration. Hitherto nature ſeems to have had nothing in view but the preſervation and increaſe of her work: ſhe has made no proviſion for the infant except what is neceſſary to its life and growth. It has lived, or rather enjoyed a kind of vegetable exiſtence, which was ſhut up within itſelf, and which it was incapable of communicating. In this firſt ſtage of life, reaſon is ſtill aſleep: but the principles of life ſoon multiply, and man has not only what is neceſſary to his own exiſtence, but what enables him to give exiſtence to others. This redundancy of life, this ſource of health and vigour, can no longer be confined, but endeavours to diffuſe and expand itſelf.

The age of puberty is announced by ſeveral marks. The firſt ſymptom is a kind of numbneſs and ſtiffneſs in the groins, accompanied with a new and peculiar ſenſation in thoſe parts which diſtinguiſh the ſexes. There, as well as in the arm-pits, ſmall protuberances of a whitiſh colour appear, which are the germs of a new production of a kind of hair, by which theſe parts are afterwards to be veiled. The voice, for a conſiderable time, is rough and unequal; after which it becomes fuller, ſtronger, and graver, than it was before. This change may eaſily be diſtinguiſhed in boys; but leſs ſo in girls, becauſe their voices are naturally ſharper. Theſe marks of puberty are common to both ſexes: but there are marks peculiar to each, ſuch as the diſcharge of the menſes, and the growth of the breaſts, in girls; the beard, and the emiſſion of ſemen, in boys; in ſhort, the feeling of venereal deſire, and the appetite which unites the ſexes. Among all races of mankind, the females arrive at puberty ſooner than the males; but the age of puberty is different in different nations, and ſeems partly to depend on the temperature of the climate and the quality of the food. In all the ſouthern countries of Europe, and in cities, the greateſt part of girls arrive at puberty about twelve, and boys about fourteen years of age. But in the northern parts, and in the country, girls ſcarcely arrive at puberty till they are fourteen or fifteen, and boys not till they are ſixteen or ſeventeen. In our climate, girls, for the greateſt part, have attained complete maturity at eighteen, and boys at twenty years of age.

At the age of adoleſcence, and of puberty, the body commonly attains its full height. About that time, young people ſhoot out ſeveral inches almoſt at once. But there is no part of the human body which increaſes more quickly and more perceptibly than the organs of generation in both ſexes. In males, this growth is nothing but an unfolding of the parts, an augmentation in ſize; but in females, it often occaſions a ſhrinking and contraction, which have received different names from thoſe who have treated of the ſigns of virginity. See VIRGINITY.

Marriage is a ſtate ſuitable to man, wherein he muſt make uſe of thoſe new faculties which he has acquired by puberty. At this period of life, the deſire of producing a being like himſelf is ſtrongly felt. The external form and the correſpondence of the organs of ſex, occaſion without doubt that irreſiſtible attraction which unites the ſexes and perpetuates the race. By connecting pleaſure with the propagation of the ſpecies, nature has provided moſt effectually for the continuance of her work. *Increaſe and multiply*, is the expreſs command of the Creator, and one of the natural functions of life. We may add, that at the age of puberty a thouſand impreſſions act upon the nervous ſyſtem, and reduce man to ſuch a ſituation that he feels his exiſtence only in that voluptuous ſenſe, which then appears to become the ſeat of his ſoul, which engroſſes the whole ſenſibility of which he is ſuſceptible, and which at length proceeds to ſuch a height, that its attacks cannot long be ſupported without a general derangement of the whole machine. The continuance of ſuch a feeling may ſometimes indeed prove fatal to thoſe who indulge in exceſſive enjoyment; but it is equally dangerous to thoſe who obſtinately perſiſt in celibacy, eſpecially when ſtrongly ſolicited by nature. But exceſs is much more to be dreaded than continency. The number of diſſolute and intemperate men afford us plenty of examples. Some have loſt their memory, ſome have been deprived of ſight, ſome have become bald, and ſome have died through mere weakneſs. Young men cannot be too often warned of the irreparable injury they may do to their health; and parents, to whoſe care they are entruſted, ought to employ all the means in their power to turn them from ſuch dangerous exceſſes. But at the age of puberty, young men know not of how great importance it is to prolong this ſmiling ſeaſon of their days, whereon the happineſs or miſery of their future life ſo much depends. Then they look not forwards to futurity, nor reflect on what is paſt, nor enjoy preſent pleaſures with moderation. How many ceaſe to be men, or at leaſt to have the faculties of men, before the age of thirty! Nature muſt not be forced: like a true mother, her object is the ſober and diſcreet union of the ſexes. It is ſufficient to obey when ſhe commands, and to anſwer when ſhe calls. Neither muſt we forget here to mention and condemn an outrage committed againſt nature, the ſhameful practice of which endangers the loſs of health, and the total ruin of the conſtitution; we mean that ſolitary libertiniſm *(maſturbatio)*, by which a man or woman, deceiving nature as it were, endeavours to procure thoſe enjoyments which religion has forbidden except when connected with the happineſs of being a parent. Such then is the phyſical order which the Author of nature, the great preſerver of the ſpecies as well as of the individual, has appointed to induce man, by the attraction of pleaſure, to propagate and continue his race.

The procreation of children is the object of marriage; but ſometimes this object fails to be accompliſhed. See IMPOTENCE and STERILITY.

According to the ordinary courſe of nature, women are not fit for conception till after the firſt appearance of the menſes. When theſe ſtop, which generally happens about forty or fifty years of age, they are barren ever after. Their breaſts then ſhrink and decay, and the voice becomes feebler. Some, however, have become mothers before they have experienced any menſtrual diſcharge; and others have conceived at the age of ſixty, and ſometimes at a more advanced age. Such examples, though not unfrequent, muſt be conſidered as exceptions to the general rule; but they are ſufficient to ſhow that the menſtrual diſcharge is not eſſential to generation. The age at which man acquires the faculty of procreating is not ſo diſtinctly marked. In order to the production of ſemen, the body muſt have attained a certain growth, which generally happens between twelve and eighteen years of age. At ſixty or ſeventy, when the body begins to be enervated by old age, the voice becomes weaker, the ſemen is ſecreted in ſmaller quantities, and it is often unprolific. There are inſtances, however, of old men who have procreated at the age of eighty or ninety. Boys have been found who had the faculty of generating at nine, ten, or eleven years of age; and young girls who have become pregnant at the age of ſeven, eight, or nine. But ſuch facts, which are very rare, ought to be conſidered as extraordinary phenomena in the courſe of nature.

Pregnancy is the time during which a woman carries in her womb the fruit of conception. It begins from the moment the prolific faculty has been reduced into act, and all the conditions requiſite in both ſexes have concurred to form the rudi-

ments of a male or female fœtus; and it ends with delivery. As ſoon as a woman is declared pregnant, ſays the author of the eſſay *Sur la maniere de perfectionner l'eſpece humaine*, ſhe ought to direct her attention wholly to herſelf, and make the wants of her offſpring the ſtandard of her actions. She is now become the depoſitary of a new creature ſimilar to herſelf, and differing only in the proportion and ſucceſſive unfolding of its parts. She muſt be highly careful not to lace herſelf tight, to avoid exceſſive ſtretchings, and, in ſhort, to diſturb in no reſpect the natural ſtate of the womb. She muſt likewiſe beware of indulging certain paſſions; for we ſhall afterwards ſee what great changes are produced in the animal œconomy by ſtrong and violent paſſions.

An explanation, then, of what takes place during pregnancy, is nothing but a hiſtory of the formation of the fœtus; of its expanſion; of the extraordinary manner in which it lives, is nouriſhed, and grows in its mother's womb; and of the way in which all theſe operations are performed with regard to both. It has been proved by many obſervations, that the fœtus changes its poſition in the womb, according to the different attitudes of the mother. It is commonly ſituated with its feet downwards, the breech reſting upon the heels, the head bent towards the knees, the hands bent towards the mouth, the feet turned inwards; and in this poſition it ſwims like a kind of veſſel in the watery fluid contained in the membranes by which it is ſurrounded, without occaſioning any inconvenience to the mother, except what ariſes from its motions, ſometimes to the one ſide, and ſometimes to the other. At times, it even kicks with ſuch violence as to frighten the mother. But when once the head becomes ſufficiently large to deſtroy the equilibrium, it tumbles over and falls downwards; the face is turned towards the *os ſacrum*, and the crown of the head towards the orifice of the *uterus*. This happens ſix weeks or two months before delivery. When the time of delivery arrives, the fœtus, finding itſelf too much confined in the womb, makes an effort to eſcape with its head firſt. At length, at the moment of delivery, it unites its own ſtrength with that of the mother, and opens the orifice of the *uterus* wide enough to allow a paſſage for itſelf. It happens ſometimes that the fœtus eſcapes from the *uterus* without burſting its covering, as is the caſe with animals. But in general, the human fœtus pierces the membranes by its efforts; and ſometimes a very thin part of them remains upon the head like a cap. The ancients conſidered this membranous covering as a ſign of good fortune; and the ſame idea is ſtill prevalent among the vulgar. The liquor which eſcapes during delivery is called the *waters* of the mother. Theſe waters ſerve to guard the fœtus from external injuries, by eluding the violence of the blows which the mother may receive upon the belly; and, in the ſame manner, they defend the womb from the ſhocks occaſioned by the motions of the fœtus. In ſhort, by rendering the paſſages ſoft and pliable, they facilitate the eſcape of the child in the time of delivery. (See MIDWIFERY.)—In the womb the fœtus does not reſpire, as has been already mentioned; conſequently what has been ſaid of the cries of children in the womb muſt be conſidered as altogether fabulous.—Women have generally only one child at a birth. When they bear two, three, or more, the fœtuſes are ſeldom found under the ſame covering; and their placentæ, though adhering, are almoſt always diſtinct. Twins are not uncommon, but there are ſeldom more. It is ſuppoſed, that among women with child, there is only one in 2500 who brings forth three children at a birth, one in 20,000 who brings forth four, and one in a million who brings forth five. When the number amounts to five, or even when there are but three or four, they are generally of a weakly conſtitution; moſt of them die in the womb, or ſoon after delivery. See the article PROLIFIC.

At the age of puberty, or a few years after, the body attains its full ſtature. Some young men grow no taller after 15 or 16, and others continue to grow till the age of 20 or 23. At this period they are very ſlender: but by degrees the members ſwell and begin to aſſume their proper ſhape; and before the age of 30, the body in men has attained its greateſt perfection with regard to ſtrength, conſiſtence, and ſymmetry. Adoleſcence ends at the age of 20 or 25, and at this period youth (according to the diviſion which has been made of the years of man's life into different ages) begins. It continues till the age of 30 or 35.

The common ſtature of men is about five feet and three, four, five, ſix, or ſeven inches; and of women about five feet and two, three, or four inches. Men below five feet are of a ſmall ſtature. The Laplanders do not exceed four feet and a half; and the natives of ſome other countries are ſtill ſmaller. Women attain their full height ſooner than men. Haller computes, that in the temperate climates of Europe, the medium ſtature of men is about five feet and five or ſix inches. It is obſerved by the ſame author, that in Switzerland the inhabitants of the plains are taller than thoſe of the mountains. It is difficult to aſcertain with preciſion the actual limits of the human ſtature. In ſurveying the inhabited earth, we find greater differences in the ſtatures of individuals than in thoſe of nations. In the ſame climate, among the ſame people, and ſometimes in the ſame family, there are men whoſe ſtature is either too tall or too diminutive. See the articles GIANT and DWARF.

The body having acquired its full height during the period of adoleſcence, and its full dimenſions in youth, remains for ſome years in the ſame ſtate before it begins to decay. This is the period of manhood, which extends from the age of 30 or 35 to that of 40 or 45 years. During this ſtage, the powers of the body continue in full vigour, and the principal change which takes place in the human figure ariſes from the formation of fat in different parts. Exceſſive fatneſs diſfigures the body, and becomes a very cumberſome and inconvenient load.

The body of a well-ſhaped man ought to be ſquare, the muſcles ought to be ſtrongly marked, the contour of the members boldly delineated, and the features of the face well defined. In women, all the parts are more rounded and ſofter, the features are more delicate, and the complexion brighter. To man belong ſtrength and majeſty; gracefulneſs and beauty are the portion of the other ſex. The ſtructure eſſential to each will be found in the deſcription of the human ſkeleton, under the article ANATOMY.

Every thing in both ſexes points them out as the ſovereigns of the earth; even the external appearance of man declares his ſuperiority to other living creatures. His body is erect; his attitude is that of command; his auguſt countenance, which is turned towards heaven, bears the impreſſions of his dignity. The image of his ſoul is painted in his face; the excellence of his nature pierces through the material organs, and gives a fire and animation to the features of his countenance. His majeſtic deportment, his firm and emboldened gait, announce the nobleneſs of his rank. He touches the earth only with his extremity: he views it only at a diſtance, and ſeems to deſpiſe it. It has been juſtly obſerved, that the countenance of man is the mirror of his mind. In the looks of no animal are the expreſſions of paſſion painted with ſuch energy and rapidity, and with ſuch gentle gradation and ſhades, as in thoſe of man. We know, that in certain emotions of the mind, the blood riſes to the face, and produces bluſhing; and that in others, the countenance turns pale. Theſe two ſymptoms, the appearance of which depends on the ſtructure and the tranſparency of the reticulum, eſpecially redneſs, conſtitute a peculiar beauty. In our climates, the natural colour of the face of a man in good

health is white, with a lively red ſuffuſed upon the cheeks. Paleneſs of the countenance is always a ſuſpicious ſymptom. That colour which is ſhaded with black is a ſign of melancholy and of vitiated bile: and conſtant and univerſal redneſs is a proof that the blood is carried with too great impetuoſity to the brain. A livid colour is a morbid and dangerous ſymptom; and that which has a tint of yellow is a ſign of jaundice or repletion of bile. The colour of the ſkin is frequently altered by want of ſleep or of nouriſhment, or by looſeneſs and diarrhœa.

Notwithſtanding the general ſimilitude of countenance in nations and families, there is a wonderful diverſity of features. No one, however, is at a loſs to recollect the perſon to whom he intends to ſpeak, provided he has once fully ſeen him. One man has livelineſs and gaiety painted in his countenance, and announces before-hand, by the cheerfulneſs of his appearance, the character he is to ſupport in ſociety. The tears which bedew the cheeks of another man would excite compaſſion in the moſt unfeeling heart. Thus the face of man is the rendezvous of the ſymptoms both of his moral and phyſical affections: tranquillity, anger, threatening, joy, ſmiles, laughter, malice, love, envy, jealouſy, pride, contempt, diſdain or indignation, irony, arrogance, tears, terror, aſtoniſhment, horror, fear, ſhame, or humiliation, ſorrow and affliction, compaſſion, meditation, particular convulſions, ſleep, death, &c. &c. The difference of theſe characters appears to us of ſufficient importance to form a principal article in the natural hiſtory of man.

When the mind is at eaſe, all the features of the face are in a ſtate of profound tranquillity. Their proportion, harmony, and union point out the ſerenity of the thoughts. But when the ſoul is agitated, the human face becomes a living canvas, whereon the paſſions are repreſented with equal delicacy and energy, where every emotion of the ſoul is expreſſed by ſome feature, and every action by ſome mark; the lively impreſſion of which anticipates the will, and reveals by pathetic ſigns our ſecret agitation, and thoſe intentions which we are anxious to conceal. It is particularly in the eyes that the ſoul is painted in the ſtrongeſt colours and with the moſt delicate ſhades.

The different colours of the eyes are, dark hazel, light hazel, green, blue, gray, and whitiſh-gray. The moſt common of theſe colours are hazel and blue, both of which are often found in the ſame eye. Eyes which are commonly called black, are only dark hazel; they appear black in conſequence of being contraſted with the white of the eye. Wherever there is a tint of blue, however ſlight, it becomes the prevailing colour, and outſhines the hazel, with which it is intermixed, to ſuch a degree, that the mixture cannot be perceived without a very narrow examination. The moſt beautiful eyes are thoſe which appear black or blue. In the former, there is more expreſſion and vivacity; in the latter, more ſweetneſs and perhaps delicacy.

Next to the eyes, the parts of the face by which the phyſiognomy is moſt ſtrongly marked, are the eye-brows. Being of a different nature from the other parts, their effect is increaſed by contraſt. They are like a ſhade in a picture, which gives relief to the other colours and forms.

The forehead is one of the largeſt parts of the face, and contributes moſt to its beauty. Every body knows of how great importance the hair is in the phyſiognomy, and that baldneſs is a very great defect. When old age begins to make its approaches, the hair which firſt falls off is that which covers the crown of the head and the parts above the temples. We ſeldom ſee the hair of the lower part of the temples, or of the back of the head, completely fall off. Baldneſs is peculiar to men: women do not naturally loſe their hair, though it becomes white as well as that of the men at the approach of old age

The noſe is the moſt prominent feature of the face. But as it has very little motion, and that only in the moſt violent paſſions, it contributes leſs to the expreſſion than to the beauty of the countenance. The noſe is ſeldom perpendicular to the middle of the face, but for the moſt part is turned to one ſide or the other. The cauſe of this irregularity, which, according to the painters, is perfectly conſiſtent with beauty, and of which even the want would be a deformity, appears to be frequent preſſure on one ſide of the cartilage of the child's noſe againſt the breaſt of the mother when it receives ſuck. At this early period of life, the cartilages and bones have acquired very little ſolidity, and are eaſily bent, as may be obſerved in the legs and thighs of ſome individuals, who have been injured by the bandages of the ſwaddling clothes.

Next to the eyes, the mouth and lips have the greateſt motion and expreſſion. Theſe motions are under the influence of the paſſions. The mouth, which is ſet off by the vermilion of the lips and the enamel of the teeth, marks, by the various forms which it aſſumes, their different characters. The organ of the voice likewiſe gives animation to this feature, and communicates to it more life and expreſſion than is poſſeſſed by any of the reſt. The cheeks are uniform features, and have no motion or expreſſion excepting from that involuntary redneſs or paleneſs with which they are covered in different paſſions, ſuch as ſhame, anger, pride, and joy, on the one hand; and fear, terror, and ſorrow, on the other.

In different paſſions, the whole head aſſumes different poſitions, and is affected with different motions. It hangs forward during ſhame, humility, and ſorrow; it inclines to one ſide in languor and compaſſion; it is elevated in pride, erect and fixed in obſtinacy and ſelf-conceit: in aſtoniſhment it is thrown backwards; and it moves from ſide to ſide in contempt, ridicule, anger, and indignation.

Beſides that expreſſion of the different paſſions which is denoted by the various lineaments of the face, the arms, and hands alſo, and indeed every part of the body, contribute to it. In joy, for inſtance, all the members of the body are agitated with quick and various motions. In languor and ſorrow, the arms hang down, and the whole body remains fixed and immoveable. In admiration and ſurpriſe, this total ſuſpenſion of motion is likewiſe obſerved. In love, deſire, and hope, the head and eyes are raiſed to heaven, and ſeem to ſolicit the wiſhed-for good; the body leans forward as if to approach it; the arms are ſtretched out, and ſeem to ſeize before-hand the beloved object. On the contrary, in fear, hatred, and horror, the arms ſeem to puſh backward and repel the object of our averſion; we turn away our head and eyes as if to avoid the ſight of it; we recoil in order to ſhun it.

Although the human body is externally much more delicate than that of any other animal, yet it is very nervous, and perhaps ſtronger in proportion to its ſize than that of the ſtrongeſt animals. We are aſſured that the porters at Conſtantinople carry burdens of 900 pounds weight. A thouſand wonderful ſtories are related of the Hottentots and other ſavages, concerning their agility in running. Civiliſed man knows not the full extent of his powers, nor how much he loſes by that effeminacy and inactivity by which they are weakened and deſtroyed. He is contented even to be ignorant of the ſtrength and vigour which his members are capable of acquiring by motion, and by being accuſtomed to ſevere exerciſes, as is obſerved in runners, tumblers, and rope-dancers. The concluſion is, therefore, founded on the moſt juſt and indiſputable induction and analogy.—The attitude of walking is leſs fatiguing to man than that in which he is placed when he is ſtopped in running. Every time he ſets his foot upon the ground, he paſſes over a

more conſiderable ſpace; the body leans forwards, and the arms follow the ſame direction; the reſpiration increaſes, and breathing becomes difficult. Leaping begins with great inflexions of the members; the body is then much ſhortened, but immediately ſtretches itſelf out with a great effort. The motions which accompany leaping make it very fatiguing.

It is obſerved by M. Daubenton *(Nouvelle Encyclopédie)*, that a ceſſation from exerciſe is not alone ſufficient to reſtore the powers of the body when they are exhauſted by fatigue. The ſprings, though not in action, are ſtill wound up while we are awake, even when every movement is ſuſpended. In ſleep nature finds that repoſe which is ſuited to her wants, and the different organs enjoy a ſalutary relaxation. This is that wonderful ſtate in which man, unconſcious of his own exiſtence, and ſunk in apparent death, repairs the loſs which his faculties have ſuſtained, and ſeems to aſſume a new exiſtence. In this ſtate of drowſineſs and repoſe, the ſenſes ceaſe to act, the functions of the ſoul are ſuſpended, and the body ſeems abandoned to itſelf. The external ſymptoms of ſleep, which alone are the object of our attention, are eaſily diſtinguiſhed. At the aproach of ſleep, the eyes begin to wink, the eye-lids fall down, the head nods and hangs down: its fall aſtoniſhes the ſleeper; he ſtarts up, and makes an effort to drive away ſleep, but in vain; a new inclination, ſtronger than the former, deprives him of the power of raiſing his head; his chin reſts upon his breaſt, and in this poſition he enjoys a tranquil ſleep. See the article SLEEP.

Phyſiologiſts give the name of old age to that period of life which commences immediately after the age of manhood and ends at death; and they diſtinguiſh green old age from the age of decrepitude. But in our opinion ſuch an extenſive ſignification of the word ought not to be admitted. We are not old men at the age of forty or forty-five; and though the body then gives ſigns of decay, it has not yet arrived at the period of old age. M. Daubenton obſerves, that it would be more proper to call it the *declining age*, becauſe nature then becomes retrograde, the fatneſs and good plight of the body diminiſhes, and certain parts of it do not perform their functions with equal vigour.

The age of decline extends from forty or forty-five to ſixty or ſixty-five years of age. At this time of life, the diminution of the fat is the cauſe of thoſe wrinkles which begin to appear in the face and ſome other parts of the body. The ſkin, not being ſupported by the ſame quantity of fat, and being incapable, from want of elaſticity, of contracting, ſinks down and forms folds. In the decline of life, a remarkable change takes place alſo in viſion. In the vigour of our days, the cryſtalline lens, being thicker and more diaphanous than the humours of the eye, enables us to read letters of a very ſmall character at the diſtance of eight or ten inches. But when the age of decline comes on, the quantity of the humours of the eye diminiſhes, they loſe their clearneſs, and the tranſparent cornea becomes leſs convex. To remedy this inconvenience, we place what we wiſh to read at a greater diſtance from the eye: but viſion is thereby very little improved, becauſe the image of the object becomes ſmaller and more obſcure. Another mark of the decline of life is a weakneſs of the ſtomach, and indigeſtion, in moſt people who do not take ſufficient exerciſe in proportion to the quantity and quality of their food.

At ſixty, ſixty-three, or ſixty-five years of age the ſigns of decline become more and more viſible, and indicate *old age*. This period commonly extends to the age of ſeventy, ſometimes to ſeventy-five, but ſeldom to eighty. When the body is extenuated and [illegible] by old age, man then becomes crazy. Crazineſs therefore is nothing but an *infirm old age*. The eyes and ſtomach then become weaker and weaker; leanneſs increaſes the number of the wrinkles; the beard and the hair become white; the ſtrength and the memory begin ſenſibly to fail.

After ſeventy, or at moſt eighty years of age, the life of man is nothing but labour and ſorrow: ſuch was the language of David near three thouſand years ago. Some men of ſtrong conſtitutions, and in good health, enjoy old age for a long time without decrepitude; but ſuch inſtances are not very common. The infirmities of decrepitude continually increaſe, and at length death concludes the whole. This fatal term is uncertain. The only concluſions which we can form concerning the duration of life muſt be derived from obſervations made on a great number of men who were born at the ſame time, and who died at different ages. Theſe we ſhall mention in the ſequel.

The ſigns of decrepitude form a ſtriking picture of weakneſs, and announce the approaching diſſolution of the body. The memory totally fails; the nerves become hard and blunted; deafneſs and blindneſs take place; the ſenſes of ſmell, of touch, and of taſte are deſtroyed; the appetite fails; the neceſſity of eating, and more frequently that of drinking, are alone felt; after the teeth fall out, maſtication is imperfectly performed, and digeſtion is very bad; the lips fall inwards; the edges of the jaws can no longer approach one another; the muſcles of the lower jaw become ſo weak, that they are unable to raiſe and ſupport it: the body ſinks down; the ſpine is bent outward; and the vertebræ grow together at the anterior part: the body becomes extremely lean; the ſtrength fails: the decrepid wretch is unable to ſupport himſelf; he is obliged to remain on a ſeat, or ſtretched in his bed: the bladder becomes paralytic; the inteſtines loſe their ſpring; the circulation of the blood becomes ſlower; the ſtrokes of the pulſe no longer amount to the number of eighty in a minute as in the vigour of life, but are reduced to twenty-four and ſometimes fewer: reſpiration is ſlower; the body loſes its heat; the circulation of the blood ceaſes; death follows; and the dream of life is no more.

Man, ſays Haller in his Phyſiology, has no right to complain of the ſhortneſs of life. Throughout the whole of living beings, there are few who unite in a greater degree all the internal cauſes which tend to prolong its different periods. The term of geſtation is very conſiderable; the rudiments of the teeth are very late in unfolding; his growth is ſlow, and is not completed before about twenty years have elapſed.—The age of puberty, alſo, is much later in man than in any other animal. In ſhort, the parts of his body being compoſed of a ſofter and more flexible ſubſtance, are not ſo ſoon hardened as thoſe of inferior animals. Man, therefore, ſeems to receive at his birth the ſeeds of a long life: if he reaches not the diſtant period which nature ſeemed to promiſe him, it muſt be owing to accidental cauſes foreign to himſelf. Inſtead of ſaying that he has finiſhed his life, we ought rather to ſay that he has not completed it.

The natural and total duration of life is in ſome meaſure proportioned to the period of growth. A tree or an animal which ſoon acquires its full ſize, decays much ſooner than another which continues to grow for a longer time. If it is true that the life of animals is eight times longer than the period of their growth, we might conclude that the boundaries of human life may be extended to a century and a half.

It does not appear that the life of man becomes ſhorter in proportion to the length of time the world has exiſted. In the days of the Pſalmiſt, the ordinary limits of human life did not exceed ſeventy or eighty years. No king of Judah lived beyond that period. When the Romans, however, were numbered by Veſpaſian, there were found in the empire, in that age of effeminacy, ten men aged an hundred and twenty and upwards. Among the princes of modern times, the late Frederick the Great of Pruſſia lived to the age of 74.

George II. of Britain lived to that of 77. Louis XIV. lived to the ſame age. Staniſlaus king of Poland and duke of Lorrain exceeded that age. Pope Clement XII. lived to the age of 80. George I. of Britain attained the age of 83. M. Bomare has collected inſtances of perſons who lived to the age of 110 and upwards: of ſuch, however, we have already ſpoken under the article LONGEVITY.

Before we proceed to aſſign the common cauſes of longevity, it is proper to inquire into the manner of life and the ſituation of thoſe by whom it has been enjoyed. We find, then, that thoſe who have lived to the greateſt age have been ſuch as did not attain their full growth till a very advanced period of life, and who have kept their appetites and paſſions under the moſt complete ſubjection. In a word, thoſe who have exceeded 100 years have in general been robuſt, laborious, ſober, and careful to obſerve the ſtricteſt regimen. Enjoying a good conſtitution from nature, they have ſeldom or never been ſubject to diſeaſe. They have even enjoyed the greateſt health and vigour, and retained the uſe of their ſenſes to the laſt moment of their lives.

Among thoſe who have led a life of contemplation and ſtudy, many have reached a very advanced age. Longevity is frequent among the different orders of religious, who by their ſtatutes are confined to a moderate diet, and obliged to abſtain from wine and the uſe of meat. Some celebrated anchorets have lived to a great age, while they fed upon nothing but the wild roots and fruits which they found in the deſert whither they had retired. The philoſopher Xenophilus, who lived to the age of 106, was of the Pythagorean ſect. It is well known, that thoſe philoſophers who held the tranſmigration of ſouls, denied themſelves the uſe of meat, becauſe they imagined that killing an animal would be to aſſaſſinate another ſelf. A country life has produced many ſound and vigorous old men. It is ſuppoſed that a happy old age is attained with greater difficulty in towns than in the country. Sir Hans Sloane, Duverney, and Fontenelle, however, are inſtances of men whoſe lives have been ſpent in cities, and yet extended to a very great length. It has been obſerved, that men deprived of reaſon live very long; and this Dr. Haller imputes to their being exempted from thoſe inquietudes which he conſiders as the moſt deadly poiſon. Perſons poſſeſſing a ſufficiently good underſtanding, but deſtitute of ambition, have been found to enjoy very long life. Men who are devoid of pretenſions, who are free from thoſe cares which a deſire of ſhining by a diſplay of talents, or of acquiring dignity and power, neceſſarily brings in its train, who feel no regret for the paſt nor anxiety about the future, are ſtrangers to thoſe torments of the mind which waſte and conſume the body. To that tranquillity of ſoul, which is ſo excellent a prerogative of infancy, they add that of being long young by phyſical conſtitution, on which the moral has a ſtriking and powerful influence.

Premature wiſdom, and early talents, are often fitter to excite aſtoniſhment than expectation. The rapid unfolding of the moral faculties, by ſhortening the period of youth, ſeems to diminiſh in proportion the total duration of life. We have known a young lady of ſeventeen, who could ſpeak very correctly ſeven languages: ſhe tranſlated and wrote Latin, Greek, Italian, Spaniſh, German, Engliſh, and French; but ſhe died at the age of eighteen. The young man by whom ſhe was aſked in marriage, having been informed that he could not obtain her hand till he had made himſelf worthy of her by the ſame degree of talents and information, died the ſame year, and at the ſame age. But in ſome families, the web of life, to uſe an expreſſion of Haller, ſeems to be better warped than in others: of this kind was the family of *Thomas Parr*, mentioned under the article LONGEVITY.

From the preceding obſervations, Dr. Haller has attempted to deduce the cauſes why a few men are longer exempted than others from the common fate.

The circumſtances which oppoſe their influence are independent of our will; ſuch as the ravages of epidemic diſtempers, trouble, and anxiety of mind, which create diſeaſes in the body, or the torments of ambition. It is neceſſary to live in a ſalubrious climate, to enjoy a fortune ſufficiently eaſy to exclude thoſe uneaſy deſires which create a feeling of want and privation, to be deſcended from healthy parents, to avoid drinking wine in youth, to drink water, and to eat little meat and a great deal of vegetables. It is neceſſary alſo to be temperate in meals; moderate in pleaſures, ſtudy, and exerciſe; to be naturally inclined to cheerfulneſs; and to allot a due time to ſleep and repoſe.

Long life is certainly very rare; but, as has been already obſerved, we muſt diſtinguiſh between what is natural to the conſtitution of man, and that which is the conſequence of his condition. By the former he is made to be long lived; but nature is arreſted in her courſe by local and accidental cauſes, which it is not in our power to avoid.

Let us take a retroſpective view of man's life from his infancy, and enumerate the chief of theſe different cauſes. Of a thouſand infants, an account of which Dr. Haller has extracted from the London bills of mortality, twenty-three died almoſt as ſoon as they came into the world: teething carried off fifty, and convulſions two hundred and ſeventy-ſeven: eighty died of the ſmall-pox, and ſeven of the meaſles. Among the adult females, eight at leaſt died in child-bed: conſumption and aſthma, diſeaſes more frequent in England than in France, carried off an hundred and ninety-one of the ſame ſex, and almoſt a fifth part of the full grown men. An hundred and fifty died of fevers. At a more advanced age, twelve died of apoplexy, and forty-one of dropſy, without mentioning thoſe to whom diſeaſes of little importance in themſelves became mortal. There only remained ſeventy-eight whoſe death could be aſcribed to old age; and of theſe twenty-ſeven lived to the age of eighty and upwards. Among the different diſeaſes of which we have juſt now ſeen the fatal effects, and which carrry off more than nine-tenths of mankind, not one, it muſt be allowed, is natural to the conſtitution. The inhabitants of this iſland are in general but little ſubject to diſeaſes, excepting the ſmall-pox and the meaſles; and many of them enjoy uninterrupted health to old age.

What are the moſt prevalent diſeaſes in other countries, which prove equally fatal to the duration of human life? In northern climates, ſcurvy, the colic of the Laplanders, and diſeaſes of the lungs, moſt frequently occaſion death. In temperate climates, dropſy carries off a great many at the beginning of old age, which is the boundary of life in the greateſt part of both ſexes, when they have eſcaped the acute diſeaſes, ſuch as putrid fever, &c. Acute diſeaſes are moſt common in warm countries. In ſome places, the rays of the ſun kill in a few hours thoſe who are expoſed to its burning heat. The air of Egypt and of Aſia Minor engenders the plague, by which one half of their inhabitants are carried off. Between the tropics men are ſubject to dyſenteries and violent fevers. The cold of the night, in warm climates, occaſions ſometimes violent diſeaſes, ſuch as palſy, quinſey, and a ſwelling of the head. Damp and marſhy places give riſe to fevers of a different kind, but alſo very dangerous. The life of ſailors has a great tendency to produce ſcurvy. How many profeſſions prove fatal to the health, and in moſt men haſten that period which nature would have brought on by ſlow degrees! Miners, ſtone-cutters, gilders, perſons employed in emptying privies, &c. are ſubject to diſeaſes of the lungs, and become paralytic. Other profeſſions of life bring on other accidents,

of which it would carry us too far to give a particular account. What has been faid is fufficient to fhow, that it is the dangers with which we are furrounded that fhorten the period of human life.

By examining the lift of thofe who have attained a great age, it will be found that mankind are longer lived in northern than in fouthern countries. It has been obferved, that there are more old men in mountains and elevated fituations than in plains and low countries. We repeat it, if the duration of life among the inhabitants of fouthern climates be compared with the duration of life in northern nations, it will be allowed, that the latter enjoy both longer life and better health than the former. Their growth being retarded by the rigour of the climate, their decay muft alfo be flower, becaufe of the proportion which exifts between the growth of animals and the length of their lives. Among ten perfons who have lived to the age of an hundred, eight or nine will be found to have lived in the north.

It appears from the bills of mortality, that in the country more boys are born than girls: in cities, on the contrary, the number of females is commonly greateft. Obfervations made with great care prove, that in moft countries there are fewer men alive than women, and that more males die, chiefly at the firft and laft periods of life. In Sweden, the whole number of females in 1763 was to that of males in the proportion of ten to nine. The number of old women who exceeded 80 years of age, was to that of old men of the fame age in the proportion of 33 to 19: and there were more women than men who had attained the age of 86, in the proportion of almoft two to one.

The late Dr. Price made obfervations, after Dr. Percival, on the difference of longevity, and the duration of human life, in towns, country-parifhes, and villages; of which the following is the refult: A greater number in proportion die in great towns than in fmall ones, and a greater number in the latter than in villages. The caufe of this difference, which is found to be very great, muft be, in the firft place, the luxury and diffipation which prevail in towns; and, fecondly, the badnefs of the air. In the town of Manchefter, according to obfervation, $\frac{1}{28}$ of the inhabitants die annually; whereas, in the neighbouring country, the number of deaths does not exceed $\frac{1}{47}$ of the whole inhabitants. It may be laid down as a general principle, that in great towns the number of deaths annually is from 1 in 19 to 1 in 22 or 23; in middling towns, from 1 in 24 to 1 in 28; and in country parifhes and villages feldom more than 1 in 40 or 50. In 1763, the number of inhabitants in Stockholm amounted to 72,979. The average number of deaths for the fix years preceding had been 3802, which makes 1 in 19 annually; while throughout all Sweden, including the towns and the country, not more than 1 in 35 die annually. At Rome the inhabitants are numbered every year. In 1771 they were found to amount to 159,675: the average number of deaths for ten years was 7367; which makes 1 in $23\frac{1}{2}$ annually. In London not lefs than 1 in $20\frac{3}{4}$ of the inhabitants die every year.

M. Daubenton has given, in the *Encyclopédie Methodique*, a table of the probabilities of the duration of life, conftructed from that which is to be found in the feventh volume of the *Supplemens à l'Hiftoire Naturelle de M. de Buffon*. The following is an abridgment of it:

Of 23,994 children born at the fame time, there will probably die,

In one year - - - -	7998
Remaining $\frac{2}{3}$ or 15996.	
In eight years - - -	11997
Remaining $\frac{1}{2}$ or 11997.	
In 38 years - - -	15996
Remaining $\frac{1}{3}$ or 7998.	
In 50 years - - -	17994
Remaining $\frac{1}{4}$ or 5998.	
In 61 years - - -	19995
Remaining $\frac{1}{6}$ or 3999.	
In 70 years - - -	21595
Remaining $\frac{1}{10}$ or 2399.	
In 80 years - - -	22395
Remaining $\frac{1}{40}$ or 599.	
In 90 years - - -	23914
Remaining $\frac{1}{300}$ or 79.	
In 100 years - - -	23992
Remaining $\frac{1}{1000}$ or 2.	

It thus appears, that a very fmall number of men indeed pafs through all the periods of life, and arrive at the goal marked out by nature. Innumerable caufes accelerate our diffolution. The life of man, we have obferved, confifts in the activity and exercife of his organs, which grow up and acquire ftrength, during infancy, adolefcence, and youth. No fooner has the body attained its utmoft perfection, than it begins to decline. Its decay is at firft imperceptible; but in the progrefs of time the membranes become cartilaginous, the cartilages acquire the conffiftence of bone; the bones become more folid, and all the fibres are hardened. Almoft all the fat waftes away; the fkin becomes withered and fcaly; wrinkles are gradually formed; the hair grows white; the teeth fall out; the face lofes its fhape; the body is bent; and the colour and conffiftence of the cryftalline humour become more perceptible. The firft traces of this decay begin to be perceived at the age of forty, and fometimes fooner; this is the *age of decline*. They increafe by flow degrees till fixty, which is the *period of old age*. They increafe more rapidly till the age of feventy or feventy-five. At this period *crazinefs* begins, and continues always to increafe. Next fucceeds *decrepitude*, when the memory is gone, the ufe of the fenfes loft, the ftrength totally annihilated, the organs worn out, and the functions of the body almoft deftroyed. Little now remains to be loft; and before the age of ninety or an hundred, death terminates at once decrepitude and life.

The body then dies by little and little: its motion gradually diminifhes; life is extinguifhed by fucceffive gradations, and death is only the laft term in the fucceffion. When the motion of the heart, which continues longeft, ceafes, man has then breathed his laft; he has paffed from the ftate of life to the ftate of death; and as at his birth a breath opened to him the career of life, fo with a breath he finifhes his courfe.

This natural caufe of death is common to all animals, and even to vegetables. We may obferve that the centre of an oak firft perifhes and falls into duft, becaufe thefe parts having become harder and more compact can receive no further nourifhment. The caufes of our diffolution, therefore, are as neceffary as death is inevitable; and it is no more in our power to retard this fatal term than to alter the eftablifhed laws of the univerfe. Hence the following maxim has been univerfally adopted, *Contra vim mortis, nullum medicamentum in hortis*. In whatever manner death happens, the time and circumftances thereof are unknown. It is conffidered, however, as at all times terrible, and the very thoughts of it fill the mind with fear and trouble. It is notwithftanding our duty frequently to direct our thoughts to that event which muft inevitably happen, and, by a life of virtue and innocence, to prepare againft thofe conffequences which we fo much dread.

As in women the bones, the cartilages, the mufcles, and every other part of the body, are fofter and lefs folid than thofe of men, they muft require more time in hardening to that degree which occafions death. Women of courfe ought to live.

longer than men. This reaſoning is confirmed by experience; for, by conſulting the bills of mortality, it appears, that after women have paſſed a certain age they live much longer than men who have arrived at the ſame age. In like manner, it is found by experience, that in women the age of youth is ſhorter and happier than in men, but that the period of old age is longer, and attended with more trouble. *Citius pubeſcunt, citius ſeneſcunt.*

After death, the organization of the body begins to be diſſolved, and all the parts relax, corrupt, and ſeparate. This is produced by an inteſtine fermentation, which occaſions putrefaction, and reduces the body to volatile alkali, fetid oil, and earth.

The other particulars that were propoſed to be noticed in this article are, The ſeveral ſenſes with which man is endowed; His conſtitution, and animal functions; and that variety of colour, form, and character, which he aſſumes in different quarters of the globe. But there is no occaſion to enlarge upon thoſe topics here, as they have been already explained in other parts of the work. For the two firſt, ſee ANATOMY, *paſſim*. The laſt has been partly diſcuſſed under the word COMPLEXION, and will be reſumed afterwards under the article VARIETIES *of the Human Species*. For what regards man conſidered as a rational, ſocial, moral, and religious being, ſee METAPHYSICS, MORAL *Philoſophy*, RELIGION, and THEOLOGY; alſo SOCIETY, LAW, LANGUAGE, and LOGIC.

ISLE OF MAN, an iſland in the Iriſh ſea, lying about ſeven leagues north from Angleſey, about the ſame diſtance weſt from Lancaſhire, nearly the like diſtance ſouth-eaſt from Galloway, and nine leagues eaſt from Ireland. Its form is long and narrow, ſtretching from the north eaſt of Ayre-point to the Calf of Man, which lies ſouth-weſt, at leaſt 30 Engliſh miles. Its breadth in ſome places is more than nine miles, in moſt places eight, and in ſome not above five, and contains about 160 ſquare miles.

The firſt author who mentions this iſland is Cæſar; for there can be as little doubt, that, by the *Mona*, of which he ſpeaks in his Commentaries, placing it in the midſt between Britain and Ireland, we are to underſtand Man; as that the *Mona* of Tacitus, which he acquaints us had a fordable ſtrait between it and the continent, can be applied only to Angleſey. Pliny has ſet down both iſlands: *Mona*, by which he intends Angleſey, and *Monabia*, which is Man. In Ptolemy we find *Monaæda*, or *Monaida*, that is, the farther or more remote Mön. Oroſius ſtyles it *Menavia*; tells us, that it was not extremely fertile; and that this, as well as Ireland, was then poſſeſſed by the Scots. Beda, who diſtinguiſhes clearly two Menavian iſlands, names this the *northern Menavia*, beſtowing the epithet of *ſouthern* upon Angleſey. In ſome copies of Nennius, this iſle is denominated *Eubonia*; in others, *Menavia*; but both are explained to mean *Man*. Alured of Beverley alſo ſpeaks of it as one of the Menavian iſlands. The Britons, in their own language, called it *Manaw*, more properly *Main au*, *i. e.* "a little iſland," which ſeems to be latinized in the word *Menavia*. All which clearly proves, that this ſmall iſle was early inhabited, and as well known to the reſt of the world as either Britain or Ireland.

In the cloſe of the firſt century, the Druids, who were the prieſts, prophets, and philoſophers of the old Britons, were finally expelled by Julius Agricola from the ſouthern Mona; and we are told, that they then took ſhelter in the northern. This iſland they found well planted with firs; ſo that they had, in ſome meaſure, what they delighted in moſt, the ſhelter of trees; but, however, not the ſhelter of thoſe trees in which they moſt delighted, viz. the oaks: and therefore theſe they introduced. No hiſtories tell us this; but we learn it from more certain authority, great woods of fir having been diſcovered interred in the bowels of the earth, and here and there ſmall groves of oaks: but as theſe trees are never met with intermixed, ſo it is plain they never grew together; and as the former are by far the moſt numerous, we may preſume them the natural produce of the country, and that the latter were planted and preſerved by the Druids. They gave the people, with whom they lived, and over whom they ruled, a gentle government, wiſe laws, but withal a very ſuperſtitious religion. It is alſo very likely that they hindered them, as much as they could, from having any correſpondence with their neighbours; which is the reaſon that, though the iſland is mentioned by ſo many writers, not one of them, before Oroſius, ſays a word about the inhabitants. A little before his time, that is, in the beginning of the fifth century, the Scots had tranſported themſelves thither, it is ſaid, from Ireland. The tradition of the natives of Man (for they have a traditionary hiſtory) begins at this period. They ſtyle this firſt diſcoverer *Mannan Mac Lear*; and they ſay that he was a magician, who kept this country covered with miſts, ſo that the inhabitants of other places could never find it. But the ancient chronicles of Ireland inform us, that the true name of this adventurer was *Orbſenius*, the ſon of Alladius, a prince in their iſland; and that he was ſurnamed *Mannanan*, from his having firſt entered the iſland of Man, and *Mac Lir*, i. e. "the offſpring of the ſea," from his great ſkill in navigation. He promoted commerce; and is ſaid to have given a good reception to St. Patrick, by whom the natives were converted to Chriſtianity.

The princes who ruled after him ſeem to have been of the ſame line with the kings of Scotland, with which country they had a great intercourſe, aſſiſting its monarchs in their wars, and having the education of their princes confided to them in time of peace.

In the beginning of the ſeventh century, Edwin king of Northumberland invaded the Menavian iſlands, ravaged Man, and kept it for ſome time, when, Beda aſſures us, there were in it about 300 families; which was leſs than a third part of the people in Angleſey, though Man wants but a third of the ſize of that iſland.

The ſecond line of their princes they derive from Orri, who, they ſay, was the ſon of the king of Norway; and that there were 12 princes of this houſe who governed Man. The old conſtitution, ſettled by the Druids while they ſwayed the ſceptre, was perfectly reſtored; the country was well cultivated and well peopled; their ſubjects were equally verſed in the exerciſe of arms and in the knowledge of the arts of peace: in a word, they had a conſiderable naval force, an extenſive commerce, and were a great nation, though inhabiting only a little iſle. Guttred the ſon of Orri built the caſtle of Ruſſyn, A. D. 960, which is a ſtrong place, a large palace, and has ſubſiſted now above 800 years. Macao was the ninth of theſe kings, and maintained an unſucceſsful ſtruggle againſt Edgar, who reduced all the little ſovereigns of the different parts of Britain to own him for their lord; and who, upon the ſubmiſſion of Macao, made him his high-admiral, by which title (*archipirata*, in the Latin of thoſe times) he ſubſcribes that monarch's charter to the abbey of Glaſtonbury.

After the death of Edward the Confeſſor, when Harold, who poſſeſſed the crown of England, had defeated the Norwegians at the battle of Stamford, there was amongſt the fugitives one Goddard Crownan, the ſon of Harold the Black, of Iceland, who took ſhelter in the iſle of Man. This iſle was then governed by another Goddard, who was a deſcendant from Macao, and he gave him a very kind and friendly reception. Goddard Crownan, during the ſhort ſtay he made in the iſland, perceived that his name-ſake was univerſally hated by his ſubjects; which

inſpired him with hopes that he might expel the king, and become maſter of the iſland. This he at laſt accompliſhed, after having defeated and killed Fingal the ſon of Goddard, who had ſucceeded his father. Upon this he aſſigned the north part of the iſland to the natives, and gave the ſouth to his own people; becoming, in virtue of his conqueſt, the founder of their third race of princes. However he might acquire his kingdom, he governed it with ſpirit and prudence; made war with ſucceſs in Ireland; gained ſeveral victories over the Scots in the Iſles; and, making a tour through his new-obtained dominions, deceaſed in the iſland of Iſlay. He left behind him three ſons. A civil war breaking out between the two eldeſt, and both of them deceaſing in a few years, Magnus king of Norway coming with a powerful fleet, poſſeſſed himſelf of Man and the iſles, and held them as long as he lived; but, being ſlain in Ireland, the people invited home Olave, the youngeſt ſon of Goddard Crownan, who had fled to the court of England, and been very honourably treated by Henry the Second. There were in the whole nine princes of this race, who were all of them feudatories to the kings of England; and often reſorted to their court, were very kindly received, and had penſions beſtowed upon them. Henry III. in particular, charged Olave, king of Man, with the defence of the coaſts of England and Ireland; and granted him annually for that ſervice 40 marks, 100 meaſures of wheat, and five pieces of wine. Upon the demiſe of Magnus, the laſt king of this iſle, without heirs male, Alexander III. king of Scots, who had conquered the other iſles, ſeized likewiſe upon this; which, as parcel of that kingdom, came into the hands of Edward I. who directed William Huntercumbe, guardian or warden of that iſle for him, to reſtore it to John Baliol, who had done homage to him for the kingdom of Scotland.

But it ſeems there was ſtill remaining a lady named *Auſtrica*, who claimed this ſovereignty, as couſin and neareſt of kin to the deceaſed Magnus. This claimant being able to obtain nothing from John Baliol, applied herſelf next to king Edward, as the ſuperior lord. He, upon this application, by his writ, which is yet extant, commanded both parties, in order to determine their right, to appear in the king's-bench. The progreſs of this ſuit does not appear; but we know farther, that this lady, by a deed of gift, conveyed her claim to Sir Simon de Montacute; and after many diſputes, invaſions by the Scots, and other accidents, the title was examined in parliament, in the ſeventh of Edward III. and ſolemnly adjudged to William de Montacute; to whom, by letters-patent dated the ſame year, that monarch releaſed all claim whatſoever.

In the ſucceeding reign, William Montacute, earl of Saliſbury, ſold it to Sir William Scroop, afterwards earl of Wiltſhire; and, upon his loſing his head, it was granted by Henry IV. to Henry Percy, earl of Northumberland; who, being attainted, had, by the grace of that king, all his lands reſtored, except the iſle of Man, which the ſame monarch granted to Sir John Stanley, to be held by him of the kings his heirs and ſucceſſors, by homage, and a caſt of falcons to be preſented at every coronation. Thus it was poſſeſſed by this noble family, who were created earls of Derby, till the reign of queen Elizabeth; when, upon the demiſe of earl Ferdinand, who left three daughters, it was, as lord Coke tells us, adjudged to thoſe ladies, and from them purchaſed by William earl of Derby, the brother of Ferdinand, from whom it was claimed by deſcent, and adjudged to its preſent poſſeſſor, his grace the duke of Athol.

This iſland, from its ſituation directly in the mouth of the channel, is very beneficial to Britain, by leſſening the force of the tides, which would otherwiſe break with far greater violence than they do at preſent. It is frequently expoſed to very high winds; and at other times to miſts, which, however, are not at all unwholeſome. The ſoil towards the north is dry and ſandy, of conſequence unfertile, but not unimprovable; the mountains, which may include near two-thirds of the iſland, are bleak and barren; yet afford excellent peat, and contain ſeveral kinds of metals. They maintain alſo a kind of ſmall ſwine, called *purrs*, which are eſteemed excellent pork. In the valleys there is as good paſture, hay, and corn, as in any of the northern counties; and the ſouthern part of the iſland is as fine ſoil as can be wiſhed. They have marl and lime-ſtone ſufficient to render even their pooreſt lands fertile; excellent ſlate, rag-ſtone, black marble, and ſome other kinds for building. They have vegetables of all ſorts, and in the utmoſt perfection; potatoes in immenſe quantities; and, where proper pains have been taken, they have tolerable fruit. They have alſo hemp, flax, large crops of oats and barley, and ſome wheat. Hogs, ſheep, goats, black cattle, and horſes, they have in plenty; and, though ſmall in ſize, yet if the country was thoroughly and ſkilfully cultivated, they might improve the breed of all animals, as experience has ſhown. They have rabbits and hares very fat and fine; tame and wild fowl in great plenty; and in their high mountains they have one eyry of eagles and two of excellent hawks. Their rivulets furniſh them with ſalmon, trout, eels, and other kinds of freſh-water fiſh; on their coaſts are caught cod, turbot, ling, halibut, all ſorts of ſhell-fiſh (oyſters only are ſcarce, but large and good), and herrings, of which they made anciently a great profit, though this fiſhery is of late much declined.

The inhabitants of Man, though far from being unmixed, were, perhaps, till within the courſe of the preſent century, more ſo than any other under the dominion of the crown of Great Britain; to which they are very proud of being ſubjects, though, like the inhabitants of Jerſey and Guernſey, they have a conſtitution of their own, and a peculiarity of manners naturally reſulting from a long enjoyment of it.—The Manks tongue is the only one ſpoken by the common people. It is the old Britiſh, mingled with Norſe, or the Norwegian language, and the modern language. The clergy preach and read the common prayer in it. In ancient times they were diſtinguiſhed by their ſtature, courage, and great ſkill in maritime affairs. They are at this day a briſk, lively, hardy, induſtrious, and well-meaning people. Their frugality defends them from want: and though there are few that abound, there are as few in diſtreſs; and thoſe that are, meet with a cheerful unconſtrained relief. On the other hand, they are choleric, loquacious, and, as the law till lately was cheap, and unincumbered with ſolicitors and attorneys, not a little litigious. The revenue, in the earl of Derby's time, amounted to about 2500l. a year; from which, deducting his civil liſt, which was about 700l. the clear income amounted to 1800l. At the ſame time, the number of his ſubjects was computed at 20,000.—The ſovereign of Man, though he has long ago waved the title of *king*, was ſtill inveſted with regal rights and prerogatives; but the diſtinct juriſdiction of this little ſubordinate royalty being found inconvenient for the purpoſes of public juſtice, and for the revenue (it affording a commodious aſylum for debtors, outlaws, and ſmugglers), authority was given to the treaſury, by ſtat. 12 Geo. I. c. 28. to purchaſe the intereſt of the then proprietors for the uſe of the crown: which purchaſe was at length completed in the year 1765, and confirmed by ſtat. 5 Geo III. c. 26. and 39.; whereby the whole iſland and all its dependencies (except the landed property of the Athol family), their manorial rights and emoluments, and the patronage of the biſhopric and other eccleſiaſtical benefices, are unalienably veſted in the crown, and ſubjected to the regulation of the Britiſh exciſe and cuſtoms. The duke, however, is procuring an act of parliament to reviſe the former one.

The moſt general diviſion of this iſland is into north and ſouth; and it contains 17 pariſhes, of which five are market-towns, the reſt villages. Its diviſion with regard to its civil government, is into ſix ſheedings, every one having its proper coroner, who is in the nature of a ſheriff, is intruſted with the peace of his diſtrict, ſecures criminals, brings them to juſtice, &c. The lord chief-juſtice Coke ſays, "their laws were ſuch as ſcarce to be found any where elſe." In July 1786, a copper coinage for the uſe of the iſland was iſſued from the Tower of London.—There is a ridge of mountains runs almoſt the length of the iſle, from whence they have abundance of good water from the rivulets and ſprings; and Snafield, the higheſt, riſes about 580 yards. The air is ſharp and cold in winter, the froſts ſhort, and the ſnow, eſpecially near the ſea, lies not long on the ground. Here are quarries of good ſtone, rocks of lime-ſtone, and red free-ſtone, and good ſlate, with ſome mines of lead, copper, and iron. The trade of this iſland was very great before the year 1726; but the late lord Derby farming out his cuſtoms to foreigners, the inſolence of thoſe farmers drew on them the reſentment of the government of England, who, by an act of parliament, deprived the inhabitants of an open trade with this kingdom. This naturally introduced a clandeſtine commerce, which they carried on with England and Ireland with prodigious ſucceſs, and an immenſe quantity of foreign goods was run into both kingdoms, till the government in 1765 thought proper to put an entire ſtop to it, by purchaſing the iſland of the duke of Athol, as already mentioned, and permitting a free trade with England. On the little iſle of Peele, on the weſt ſide of Man, is a town of the ſame name, with a fortified caſtle. Before the ſouth promontory of Man, is a little iſland called the *Calf of Man:* it is about three miles in circuit, and ſeparated from Man by a channel about two furlongs broad. At one time of the year it abounds with puffins, and alſo with a ſpecies of ducks and drakes, by the Engliſh called *barnacles*, and by the Scots *clakes* and *Solan geeſe*.

The inhabitants of this iſle are of the church of England; and the biſhop is ſtyled *Biſhop of Sodor and Man*. This biſhopric was firſt erected by Pope Gregory IV. and for its dioceſe had this iſle and all the Hebrides, or Weſtern iſlands of Scotland; but which were called *Sodoroc* by the Danes, who went to them by the north, from the Swediſh Sodor, Sail or Oar iſlands, from which the title of the biſhop of Sodor is ſuppoſed to originate. The biſhop's ſeat was at Ruſhin, or Caſtletown, in the iſle of Man, and in Latin is entitled *Sodorenſis*. But when this iſland became dependent upon the kingdom of England, the Weſtern iſlands withdrew themſelves from the obedience of their biſhop, and had a biſhop of their own, whom they entitled alſo *Sodorenſis*, but commonly *Biſhop of the Iſles*. The patronage of the biſhopric was given, together with the iſland, to the Stanleys by king Edward IV. and came by an heir-female to the family of Athol; and, on a vacancy thereof, they nominated their deſigned biſhop to the king, who diſmiſſed him to the archbiſhop of York for conſecration.—By an act of parliament, the 33d of King Henry VIII. this biſhopric is declared in the province of York.

Man-*of-war Bird*. See Pelicanus.

MANAGE. See Manege.

MANASSEH (in Scripture hiſt.), the eldeſt ſon of Joſeph, and grandſon of the patriarch Jacob (Gen. xli. 50, 51.), was born in the year of the world 2290, before Jeſus Chriſt 1714. The tribe deſcended from him came out of Egypt, in number 32,200 men, fit for battle, upwards of 20 years old, under the conduct of Gamaliel ſon of Pedahzur (Numb. ii. 20, 21.). This tribe was divided at their entrance into the land of Promiſe. One half had its portion beyond the river Jordan, and the other half on this ſide the river. The half tribe of Manaſſeh which ſettled beyond the river poſſeſſed the country of Baſhan, from the river Jabbok to mount Libanus (Numb. xxii. 33, 34, &c.); and the other half tribe of Manaſſeh on this ſide Jordan, obtained for its inheritance the country between the tribe of Ephraim to the ſouth and the tribe of Iſſachar to the north, having the river Jordan to the eaſt and the Mediterranean ſea to the weſt (Joſh. xvi. xvii.).

Manasseh, the 15th king of Judah, being the ſon and ſucceſſor of Hezekiah. His acts are recorded in 2 Kings xx. xxi. and 2 Chr. xxxiii.

MANATI, in zoology. See Trichecus.

MANCA, was a ſquare piece of gold coin, commonly valued at 30 pence; and *mancuſa* was as much as a mark of ſilver, having its name from *manu cuſa*, being coined with the hand *(Leg. Canut.)*. But the *manca* and *mancuſa* were not always of that value; for ſometimes the former was valued at ſix ſhillings, and the latter, as uſed by the Engliſh Saxons, was equal in value to our half crown. Manca *ſex ſolidis æſtimetur* (Leg. H. 1. c. 69.). Thorn in his chronicle tells us, that mancuſa *eſt pondus duorum ſolidorum et ſex denariorum*; and with him agrees Du Cange, who ſays, that 20 *mancæ* make 50 ſhillings. *Manca* and *mancuſa* are promiſcuouſly uſed in the old books for the ſame money.

MANCHA, a territory of Spain in the province of New Caſtile, lying between the river Guadiana and Andaluſia. It is a mountainous country; and it was here that the famous Don Quixote was ſuppoſed to perform his exploits.

MANCHESTER, a town of Lancaſhire in England, ſituated in W. lon. 2. 42. N. lat. 53. 27. Mr. Whitaker conjectures, that the ſtation was firſt occupied by the Britons about 500 years B. C. but that it did not receive any thing like the form of a town till 450 years after, or 50 years B. C. when the Britons of Cheſhire made an irruption into the territories of their ſouthern neighbours, and of conſequence alarmed the Seſtuntii, or inhabitants of Lancaſhire, ſo much, that they began to build fortreſſes in order to defend their country. Its Britiſh name was *Mancenion*, that is, "a place of tents:" it was changed, however, into *Mancunium* by the Romans, who conquered it under Agricola in the memorable year of the Chriſtian æra 79. It appears alſo to have been called *Manducſuedum, Manducſſedum, Manucium*, and *Mamceſtre*; from which laſt it ſeems moſt evident that the preſent name has been derived. It is diſtant from London 182 miles, and from Edinburgh 214; ſtanding near the conflux of the Irk and the Irwell, about three miles from the Merſey.

Manchester was accounted a large and populous town even 50 years ago; but ſince that time it is ſuppoſed to have increaſed in more than a triple proportion, both in reſpect to buildings and inhabitants. The houſes amount to a number not far ſhort of 12,000; and perhaps it may not be an overrate to reckon ſeven perſons to each, when it is conſidered, that, of the houſes occupied by working people of various deſcriptions, many have two, three, and ſometimes more, families in each. For though many hundred houſes have been built in the courſe of a few late years, yet are they conſtantly engaged as ſoon as poſſible; the avidity for building increaſing with every new acceſſion of inhabitants, and rents riſing to a degree ſcarcely known in other places. The progreſs of this *οικομανια* may be partly eſtimated by the price of building, land, and materials: a guinea per ſquare yard, chief rent, having been refuſed for ſome central plots; and bricks ſelling at 24s. per 1000, which a few years ſince were not more than half the price. Such, however, has been the happy concurrence of ingenuity and induſtry, and ſuch the aſtoniſhing improvements daily making in its numerous manufactures, together with the encouragement theſe afford to ſkilful artiſts in various branches, that ſtreets muſt extend in proportion: yet

population appears to have increaſed more rapidly than buildings; hence competitions naturally ariſe, and hence a temporary advance of rents. The manufactures of this town and neighbourhood, from humble domeſtic beginnings about two centuries ago, have now, after progreſſive improvements, acquired ſuch celebrity, both in the ſcale of ornament and utility, as to ſpread in ten thouſand forms and colours, not only in theſe kingdoms, but over all Europe, and even into the diſtant continents; being at once moſt precious mines of well earned private wealth, and important contributors to the neceſſary public treaſure of the ſtate. Its poſt-office alone may afford ſtrong evidence of its extenſive commerce. The population of the town may be further calculated from the great number of cotton factories within the boundaries of the town, wherein it is thought that 20,000 men, women, and children, are employed in the mere branches of preparing *warp* and *weft*. If to theſe be added the many hands applied to weaving, &c. &c. &c. beſide all the more general mechanics, as well as houſeholders, domeſtic ſervants, &c. Mancheſter may be ranked as the moſt populous market-town in Great Britain. The marriages in Mancheſter and Salford, from January 1791 to January 1792, were 1302, the chriſtenings 2960, and the burials 2286. Hence, ſhould it be computed that one in every 30 perſons died, the number of inhabitants would amount to 68,580, which is thought to be much under the ſum of an actual enumeration. The ſtreets are about 600, many of them ſpacious and airy, great part of the old buildings being removed, and the new ſtreets allowed a convenient breadth. The town is now lighted every night by 2000 lamps, and guarded by nearly 200 watchmen.

The college here was founded in 1422 by *Thomas Weſt* Lord Delaware; and conſiſted of a warden, eight fellows, four clerks, and ſix choriſters. About the ſame time the preſent collegiate church was built (timber only having been uſed for the former church); and John Huntington bachelor of laws was the firſt warden, named by the founder himſelf: he enjoyed the wardenſhip nearly 40 years; and a monument juſtly remains to his memory, he having been the firſt to propoſe and aſſiſt in the erection of the church. He died Nov. 11, 1458, and was interred in the middle of the choir. This church is a fine ſtructure of what is termed the Gothic ſyſtem, and is more enriched with ſculpture than ſuch churches uſually are. The tabernacle work over the ſtalls in the choir is very curious, as are the large arches added upon vaulting the choir. The organ, which coſt not leſs than 1000l. is large and powerful. The laſt warden was Richard Murray, D. D. the 14th in ſucceſſion. The college was new-founded in 1636; and Richard Heyrick, B. D. named the firſt warden on that foundation. The preſent warden, Richard Aſheton, D. D rector of Middleton, is the fifth in ſucceſſion from Richard Heyrick. The collegiate body now conſiſts of a warden, four fellows, two chaplains, two clerks (one of whom, by a late regulation, is to be at leaſt bachelor of arts and in prieſt's orders), four choriſters, and four ſinging men.

Beſide the collegiate church, there are alſo the following: St. Anne's, a handſome church, begun in 1709 and finiſhed in 1723: it is in the gift of the Biſhop of Cheſter. St. Mary's, built by the clergy of the collegiate church, and conſecrated upwards of 36 years ago, is a neat and indeed an elegant edifice; as is St. John's, which was built about 26 years ſince by the late Edward Byrom, Eſq. The next preſentation thereof is, by act of parliament, veſted in his heirs, afterwards devolving to the warden and fellows of the collegiate church. St. Paul's church was erected upwards of 18 years ago; and is a handſome ſpacious building, chiefly brick; to which has been added, within the laſt eight years, a lofty and ſubſtantial ſtone tower. St. James's church has been erected about ſixteen years: it is a large well lighted building of brick and ſtone, with a ſmall ſtone ſteeple. St. Michael's is alſo of brick and ſtone, with a ſquare tower. It was built by the late Rev. Humphrey Owen (one of the chaplains of the collegiate church, and rector of St Mary's), in whoſe heirs the preſentation is veſted for a term of 60 years, and thenceforward in the warden and fellows of the college. To theſe may be added, St. Thomas's, Ardwick Green; and Trinity church, Salford: for though the Irwell intervenes between Mancheſter and Salford, and each is governed by its reſpective conſtables; yet, being connected by three bridges, by mutual friendſhip, and by the common purſuit of univerſally uſeful manufactures and commerce, the two places are generally conſidered under the name of *Mancheſter*, as the borough of Southwark is not improperly deemed a part of the metropolis. In Salford there is likewiſe a Methodiſt chapel, and a church dedicated to St. Stephen. In Mancheſter is a new church, finiſhed ſix years ago, and called *St. George's*. St. Peter's church, at the end of Moſley-ſtreet, is a ſtrong and elegant ſtone ſtructure with a high ſpire: it is lighted, in a manner not very common, by ſix ſemicircular windows. Another church, called *St. Clement's*, was alſo begun in the year 1792, in Stephenſon's ſquare; and alſo one called the *New Jeruſalem Church*. Beſide the fourteen churches above enumerated, there are, a Catholic chapel, a large Methodiſt chapel, a chapel for the people called Quakers, and five chapels for diſſenters of other denominations.

Cheetham's Hoſpital, commonly called the College, becauſe it was originally the place of reſidence of the warden and fellows, is deſerving of particular notice. Humphrey Cheetham, of Clayton near Mancheſter, Eſq. having been remarkably ſucceſsful in trade, in the middle of the laſt century bought the college, and liberally endowed it for the maintenance and education of 40 poor boys, admiſſible between the age of 6 and 10 years. By an improvement of the funds of the charity, the number of boys was increaſed to 60; and continued ſuch till the Eaſter meeting of the feoffees in 1780, when another augmentation took place, and the number has ſince been conſtantly 80. The townſhips, pointed out by the founder for objects of his charity, are the following, together with the reſpective numbers admitted from each: Mancheſter, original number 14, now 28; Salford 6, now 12; Droyſden 3, now 6; Crumpfall 2, now 4; Bolton-le-moors 10, now 20; Turton 5, now 10. So that 89 perſons are now annually provided for by this liberal benefactor; including for the hoſpital a governor, 1 man and 5 women ſervants; a ſchool-maſter; and, on the library eſtabliſhment, a librarian. (See an authentic letter in the *Gent. Mag.* for June 1792, p. 521). The boys of this hoſpital are comfortably provided for till the age of 14, when they are further clothed, and with a premium placed apprentices to uſeful trades; and, in order to incite early habits of induſtry, to make them good ſervants, and at length good maſters, it has been ſuggeſted to furniſh ſome kind of eaſy employment for a ſmall part of their time not engaged at ſchool. The library, which occupies an extenſive gallery of the ſame building, owes its foundation and increaſing importance to the ſame benevolent ſource. The annual value of the fund originally bequeathed for the purchaſe of books and for a librarian's ſalary was 116l.: but, by recent improvements of the eſtate, the income is more than thrice that ſum. The books at this time amount to 10,000 volumes, of which a catalogue handſomely printed in 2 vols. 8vo. has been publiſhed by the preſent librarian, the Rev. John Radcliffe, A. M. At ſtated hours on all days, except Sundays and other holidays, the ſtudious may have free acceſs

to read, *in the library*, any book it contains; and in order to render it comfortable during the cold ſeaſon of the year, ſeveral ſtoves are kept heated at the reading hours. This college and a large incloſed area are ſituated upon a high perpendicular rock, bounded by the Irk cloſe to its conflnence with the Irwell; and is thought by Mr. Whitaker to be included, as well as the collegiate church, within the boundaries of the ancient Roman prætorium; the whole of which ſite towards the Irwell, as on the ſide of the Irk, is conſiderably elevated above the water and the oppoſite land of Salford. The Free-ſchool, higher up on the ſame ſide the Irk, almoſt joining to the college, is ſupported by the rents of three mills; one of which is for grinding malt, another for corn, and the third is employed as a ſnuff-mill. Theſe rents are now increaſed to 700l. *per annum*, from which ſalaries are paid to three maſters and two aſſiſtants. The ſcholars educated here have certain exhibitions allowed at the univerſity; and ſuch of them as are entered at Brazen-noſe college, Oxford, have a chance of obtaining ſome valuable exhibitions ariſing from lands in Mancheſter bequeathed by Mr. Hulme. The deſerved reputation of this ſchool is a powerful recommendation of its ſcholars entering at the univerſities. The academy is a large and commodious building, raiſed by the ſubſcriptions of ſeveral reſpectable diſſenters, and placed under the care of able tutors. Here youth above 14 years of age are admitted and inſtructed in the various branches of liberal knowledge, preparatory to trade or the profeſſions. The Literary and Philoſophical Society of Mancheſter was inſtituted in the beginning of the year 1781, and is well known by its Memoirs, of which ſeveral volumes 8vo have been publiſhed; theſe have been tranſlated into the German language.

A ſociety was alſo eſtabliſhed here in November 1789, under the name of the *Lancaſhire Humane Society*, for the encouragement of all who may attempt the recovery of perſons apparently drowned. The Infirmary, Diſpenſary, Lunatic Aſylum, and public Baths, are all ſituated on one large airy plot of land, in the moſt elevated and agreeable part of the town; a pleaſant graſs-plot and gravel-walk extending the whole length of the buildings; a canal intervening between them and the public ſtreet, next to which it is guarded by iron paliſades. The Lying-in hoſpital is ſituated in Salford, at the end of the old bridge. A new Work-houſe is completed; and for ſuch a purpoſe a happier ſpot could not be found in any town than that whereon it is erected, being on an equal eminence with the college on the oppoſite ſide of the Irk, and promiſing the greateſt poſſible comforts to ſuch as may be neceſſitated to become its inhabitants. The Exchange was a ſtrong good building; but ſince the late act of parliament obtained for farther improvements of the town, it has been ſold and taken down, and its ſite formed into a convenient area, to the great advantage of the ſurrounding houſes. The Theatre is a neat building, wherein the boxes are placed in a ſemicircle oppoſite to the ſtage. The Gentlemen's Concert-room is an elegant building, capacious enough to accommodate 1200 perſons. The concerts are ſupported by annual ſubſcriptions: but ſtrangers and military gentlemen have free admiſſion to the private concerts; as alſo to the public concerts, with a ſubſcriber's ticket. The new Aſſembly-rooms are large and commodious. A Circus is likewiſe built. Here are two Market-places, the old and the new; which are well ſupplied with every thing in ſeaſon, though at high rates. There are ſeveral charity-ſchools belonging to different churches and chapels, where children are furniſhed with clothes and taught to read. The Sunday-ſchools are numerous, and afford inſtruction to upwards of five thouſand children,

Over the Irwell are three bridges, uniting the town with Salford: the old bridge is very high at the Mancheſter end, whence it ſlopes into Salford. The middle bridge, four feet wide, raiſed upon timber and flagged, is only for accommodation of foot paſſengers, who from the Mancheſter ſide muſt deſcend to it by nearly forty ſteps. The lower bridge is a handſome ſtone building of two arches; this bridge affords a level road for two or three carriages abreaſt. It was undertaken and finiſhed by the private ſubſcription of a few gentlemen: and a ſmall toll is taken for all paſſing, which toll is now annually let by auction, and pays the proprietors remarkably well.—From Mancheſter there are likewiſe the ſame number of bridges over the Irk; only one, however, is adapted for the paſſage of carriages. The Irwell having at a great expence been rendered navigable for veſſels of 20 or 30 tons burden, there is a conſtant communication between Liverpool, Mancheſter, and the intermediate places on the Irwell and Merſey, to the great advantage of the proprietors and the country at large. This navigation, and more eſpecially the duke of Bridgewater's canal, opening a paſſage from Mancheſter to the Merſey at 30 miles diſtance, have, together, greatly contributed to the preſent highly flouriſhing ſtate of the town. Advantages ſtill greater, becauſe more widely diffuſive, may reſult from the intended union of the Humber and the Merſey by means of canals. Indeed, every mile of canal would benefit many miles of land; and ſuch would be the reciprocity of intereſt, that it would undoubtedly extend and be felt far beyond the viſible meaſurement of the navigation.

We muſt not omit to notice the new penitentiary houſe, called the *New Bailey*, for ſeparate confinement of various criminals. Over the entrance is a large ſeſſion-room, with adjoining rooms for the magiſtrates, council, jurors, &c. Beyond this, in the centre of a very large area incloſed by very high walls, ſtands the Priſon, an extenſive building, forming a croſs, three ſtories high; and the four wards of each ſtory may in an inſtant be ſeen by any perſon in its centre. This priſon is kept ſurpriſingly neat and healthy; and ſuch as can work at any trade, and are not confined for crimes of the greateſt magnitude, are employed in a variety of branches; ſo that one may be ſeen beating and cleanſing cotton, another carding it, another roving, and a fourth ſpinning. In the next place may be obſerved a man or a woman buſy at the loom; and in another, one or more engaged in cutting and raiſing the velvet pile. Hence induſtry is not ſuffered to ſlumber in the ſolitary cell, nor to quit it under the acquired impreſſions of that torpor which formerly accompanied the emancipated priſoner from his dungeon; rendering him, perhaps, totally unfit for the duties of honeſt ſociety, though well qualified, in all probability, to herd with gamblers, and be then, if not before, initiated into their pernicious myſteries.—At Kerſal-moor, three miles diſtant, horſe-races are annually permitted. The banks of the rivers and various brooks about the town afford excellent ſituations for the numerous dye-houſes employed for a multitude of fabrics. Among other things, the manufacture and finiſhing of hats is carried on to an extent of great importance. The general market is here on Saturday. Tueſday's market is chiefly for tranſacting buſineſs between the traders and manufacturers of the town and circumjacent country. The fairs are on Whit-Monday, October 1ſt, and November 17th.

Mancheſter is a manor with courts leet and baron. It ſends no members to parliament, but gives title to a duke. The annual fall of rain is here about 42 inches; though from January 1791 to January 1792 it was 44 inches. The ſun's greateſt heat 1791 was 76°, July 17.

MANCHINEEL. See HIPPOMANE.

MANCIPATIO, was a term made uſe of in the Roman law, and may be thus explained: Every father had ſuch a regal authority over his ſon, that before the ſon could be releaſed from his ſubjection and made free, he muſt be three times over ſold and bought, his natural father being the vender. The vendee was called *pater fiduciarius*. After this fictitious bargain, the *pater fiduciarius* ſold him again to the natural father, who could then, but not till then, *manumit* or make him free. The imaginary ſale was called *mancipatio*; and the act of giving liberty or ſetting him free after this was called *emancipatio*.

MANCIPATIO alſo ſignifies the ſelling or alienating of certain lands by the balance, or money paid by weight, and five witneſſes. This mode of alienation took place only amongſt Roman citizens, and that only in reſpect to certain eſtates ſituated in Italy, which were called *mancipia*.

MANCIPLE *(manceps)*, a clerk of the kitchen, or caterer. An officer in the Inner Temple was anciently ſo called, who is now the ſteward there; of whom Chaucer, the ancient Engliſh poet, ſome time a ſtudent of that houſe, thus writes:

A manciple there was within the Temple,
Of which all caterers might take enſample.

This officer ſtill remains in colleges in the univerſities.

MANCUNIUM, (anc. geog.) a town of the Brigantes in Britain. Now *Mancheſter* in Lancaſhire. See MANCHESTER.

MANCUS (formed of *manu cuſus*), in antiquity, an Anglo-Saxon gold coin, equal in value to $2\frac{1}{2}$ ſolidi, or 30 pence; and in weight to 55 Troy grains. The firſt account of this coin that occurs in the hiſtory of our country is about the cloſe of the 8th century, in an embaſſy of Cenwulf king of Mercia to Leo III. requeſting the reſtoration of the juriſdiction of the ſee of Canterbury: this embaſſy was enforced by a preſent of 120 mancuſes. Ethelwolf alſo ſent yearly to Rome 300 mancuſes: and theſe coins are ſaid to have continued in ſome form or other till towards the concluſion of the Saxon government. The heriots of the nobility are chiefly eſtimated by this ſtandard in Canute's laws. It came originally from Italy, where it was called *ducat*; and is ſuppoſed to have been the ſame with the drachma or miliarenſis current in the Byzantine empire.

MANDAMUS, in law, a writ that iſſues out of the court of king's-bench, ſent to a corporation, commanding them to admit or reſtore a perſon to his office. This writ alſo lies where juſtices of the peace refuſe to admit a perſon to take the oaths in order to qualify himſelf for enjoying any poſt or office; or where a biſhop or archdeacon refuſes to grant a probate of a will, to admit an executor to prove it, or to ſwear a churchwarden, &c.

MANDANES, an Indian prince and philoſopher, who, for the renown of his wiſdom, was invited by the ambaſſadors of Alexander the Great to the banquet of the ſon of Jupiter. A reward was promiſed him if he obeyed, but he was threatened with puniſhment in caſe of a refuſal. Unmoved by promiſes and threatenings, the philoſopher diſmiſſed them with obſerving, that though Alexander ruled over a great part of the univerſe, he was not the ſon of Jupiter; and that he gave himſelf no trouble about the preſents of a man who poſſeſſed not wherewithal to content himſelf. "I deſpiſe his threats (added he): if I live, India is ſufficient for my ſubſiſtence; and to me death has no terrors, for it will only be an exchange of old age and infirmity for the happineſs of a better life."

MANDARINS, a name given to the magiſtrates and governors of provinces in China, who are choſen out of the moſt learned men, and whoſe government is always at a great diſtance from the place of their birth. *Mandarin* is alſo a name given by the Chineſe to the learned language of the country; for, beſides the language peculiar to every province, there is one common to all the learned in the empire, which is in China what Latin is in Europe: this is called the *mandarin tongue* or the *language of the court*.

MANDATE, in law, a judicial commandment to do ſomething. See the article MANDAMUS.

MANDATE, in the canon law, a reſcript of the pope, commanding an ordinary collator to put the perſon therein named in poſſeſſion of the firſt vacant benefice in his collation.

MANDATUM, was a fee or retainer given by the Romans to the *procuratores* and *advocati*. The *mandatum* was a neceſſary condition, without which they had not the liberty of pleading. Thus the legal eloquence of Rome, like that of our own country, could not be unlocked without a golden key.

MANDERSCHEIT, a town of Germany in the circle of the Lower Rhine, and in the electorate of Triers, capital of a county of the ſame name, between the dioceſe of Triers and the duchy of Juliers. E. lon. 6. 32. N. lat. 50. 20.

MANDEVILLE (Sir JOHN), a phyſician, famous for his travels, was born at St. Alban's about the beginning of the 14th century. He had a liberal education, and applied himſelf to the ſtudy of phyſic; but being at length ſeized with an invincible deſire of ſeeing diſtant parts of the globe, he left England in 1332, and did not return till 34 years after. His friends, who had long ſuppoſed him dead, did not know him when he appeared. He had travelled through almoſt all the Eaſt, and made himſelf maſter of a great variety of languages. He particularly viſited Scythia, Armenia the Greater and Leſs, Egypt, Arabia, Syria, Media, Meſopotamia, Perſia, Chaldea, Greece, Dalmatia, &c. His rambling diſpoſition did not ſuffer him to reſt; for he left his own country a ſecond time, and died at Liege in the Netherlands in 1372. He wrote An Itinerary, or an account of his travels, in Engliſh, French, and Latin.

MANDEVILLE (BERNARD DE), an eminent writer in the 18th century, was born in Holland, where he ſtudied phyſic, and took the degree of doctor in that faculty. He afterwards came over into England, and in 1714 publiſhed a poem intitled The Grumbling Hive, or Knaves turned Honeſt; upon which he afterwards wrote remarks, and publiſhed the whole at London, 1723, in 8vo. under the title of The Fable of the Bees, or, Private Vice made public Benefits; with an Eſſay on Charity and Charity-ſchools, and a Search into the Nature of Society. This book was preſented by the jury of Middleſex in July the ſame year, and ſeverely animadverted upon in A Letter to the Right Honourable Lord C. printed in the London Journal of Saturday July 27, 1723. Our author publiſhed a Vindication. His book was attacked by ſeveral writers. He publiſhed other pieces, and died in 1724.

MANDRAGORA, in botany. See ATROPA.

MANDRAKE, in botany. See ATROPA and MUSA.

MANDREL, a kind of wooden pulley, making a member of the turner's lathe. Of theſe there are ſeveral kinds; as *Flat Mandrels*, which have three or more little pegs or points near the verge, and are uſed for turning flat boards on. *Pin Mandre's*, which have a long wooden ſhank to fit into a round hole made in the work to be turned. *Hollow Mandrels*, which are hollow of themſelves, and uſed for turning hollow work. *Screw Mandrels*, for turning ſcrews, &c.

MANE, the hair hanging down from a horſe's neck; which ſhould be long, thin, and fine; and if frizzled, ſo much the better.

MANEGE, or MANAGE, the exerciſe of riding the great horſe, or the ground ſet apart for that purpoſe; which is ſometimes covered, for continuing the exerciſe in bad weather; and ſometimes open, in order to give more liberty and freedom both to the horſeman and horſe. See HORSEMANSHIP. The

word is borrowed from the French *manege*, and that from the Italian *maneggio*; or, as ſome will have it, *a manu agendo*, "acting with the hand."

MANES, a poetical term, ſignifying the ſhades or ſouls of the deceaſed The heathens uſed a variety of ceremonies and ſacrifices to appeaſe the manes of thoſe who were deprived of burial. See LEMURES and LEMURIA.

Dii MANES, were the ſame with *inferi*, or the infernal gods, who tormented men; and to theſe the heathens offered ſacrifices to aſſuage their indignation. The heathen theology is a little obſcure with regard to theſe gods' manes. Some hold, that they were the ſouls of the dead; others, that they were the genii of men; which laſt opinion ſuits beſt with the etymology of the word. The heathens, it is pretty evident, uſed the word *manes* in ſeveral ſenſes; ſo that it ſometimes ſignified the ghoſts of the departed, and ſometimes the infernal or ſubterraneous deities, and in general all divinities that preſided over tombs. The evocation of the manes of the dead ſeems to have been very frequent among the Theſſalians; but it was expreſsly prohibited by the Romans. See LARES.

MANES, the founder of the Manichæan ſyſtem. See MANICHEES.

MANETHO, an ancient Egyptian hiſtorian, who pretended to take all his accounts from the ſacred inſcriptions on the pillars of Hermes Triſmegiſtus. He was high-prieſt of Heliopolis in the time of Ptolemy Philadelphus, at whoſe requeſt he wrote his hiſtory in Greek; beginning from their gods, and continuing it down to near the time of Darius Codomannus, who, was conquered by Alexander the Great. His hiſtory of Egypt is a celebrated work, that is often quoted by Joſephus and other ancient authors. Julius Africanus gave an abridgment of it in his Chronology. Manetho's work is however loſt; and there only remain ſome fragments extracted from Julius Africanus, which are to be found in Euſebius's Chronica.

MANFREDI (EUSTACHIO), a celebrated mathematician, born at Bologna in 1674, where he was elected mathematical profeſſor in 1698. He was made a member of ſeveral academies, and acquired great reputation by his Ephemerides, 4 vols. 4to, as well as by other works. He died in 1739.

MANFREDONIA, a port town of Naples, on the Gulph of Venice, which aroſe on the ruins of the ancient Sipontum; (ſee the article SIPONTUM.) It received its name from its founder *Manfred*; who tranſplanted hither the few inhabitants that remained at Sipontum, and attracted other ſettlers to it by various privileges and exemptions. In order to found it under the moſt favourable auſpices, he called together all the famous profeſſors of aſtrology (a ſcience in which both he and his father placed great confidence), and cauſed them to calculate the happieſt hour and minute for laying the firſt ſtone. He himſelf drew the plans, traced the walls and ſtreets, ſuperintended the works, and by his preſents and largeſſes animated the workmen to finiſh them in a very ſhort ſpace of time. The port was ſecured from ſtorms by a pier, the ramparts were built of the moſt ſolid materials, and in the great tower was placed a bell of ſo conſiderable a volume as to be heard over all the plain of Capitanata, in order to alarm the country in caſe of an invaſion. Charles of Anjou afterwards removed the bell to Bari, and offered it at the ſhrine of St. Nicholas, as a thankſgiving for the recovery of one of his children. In ſpite of all the precautions taken by Manfred to ſecure a brilliant deſtiny to his new city, neither his pains, nor the horoſcopes of his wizards, have been able to render it opulent or powerful. At preſent, Mr. Swinburn informs us, it ſcarce muſters ſix thouſand inhabitants, though moſt of the corn exported from the province is ſhipped off here, and a direct trade carried on with Venice and Greece, for which reaſon there is a lazaretto eſtabliſhed; but from ſome late inſtances we may gather, that if the kingdom of Naples has for many years paſt remained free from the plague, it is more owing to good luck, and the very trifling communication with Turkey, than to the vigilance or incorruptibility of the officers of this port. In 1620 the Turks landed and pillaged Manfredonia. All ſorts of vegetables abound here, for flavour and ſucculency infinitely ſuperior to thoſe raiſed by continual waterings in the cineritious ſoil of Naples. Lettuce in particular is delicious, and fiſh plentiful and cheap.

MANGANESE, or MAGNESIA NIGRA, a dark-coloured mineral employed in glaſs-works for purifying the glaſs, by taking away the colour it has already, or by ſuperadding a new colour to it. It is alſo uſed in the glazing of earthen ware, where it communicates a black colour. From its property of rendering glaſs colourleſs, it has ſometimes been called the ſoap of glaſs.

This ſubſtance, commonly called *black* or *glaſs-maker's* manganeſe, is ſcarcely any other thing than the calx of a new ſemimetal, whoſe properties were for the firſt time inveſtigated by Mr. Scheele in the Stockholm Memoirs for 1774: afterwards it was more fully inveſtigated by Dr. Gahn, and lately by ſeveral other chemiſts. Its colour is of a duſky white; and the ſurface is uneven and irregular, owing to its imperfect fuſion. It is bright and ſhining when firſt broken, but tarniſhes by expoſure to air much ſooner than any other metallic ſubſtance. Its ſpecific gravity is 6,850; it equals, if it does not exceed, iron in hardneſs as well as difficulty of fuſion. When reduced to powder it becomes magnetical, though large pieces of it are not ſo. When expoſed to the air, it ſoon crumbles into a blackiſh brown powder, ſomewhat heavier than the regulus itſelf; and this effect is ſooner produced in a moiſt than a dry air.

The regulus is obtained by making the calx or ore of manganeſe into a ball with pitch, and putting it into a crucible with powdered charcoal one-tenth of an inch thick on the ſides and a quarter of an inch at the bottom. The empty ſpace is then to be filled with powdered charcoal, covering the crucible with another. Having luted the joints, the whole is to be expoſed to the ſtrongeſt heat of a forge for an hour or more. This regulus is ſoluble in all the acids, but moſt readily in the nitrous, the ſolution in which is generally of a browniſh colour, though that in the others is moſtly colourleſs. The brown colour in the nitrous ſolution ariſes from the mixture of a ſmall portion of iron, and there is always a black reſiduum reſembling plumbago left undiſſolved. Aerated alkalis throw down a white precipitate from theſe ſolutions, which by heat grows black, and is converted into the original calx of the metal.

Regulus of manganeſe melts readily with other metals, mercury alone excepted. Copper, united with a certain quantity of it, is extremely malleable; but ſcarcely any traces of the red colour are to be ſeen on the ſurface when poliſhed, but the mixture ſometimes has a green efflorescence by age. Its decompoſition by air is very remarkable. A piece of it newly made, when put into a dry bottle well corked, remained perfect for ſix months: but afterwards, when expoſed only for two days to the open air of a chamber, contracted a brown colour on the ſurface, and became ſo friable as to crumble into powder between the fingers, the internal parts only retaining an obſcure metallic ſplendour, which alſo diſappeared in a few hours.

This ſurpriſing facility of decompoſition might naturally lead us to ſuppoſe that no ſuch thing as native manganeſe could exiſt in the earth. In the *Journal de Phyſique* for January 1786, however, M. de Peyrouſe gives an account of a native regulus of manganeſe, the properties of which are as follow: 1. In appearance it very much reſembles the artificial regulus already mentioned. 2. It dirties the fingers by handling.

3. None of its particles are in the leaſt affected by the magnet. 4. It is compoſed of laminæ having a kind of divergence among themſelves. 5. Its metallic brilliancy is the ſame with that of the artificial regulus, and it has a partial malleability. 6. When repeatedly hammered, it exhibits a kind of exfoliation, forming itſelf into very thin leaves. 7. Its opacity and denſity are ſo completely ſimilar to the artificial regulus, that, were it not for the matrix in which the latter is imbedded, it would be in a manner impoſſible to diſtinguiſh them.

This regulus is not found in large maſſes, or in any ſolid continuous body, but only in clots or lumps incloſed and intermixed with the powdery or calciform ore. Theſe lumps are ſomewhat flattened or compreſſed in their form, like the artificial ones, though for the moſt part they are of a larger ſize. This powdery magneſian ore, in which the reguline lumps are imbedded, has an argentine hue, as if the materials had been ſubjected to ſome violent heat upon the ſpot.—This regulus was found among the iron mines of *Sem*, in the valley of *Viedorſos*, in the county of Foix, near the Pyrenean mountains.

Manganeſe is found in a calciform ſtate, of various colours. M. de Magellan obſerves, that the aërial acid is the only mineralizer of this ſemimetal in its dry ſtate; and that in proportion to the different degrees of phlogiſtication, a variety of colours is produced. When it contains as much phlogiſton as poſſible without being reduced to a regulus, it always appears of a white colour, and contains about 40 *per cent.* of fixed air. In proportion to its dephlogiſtication and union with other ſubſtances, its colour is either blue, green, yellow, red, or black.

The black manganeſe ſeems to be the decayed particles of that which is indurated. The latter is met with either pure, or in form of balls ſeemingly compoſed of concentric fibres; ſometimes, but very rarely, it is met with of a white colour. Cronſtedt informs us, that he had a ſpecimen of this from an unknown place in Norway. He found that it differed from the common kind, by giving a deep red colour to borax in the fire. By calcination it aſſumes a reddiſh brown colour.

Blue manganeſe, according to Mr. Scheele, acquires its colour from the phlogiſton which it is enabled to retain by its union with fixed alkalies. Green ariſes from a mixture of the blue with the yellow calx of iron; and the yellow colour, from a prevalence of this calx; red, from a ſlight dephlogiſtication of the calx; and black, from a thorough dephlogiſtication of it.—The white kind, above mentioned, contains but a very ſmall proportion of iron. Rinman found it both in ſmall white cryſtals and in round maſſes in the cavities of quartz, and adhering to glanz-blende. The hardneſs rather leſs than limeſtone, the texture ſparry, and the ſubſtance ſcarcely magnetic even after roaſting. It affords a colourleſs ſolution with nitrous acid, from which mild alkalies throw down a white precipitate turning black with heat, as already mentioned, of the regulus itſelf. The white ore has alſo been found vegetating on the ſurface of ſome iron ores, particularly hæmatites. Mr. Rinman alſo met with it in the form of calcareous ſpar of the colour of roſin, ſomewhat ſhining, and covered over in ſome places with a ſooty powder. It is found alſo in thin pieces, tranſparent at the edges, but not hard enough to ſtrike fire. This conſiſts of manganeſe bedded in zeolite. It melts *per ſe* with the heat of a blow-pipe into a whitiſh grey porous ſlag; and with the addition of calcined borax gives a garnet colour to glaſs. According to Kirwan, many of the white ſparry iron ores may be claſſed among thoſe of manganeſe, as they contain more of this ſemimetal than of iron.

Red manganeſe is ſaid to be found in Piedmont, but Cronſtedt ſays he never ſaw it. He was told by an ingenious workman, that this variety is free from iron, and gives rather a red than violet colour to glaſs. Mr. Kirwan ſays that this kind has leſs fixed air and more iron than the white kind. It is alſo joined with ponderous earth, calcareous earth, ponderous ſpar, and flint. It is found either looſe or ſemi-indurated, in a matrix of calcareous ſpar, on talcky ſchiſtus, or on hæmatites or other iron ores. It is found likewiſe in heavy hard maſſes of lamellar, radiated, or equable texture, or cryſtallized in pyramids, rhomboids, or ſhort brittle needles.

Manganeſe is alſo met with in a ſtate of union with iron. This is black, with a metallic ſplendour, and is the kind commonly employed in glaſs-houſes and potteries. There are ſeveral varieties of this ſtone in the mountains round Bath named Mendip-hills, of which the Briſtol potters conſume great quantities. The black ores of manganeſe differ but little from the brown ones. They are both found either cryſtallized as the red ores, or in ſolid maſſes, ſome of which have a metallic appearance; but others are dull, earthy, and mixed, or embodied in quartz, or in a looſe earthy form. Their ſpecific gravity is about 4.000. The black manganeſe is met with either ſolid and of a flaggy texture, ſteel-grained, radiated, or cryſtallized.

The Perigord ſtone belongs to this ſpecies of manganeſe. It is of a dark grey colour like the baſaltes, and may be ſcraped with a knife, but cannot be broken without difficulty. It is very compact, heavy, and as black, internally, as charcoal. It has a glittering appearance of a ſtriated kind, like the ore of antimony; and its particles are diſpoſed in the form of needles croſſing one another without any agglutination, inſomuch that ſome are looſe in a manner ſimilar to iron-filings when ſtuck to a loadſtone, and reſembling on the whole the ſcoria from a blackſmith's forge. By calcination this ſubſtance aſſumes a reddiſh brown colour, and becomes harder, but is not magnetic. It does not melt *per ſe*, but affords an amethyſt-coloured glaſs with borax. Nitrous acid has little effect upon it without ſugar. It ſeems to contain clay and ſome iron, and is of conſiderable ſpecific gravity. It is found in ſome parts of England, as well as in Gaſcony and Dauphiny in France. The French potters and common enamellers ſometimes employ this ſubſtance in the glazing of their ware.

Black-wadd is likewiſe an ore of manganeſe. It is found in Derbyſhire, and is of a dark brown colour, partly in powder, and partly indurated and brittle. If half a pound of it be dried before the fire, and afterwards ſuffered to cool for an hour, and two ounces of linſeed oil afterwards added, mixing the whole looſely like barm with flour, little clots will be formed, and in ſomething more than half an hour the whole will grow hot, and at laſt burſt into flame. The heat of the room in which this experiment was tried might be about 30° of Fahrenheit, and the heat to which it was expoſed in drying about 130. According to Wedgwood's analyſis, this ore contains 43 parts of manganeſe, as much iron, 4½ of lead, and near 5 of micaceous earth.

Beſides the ores mentioned above, Mr. Scheele informs us, that he has found manganeſe exiſting in pot-aſhes. Chemiſts, he tells us, have often obſerved, that alkaline ſalts, when calcined, aſſume a blueiſh or greeniſh colour. The cauſe of this has been ſaid to be a quantity of phlogiſton preſent in the alkali; but to this he objects, that ſuch a colour is not deſtroyed by fuſion with nitre. When fixed alkali is made to run over the crucible by too ſtrong a fire, the part that attaches itſelf to the outſide acquires a dark-green colour in conſequence of the aſhes uniting with it. If one part of alkali of tartar be mixed with one-fourth of fine ſifted aſhes and one-eighth of nitre, a dark-green maſs is obtained, which, by ſolution in water, affords a beautiful green ſolution, and, when filtered, turns red on the addition of a few drops of vitriolic acid. Some days afterwards a ſmall quantity of brown powder falls to the bottom, which diſcovers the ſame chemical properties as manga-

manganeſe. On diſſolving a quantity of ſifted aſhes in muriatic acid by digeſtion in a ſand-heat, the ſame ſmell of aqua-regia ariſes that is perceived on mixing manganeſe with ſpirit of ſalt. Adding ſome hours afterwards a certain quantity of vitriolic acid, in order to precipitate the greater part of the calcareous earth, the liquor had a yellow colour when filtered, and by means of fixed alkali let fall a yellow precipitate, which by calcination turned of a dark-grey, and ſhowed ſigns of containing manganeſe. Hence it appears that manganeſe really exiſts in the aſhes of vegetables, but not equally in all; for Mr. Scheele obſerves, that wood-aſhes contain much more than thoſe of thyme *(thymus ſerpillum)*.

Mr. Scheele has laboured exceedingly to decompoſe this ſubſtance, and to diſcover its component parts. He candidly acknowledges, however, that he did not ſucceed in this inveſtigation according to his wiſh, and therefore cannot be certain that his concluſions are altogether juſt. The following experiments, however, he tells us, were made with the greateſt accuracy as well as expence of time and trouble.

Half an ounce of phlogiſticated manganeſe, purified from all foreign particles, was calcined upon an iron-plate till it grew black. It was then diſſolved in diluted vitriolic acid, with the addition of a little ſugar, in a ſand heat till the ſolution became limpid. On cooling, a fine ſhining powder precipitated, which proved to be ſelenite. Having ſeparated this by filtration, and then diluted the ſolution with ſix ounces of diſtilled water, precipitating it afterwards by vegetable alkali, the powder was edulcorated, and again expoſed to calcination*. The manganeſe, when deprived of its phlogiſton, was again diſſolved by means of ſugar in diluted vitriolic acid; by which means as much ſelenite was obtained as before. The filtered ſolution was treated exactly in the ſame manner, and the operation repeated eleven times, yielding to appearance as much ſelenite as before. On weighing the reſults of all theſe calcinations, the manganeſe was found to be reduced to three drachms and five grains, and the quantity of ſelenite had increaſed to 49 grains; the whole ſeems therefore to be convertible into calcareous earth. On attempting to invert the experiment, and to produce manganeſe by combining phlogiſton with calcareous earth, he found it impoſſible to unite the two ſubſtances by any means he could deviſe.

This analyſis of manganeſe was undertaken at the deſire of Mr. Bergman; who having informed him that Mr. Sage ſuppoſes manganeſe to be nothing elſe than a mineraliſed mixture of cobalt and zinc, he afterwards made ſeveral experiments with a view to detect theſe ſubſtances, but in vain. "Manganeſe (ſays Mr. Bergman) has been claſſed by all mineralogiſts among the ores of iron; but Mr. Pott ſuppoſed the iron to be only accidentally mixed with it; and at laſt Mr. Cronſtedt, in his Eſſay on Mineralogy, 1758, placed it among the earths. For my part, however, I muſt own that there are ſeveral circumſtances which make me think that it is a metallic ſubſtance. No pure earth colours glaſs, but all metallic calces have this property. Manganeſe, therefore, in this reſpect, ſhows a great reſemblance to the latter; which is further increaſed by its ſpecific gravity, and its ſtrong attraction for phlogiſton." Having then mentioned its precipitation by the Pruſſian alkali as an additional proof of its metallic nature, he proceeds thus: "But what kind of metal it is which manganeſe contains is not ſo eaſily aſcertained. The ſolution of cobalt does not loſe its colour on adding ſugar or any other phlogiſtic ſubſtance, and zinc does not impart any colour to acids. Theſe two ſubſtances conſequently differ from manganeſe, which does not indeed entirely agree with any other of the known metallic earths. I have, however, great reaſon to conjecture that it muſt be platina, the earth of which is not yet known; or a new metal, which at leaſt would agree with platina in the great difficulty with which it fuſes."

It has already been obſerved, that manganeſe is uſed in glaſs-works, and is capable both of deſtroying the colour of glaſs, and of giving a new colour to it, viz. that of violet. Mr. Scheele enumerates its effects on glaſs-fluxes as follows: 1. A colourleſs glaſs-flux becomes conſtantly more or leſs red on addition of manganeſe, according to the quantity. 2. If the flux be a little alkaline, the colour will approach to violet. 3. Arſenic, gypſum, and calx of tin, deſtroy the red colour in theſe glaſſes, and thus render them clear. Manganeſe decompoſes arſenic by uniting with its phlogiſton, and arſenic itſelf is compoſed of an acid of a peculiar nature united with phlogiſton. On mixing manganeſe, therefore, with glaſs in fuſion, the phlogiſton of the arſenic unites with the manganeſe, while the acid of arſenic unites with the alkali of the glaſs. This experiment ſucceeds in a covered crucible, though never when gypſum or calx of tin is made uſe of; but on adding powdered charcoal, an effervеſcence enſues, the red colour diſappears, and the glaſs becomes colourleſs. The phlogiſton of the charcoal is therefore the cauſe of the deſtruction of the colour, and the effervеſcence is a neceſſary conſequence of the emiſſion of the phlogiſton. 4. If glaſs coloured red by manganeſe be fuſed in a crucible with powdered charcoal, the colour diſappears during the effervеſcence without the addition of gypſum or calx of tin; but on keeping the glaſs a long time in fuſion upon charcoal, by means of the blow-pipe, the colour does not diſappear. Nay, if the colourleſs glaſs be kept in this ſtate for a ſhort time upon charcoal, it grows red again. 5. By adding a little ſulphur, the colour diſappears: and the ſame thing takes place on the addition of any metallic calx or any neutral ſalt containing the vitriolic acid. But here it muſt be obſerved, that all metals whoſe calces colour glaſs, while they deprive it of that which it has received from the manganeſe, will not fail to communicate their own peculiar colour to it. If to ſuch a colourleſs glaſs-globule, nitre, even in the ſmalleſt quantity, be added, it preſently grows red again; and the ſame thing happens if ſuch a colourleſs glaſs globule be kept in fuſion for a few minutes upon an iron plate: and thus the red colour may be made to appear and diſappear as often as we pleaſe.

From this explanation it appears how manganeſe purifies glaſs. When the colour of it depends on a quantity of coaly matter, it is improper to add more than is juſt ſufficient to ſaturate the phlogiſton. With regard to the green colour of common bottle-glaſs, Mr. Scheele made the following experiment to determine whether it proceeded from iron or not: Having melted green glaſs by the blow-pipe upon a piece of the ſame ſubſtance, leſt in uſing a crucible he ſhould have been deceived by the iron it contained, he poured upon it a large quantity of muriatic acid; and having extracted a tincture, and poured into it a few drops of the ſolution of Pruſſian alkali, it aſſumed a blueiſh colour. Hence he concludes, that iron, nearly in its metallic form, is preſent in common green glaſs: for its calx always gives a yellowiſh colour to glaſs, and manganeſe added to a ſolution of iron in acids deſtroys the green colour, ſubſtituting a yellow one in its room; and, in like manner, nitre added to green glaſs in fuſion takes away its colour. The ſame effect is produced by manganeſe, if added in proper quantity; though, according to the experiments of Mr. Scheele, ſomewhat of a yellowiſh colour ought to have been communicated by it; and he is of opinion that it was

* As in this proceſs a quantity of fixed air is always expelled from the alkali, it was neceſſary, in order to prevent any of the manganeſe from being diſſolved by it, to place the whole for ſome hours upon hot ſand, to expel the aërial fluid.

really ſo, though the quantity of iron was too ſmall to render it diſtinctly viſible. It is alſo remarkable, that the rays of light paſſing through glaſs of this kind, when nearly red hot, appear of a yellowiſh colour.

Mr Engeſtrom's experiments on this ſubject are ſomewhat different from thoſe of Mr. Scheele. Having melted manganeſe and borax together upon a piece of charcoal, the glaſs at firſt aſſumed the common colour of manganeſe; but this was repeatedly deſtroyed, and made to appear without adding any thing. During the operation he took notice of the following phenomena: 1. When a ſmall quantity of manganeſe was taken, the colour was light, but with a larger it became nearly black; and whatever colour it aſſumed on the firſt fuſion was manifeſted alſo at the ſecond, when it was made to re-appear. 2. Manganeſe, on being melted with borax, effervesces violently; which ceaſes, however, as ſoon as the manganeſe is diſſolved. 3. To make the colour of the glaſs diſappear, it was neceſſary only to direct the blue flame of the candle upon the glaſs, and that equally and conſtantly, but not very violently. On blowing more faintly, and allowing the brown flame to touch the place, the colour returned. 4. About the time that the glaſs becomes colourleſs, a kind of ſection or partition is obſerved in it; and as ſoon as the colour diſappears, the blowing muſt be immediately diſcontinued, ſo that the brown flame ſhall not afterwards touch the glaſs. When it is taken out with the forceps, it appears perfectly colourleſs. 5. This deſtruction of the colour ſeems not to happen ſuddenly, but by degrees; for when the blowing was now and then diſcontinued before the true mark had appeared, the glaſs was generally lighter than before, though not quite colourleſs.

Though our author had been able to diſcharge the colour thus from glaſs, and to make it re-appear, it ſeemed doubtful whether this could be done frequently; for, having blown the blue flame violently againſt ſome glaſs, the colour of which he had already twice diſcharged and made to re-appear, he found that it could not again be diſcharged, even by conſtant blowing for an hour. In another experiment, having added a large quantity of manganeſe, he found that the glaſs retained its colour even in the utmoſt heat he could give it, though it always became colourleſs when warm, but regained its colour in the cold.

In both theſe experiments the violence of the flame had diſperſed and driven off ſome ſmall globules, which always remained colourleſs: the reaſon of this he thinks is, that manganeſe, or its colouring part, has a ſtrong attraction for a ſmall part only of borax; and that, by means of a violent heat, the ſuperfluous part may be ſeparated, and the reſt unite more cloſely with the earthy particles. The ſame thing happened likewiſe with the ſmall globules, which ſometimes remained after the maſs was taken away, fixed to the charcoal by the violence of the flame. "If this is really the caſe (ſays he), it would follow, that by repeating the experiment ſome of theſe particles would always ſeparate if a ſufficiently ſtrong flame was applied, and it would be impoſſible to expel the red colour afterwards. I dare not, however, advance this conjecture, though it is grounded on ſome experiments as a matter of certainty."

Cronſtedt obſerves, that manganeſe communicates a colour both to glaſſes and ſaline ſolutions. Borax, which has diſſolved it, becomes tranſparent, and aſſumes a reddiſh brown or hyacinthine colour; the microcoſmic ſalt becomes tranſparent, of a crimſon colour, and moulders in the air. In compoſitions for glaſs it becomes violet with the fixed alkali; but if a great quantity of manganeſe be added, the glaſs is in thick lumps and looks black; by ſcorification with lead, the glaſs obtains a reddiſh brown colour. Manganeſe deflagrates with nitre; and the reſiduum, when thus deflagrated, communicates a deep red colour to its lixivium. The calx, when reckoned to be light, weighs as much as an iron ore of the ſame texture. It ferments with vitreous compoſitions, and ſtill more when melted with the microcoſmic ſalt. The colours communicated by manganeſe to glaſſes are eaſily deſtroyed by the calx of tin or arſenic, and likewiſe vaniſh of themſelves in the air.

According to Dr. Brunnich, manganeſe, when melted with nitre, aſſumes a green colour. Tin unites very readily with manganeſe; but zinc not without great difficulty, perhaps on account of its volatility and inflammable nature. White arſenic adheres to it, and, by means of the phlogiſton, reduces it to a metallic form. By ſimple calcination a blackiſh powder is produced; but if the ignition be continued for twelve days, it acquires a dark green colour; producing alſo, ſometimes, one of a white or reddiſh colour. All theſe various calces, by means of a ſufficient degree of heat in a common crucible, run into a yellowiſh red glaſs, which is pellucid, unleſs from too great thickneſs.

MANGE, in dogs. See *Diſeaſes of* DOGS.

MANGE, in farriery. See FARRIERY.

MANGEART (DOM THOMAS), a Benedictine of the congregation of St. Vanne and St. Hidulphe, whoſe knowledge was an ornament to his order. It gained him alſo the titles of antiquarian, librarian, and counſellor to Charles duke of Lorrain. He was preparing a very conſiderable work when he died, A. D. 1763, before he had put his laſt hand to his book, which was publiſhed by abbé Jacquin. This production appeared in 1763, in folio, with this title: *Introduction à la ſcience des Medailles, pour ſervir à la connoiſſance des Dieux, de la Religion, des Sciences, des Arts, et de tout ce qui appartient à l'Hiſtoire ancienne, avec les preuves tirées des Medailles.* The elementary treatiſes on the numiſmatic ſcience were not ſufficiently extenſive, and the particular diſſertations were by far too tedious and prolix. This learned Benedictine has collected into a ſingle volume all the principles contained in the former, and all the ideas of any conſequence which are to be found ſcattered through the latter. His work may ſerve as a ſupplement to Montfaucon's *Antiquity explained.* From Mangeart we likewiſe have a volume of ſermons; and a treatiſe on Purgatory, Nancy, 1739, 2 vols. 12mo.

MANGEL-WURZEL. See BETA.

MANGENOT (LEWIS), a canon of the Temple at Paris, where he was born A. D. 1694, and died in 1768 at the age of 74. He was a ſocial poet, and an amiable man. But, although lively and agreeable in his converſation, his character leaned ſomewhat towards cynical miſanthropy. Of this we may judge from the following verſes, written on a little parlour which he had erected in a garden dependent on his benefice:

Sans inquiétude, ſans peine,
Je jouis dans ces lieux du deſtin le plus beau;
Les Dieux m'ont accordé l'ame de Diogene,
Et mes foibles talens m'ont valu ſon tonneau.

His poems were publiſhed at Amſterdam in 1776. This collection contains two eclogues full of nature, ſimplicity, and elegance; fables, ſome of which are well compoſed; tales, which are by far too licentious; moral reflections; ſentences; madrigals, &c. &c.

MANGER, is a raiſed trough under the rack in the ſtall, made for receiving the grain or corn that a horſe eats.

MANGER, a ſmall apartment, extending athwart the lower-deck of a ſhip of war, immediately within the hauſe-holes, and fenced on the after-part by a partition, which ſeparates it from the other part of the deck behind it. This partition ſerves as a fence to interrupt the paſſage of the water, which

occaſionally guſhes in at the hauſe-holes, or falls from the wet cable whilſt it is heaved in by the capſtern. The water, thus prevented from running aft, is immediately returned into the ſea by ſeveral ſmall channels, called *ſcuppers*, cut through the ſhip's ſide within the manger. The manger is therefore particularly uſeful in giving a contrary direction to the water that enters at the hauſe-holes, which would otherwiſe run aft in great ſtreams upon the lower-deck, and render it extremely wet and uncomfortable, particularly in tempeſtuous weather, to the men who meſs and ſleep in different parts thereof.

MANGET (John-James), an eminent phyſician, born at Geneva in 1652. The elector of Brandenburg made him his firſt phyſician in 1699; in which poſt he continued till his death, which happened at Geneva in 1742. He wrote many works; the moſt known of which are, 1. A collection of ſeveral Pharmacopœias, in folio. 2. *Bibliotheca pharmaceutico-medica.* 3. *Bibliotheca anatomica.* 4. *Bibliotheca chemica.* 5. *Bibliotheca chirurgica.* 6. A *bibliotheca* of all the authors who have written on medicine, in 4 vols. folio. All theſe works are in Latin. Daniel le Clerc, the author of a Hiſtory of Phyſic, aſſiſted him in writing them.

MANGIFERA, the mango-tree, in botany: a genus of the monogynia order, belonging to the pentandria claſs of plants; and in the natural method ranking with thoſe of which the order is doubtful. The corolla is pentapetalous; the plum kidney-ſhaped. There is but one ſpecies, a native of many parts of the Eaſt Indies, whence it has been tranſplanted to Brazil and other warm parts of America. It grows to a large ſize; the wood is brittle; the bark rough when old; the leaves are ſeven or eight inches long, and more than two inches broad. The flowers are produced in looſe panicles at the ends of the branches, and are ſucceeded by large oblong kidney-ſhaped plums. This fruit, when fully ripe, is greatly eſteemed in the countries where it grows; but in Europe we have only the unripe fruit brought over in pickle. All attempts to propagate the plant have hitherto proved ineffectual; and Mr. Millar is of opinion that the ſtones will not vegetate unleſs they are planted ſoon after they are ripe. He thinks, therefore, that the young plants ought to be brought over in boxes of earth; after which they may be kept in the tan-bed of the ſtove.

MANGOSTAN, or Mangosteen. See Garcinia.

MANGROVE. See Rhizophora.

MANHEIM, a town of Germany, in the Lower Palatinate, with a very ſtrong citadel, and a palace, where the elector palatine often reſides. It is ſeated at the confluence of the rivers Neckar and Rhine, in E. lon. 8. 33. N. lat. 49. 25.

MANHOOD, that ſtage of life which ſucceeds puberty or adoleſcence. See Man.

MANIA, or Madness. See Medicine.

MANICHEES, or Manicheans *(Manichæi)*, a ſect of ancient hereticks, who aſſerted two principles; ſo called from their author *Manes* or *Manichæus*, a Perſian by nation, and educated among the Magi, being himſelf one of that number before he embraced Chriſtianity. This hereſy had its firſt riſe about the year 277, and ſpread itſelf principally in Arabia, Egypt, and Africa. St. Epiphanius, who treats of it at large, obſerves, that the true name of this hereſiarch was Cubricus; and that he changed it for *Manes*, which in the Perſian or Babyloniſh language ſignifies *veſſel*. A rich widow, whoſe ſervant he had been, dying without iſſue, left him ſtore of wealth; after which he aſſumed the title of the *apoſtle* or *envoy of Jeſus Chriſt*.

Manes was not contented with the quality of apoſtle of Jeſus Chriſt, but he alſo aſſumed that of the Paraclete, whom Chriſt had promiſed to ſend: which Auguſtin explains, by ſaying, that Manes endeavoured to perſuade men, that the Holy Ghoſt did perſonally dwell in him with full authority. He left ſeveral diſciples, and among others Addas, Thomas, and Hermas. Theſe he ſent in his lifetime into ſeveral provinces to preach his doctrine. Manes, having undertaken to cure the king of Perſia's ſon, and not ſucceeding, was put in priſon upon the young prince's death, whence he made his eſcape; but he was apprehended ſoon after, and flayed alive.

However, the oriental writers, cited by D'Herbelot and Hyde, tell us, that Manes, after having been protected in a ſingular manner by Hormizdas, who ſucceeded Sapor in the Perſian throne, but who was not able to defend him, at length, againſt the united hatred of the Chriſtians, the Magi, the Jews, and the Pagans, was ſhut up in a ſtrong caſtle, to ſerve him as a refuge againſt thoſe who perſecuted him on account of his doctrine. They add, that after the death of Hormizdas, Varanes I. his ſucceſſor, firſt protected Manes, but afterwards gave him up to the fury of the Magi, whoſe reſentment againſt him was due to his having adopted the Sadducean principles, as ſome ſay; while others attribute it to his having mingled the tenets of the Magi with the doctrines of Chriſtianity. However, it is certain that the Manicheans celebrated the day of their maſter's death. It has been a ſubject of much controverſy whether Manes was an impoſtor. The learned Dr. Lardner has examined the arguments on both ſides; and though he does not chooſe to deny that he was an impoſtor, he does not diſcern evident proofs of it. He acknowledges that he was an arrogant philoſopher and a great ſchemiſt; but whether he was an impoſtor, he cannot certainly ſay. He was much too fond of philoſophical notions, which he endeavoured to bring into religion, for which he is to be blamed: nevertheleſs, he obſerves, that every bold dogmatiſer is not an impoſtor.

The doctrine of Manes was a motley mixture of the tenets of Chriſtianity with the ancient philoſophy of the Perſians, in which he had been inſtructed during his youth. He combined theſe two ſyſtems, and applied and accommodated to Jeſus Chriſt the characters and actions which the Perſians attributed to the god Mithras.

He eſtabliſhed two principles, *viz.* a good and an evil one: the firſt, a moſt pure and ſubtile matter, which he called *light*, did nothing but good; and the ſecond, a groſs and corrupt ſubſtance, which he called *darkneſs*, nothing but evil. This philoſophy is very ancient; and Plutarch treats of it at large in his Iſis and Oſiris.

Our ſouls, according to Manes, were made by the good principle, and our bodies by the evil one; thoſe two principles being, according to him, co-eternal, and independent of each other. Each of theſe is ſubject to the dominion of a ſuper-intendent being, whoſe exiſtence is from all eternity. The being who preſides over the *light* is called *God*; he that rules the land of *darkneſs* bears the title of *hyle* or *dæmon*. The ruler of the *light* is ſupremely happy, and in conſequence thereof benevolent and good; the prince of *darkneſs* is unhappy in himſelf, and deſirous of rendering others partakers of his miſery, and is evil and malignant. Theſe two beings have produced an immenſe multitude of creatures, reſembling themſelves, and diſtributed them through their reſpective provinces. After a conteſt between the ruler of *light* and the prince of *darkneſs*, in which the latter was defeated, this prince of *darkneſs* produced the firſt parents of the human race. The beings ingendered from this original ſtock conſiſt of a body formed out of the corrupt matter of the kingdom of darkneſs, and of two ſouls; one of which is ſenſitive and luſtful, and owes its exiſtence to the evil principle; the other rational and immortal, a particle of that divine light which had been carried away in the conteſt by the army of darkneſs, and immerſed into the

mafs of malignant matter. The earth was created by God out of this corrupt mafs of matter in order to be a dwelling for the human race, that their captive fouls might by degrees be delivered from their corporeal prifons, and the celeftial elements extended from the grofs fubftance in which they were involved. With this view God produced two beings from his own fubftance, *viz.* Chrift and the Holy Ghoft; for the Manicheans held a confubftantial Trinity. Chrift, or the glorious intelligence called by the Perfians *Mithras*, fubfifting in and by himfelf and refiding in the fun, appeared in due time among the Jews, clothed with the fhadowy form of a human body, to difengage the rational foul from the corrupt body, and to conquer the violence of malignant matter. The Jews, incited by the prince of darknefs, put him to an ignominious death, which he fuffered not in reality, but only in appearance, and according to the opinion of men. When the purpofes of Chrift were accomplifhed, he returned to his throne in the fun, appointing apoftles to propagate his religion, and leaving his followers the promife of the Paraclete or Comforter, who is Manes the Perfian. Thofe fouls who believe Jefus Chrift to be the fon of God, renounce the worfhip of the God of the Jews, who is the prince of darknefs, and obey the laws delivered by Chrift, and illuftrated by Manes the comforter, are gradually purified from the contagion of matter; and their purification being completed, after having paffed through two ftates of trial, by water and fire, firft in the moon and then in the fun, their bodies return to the original mafs (for the Manicheans derided the refurrection of bodies), and their fouls afcend to the regions of light. But the fouls of thofe who have neglected the falutary work of purification, pafs after death into the bodies of other animals or natures, where they remain till they have accomplifhed their probation. Some, however, more perverfe and obftinate, are configned to a feverer courfe of trial, being delivered over for a time to the power of malignant aërial fpirits who torment them in various ways. After this, a fire fhall break forth and confume the frame of the world; and the prince and powers of darknefs fhall return to their primitive feats of anguifh and mifery, in which they fhall dwell for ever. Thefe manfions fhall be furrounded by an invincible guard, to prevent their ever renewing a war in the regions of light.

Manes borrowed many things from the ancient Gnoftics; on which account many authors confider the Manicheans as a branch of the Gnoftics.

In truth, the Manichean doctrine was a fyftem of philofophy rather than of religion. They made ufe of amulets, in imitation of the Bafilidians; and are faid to have made profeffion of aftronomy and aftrology. They denied that Jefus Chrift, who was only God, aflumed a true human body, and maintained it was only imaginary: and therefore they denied his incarnation, death, &c. They pretended that the law of Mofes did not come from God, or the good principle, but from the evil one; and that for this reafon it was abrogated. They rejected almoft all the facred books in which Chriftians look for the fublime truths of their holy religion. They affirmed that the Old Teftament was not the work of God, but of the prince of darknefs, who was fubftituted by the Jews in the place of the true God. They abftained entirely from eating the flefh of any animal, following herein the doctrine of the ancient Pythagoreans: they alfo condemned marriage. The reft of their errors may be feen in St. Epiphanius, and St. Auguftin; which laft, having been of their fect, may be prefumed to have been thoroughly acquainted with them.

Though the Manichees profeffed to receive the books of the New Teftament, yet in effect they only took fo much of them as fuited with their own opinions. They firft formed to themfelves a certain idea or fcheme of Chriftianity; and to this adjufted the writings of the apoftles, pretending that whatever was inconfiftent with this had been foifted into the New Teftament by later writers who were half Jews. On the other hand, they made fables and apocryphal books pafs for apoftolical writings; and even are fufpected to have forged feveral others, the better to maintain their errors. St. Epiphanius gives a catalogue of feveral pieces publifhed by Manes, and adds extracts out of fome of them. Thefe are the Myfteries, Chapters, Gofpel, and Treafury.

The rule of life and manners which Manes prefcribed to his followers was moft extravagantly rigorous and fevere. However, he divided his difciples into two claffes; one of which comprehended the perfect Chriftians, under the name of the *elect*; and the other, the imperfect and feeble, under the title of *auditors* or *hearers*. The elect were obliged to a rigorous and entire abftinence from flefh, eggs, milk, fifh, wine, all intoxicating drink, wedlock, and all amorous gratifications; and to live in a ftate of the fevereft penury, nourifhing their emaciated bodies with bread, herbs, pulfe, and melons, and depriving themfelves of all the comforts that arife from the moderate indulgence of natural paffions, and alfo from a variety of innocent and agreeable purfuits. The auditors were allowed to poffefs houfes, lands, and wealth, to feed on flefh, to enter into the bonds of conjugal tendernefs; but this liberty was granted them with many limitations, and under the ftricteft conditions of moderation and temperance. The general aflembly of the Manicheans was headed by a prefident, who repreferted Jefus Chrift. There were joined to him 12 rulers or maflers, who were deftigned to repreferit the 12 apoftles; and thefe were followed by 72 bifhops, the images of the 72 difciples of our Lord. Thefe bifhops had preftyters or deacons under them, and all the members of thefe religious orders were chofen out of the claffs of the elect. Their worfhip was fimple and plain; and confifted of prayers, reading the fcriptures, and hearing public difcourfes, at which both the auditors and elect were allowed to be prefent. They alfo obferved the Chriftian appointment of baptifm and the eucharift. They kept the Lord's day, obferving it as a faft; and they likewife kept Eafter and Pentecoft.

Towards the 4th century, the Manicheans concealed themfelves under various names, which they fucceffively adopted, and changed in proportion as they were difcovered by them. Thus they aflumed the names of Encratites, Apotactics, Saccophori, Hydroparaftates, Solitaries, and feveral others, under which they lay concealed for a certain time, but could not however long efcape the vigilance of their enemies. About the clofe of the 6th century, this fect gained a very conftderable influence, particularly among the Perfians.

Toward the middle of the 12th century, the fect of Manichees took a new face, on occafion of one Conftantine, an Armenian, and an adherer to it; who took upon him to fuppreft the reading of all other books befides the Evangelifts and the Epiftles of St. Paul, which he explained in fuch a manner as to make them contain a new fyftem of Manicheifm. He entirely difcarded all the writings of his predeceffors; rejecting the chimæras of the Valentinians, and their 30 æons; the fable of Manes with regard to the origin of rain, and other dreams; but ftill retained the impurities of Bafilides. In this manner he reformed Manicheifm, infomuch that his followers made no fcruple of anathematizing Scythian, Buddas, called alfo *Addas* and *Terebinth*, the contemporaries and difciples, as fome fay, and, according to others, the predeceffors and maflers of Manes, and even Manes himfelf, Conftantine being now their great apoftle. After he had feduced an infinite number of people, he was at laft ftoned by order of the emperor.

This fect prevailed in Bofnia and the adjacent provinces about the clofe of the 15th century; propagated their doc-

trines with confidence, and held their religious aſſemblies with impunity.

MANICORDON, or MANICHORD, a muſical inſtrument in form of a ſpinet; the ſtrings of which, like thoſe of the clarichord, are covered with little pieces of cloth, to deaden as well as to ſoften their ſound, whence it is alſo called the *dumb ſpinet*.

MANIFESTO, a public declaration made by a prince in writing, ſhowing his intentions to begin a war or other enterpriſe, with the motives that induce him to it, and the reaſons on which he founds his rights and pretenſions.

MANIHOT, or MANIOC. See JATROPHA.

MANILA, LUCONIA, or *Luzon*, the name of the largeſt of the Philippine iſlands in the Eaſt Indies, ſubject to Spain. It had the name of *Luzon* from a cuſtom that prevailed among the natives of beating or bruiſing their rice in wooden mortars, before they either boiled or baked it: luzon, in their language, ſignifying "a mortar."

As to ſituation, it is remarkably happy, lying between the eaſtern and weſtern continents, and having China on the north, at the diſtance of about 60 leagues; the iſlands of Japan on the north-eaſt, at the diſtance of about 250 leagues from the neareſt of them; the ocean on the eaſt; the other iſlands on the ſouth; and on the weſt Malacca, Patana, Siam, Cambodia, Cochin-China, and other provinces of India, the neareſt at the diſtance of 300 leagues.

The middle of this iſland is in the latitude 15° north: the eaſt point in 13° 38′, and the moſt northern point in 19°. The ſhape of it is ſaid to reſemble that of an arm bent; the whole length being about 160 Spaniſh leagues, the greateſt breadth between 30 and 40, and the circumference about 350. As to the longitude, the charts differ, ſome making the middle of the iſland to lie 113° eaſt from London, and others in 160°. The climate is hot and moiſt. One thing is held very extraordinary, that in ſtormy weather there is much lightning and rain, and that thunder is ſeldom heard till this is over. During the months of June, July, Auguſt, and part of September, the weſt and ſouth winds blow, which they call *vendavales*, bringing ſuch rains and ſtorms, that the fields are all overflowed, and they are forced to have little boats to go from one place to another. From October till the middle of December, the north wind prevails; and from that time till May, the eaſt and ſouth-eaſt; which winds are there called *breezes*. Thus there are two ſeaſons in thoſe ſeas, by the Portugueſe called *monzeons*; whence our word *moniſoons*, that is, the breezes half the year, with a ſerene dry air; and the vendavales the other half, wet and ſtormy. It is further to be obſerved, that in this climate no vermin breed upon Europeans, though they wear dirty ſhirts, whereas it is otherwiſe with the Indians. The days here being always of an equal length, and the weather never cold, neither their clothes, nor the hour of dining, ſupping, doing buſineſs, ſtudying, or praying, are ever changed; nor is cloth worn, but only againſt the rain.

The air here, being as has been obſerved very hot and moiſt, is not wholeſome; but is worſe for young men that come from Europe than for the old. As for the natives, without uſing any precautions, they live very commonly to fourſcore or 100. The ſoil is ſo rich that rice grows even on the tops of the mountains without being watered; and this makes it ſo plentiful that the Indians value gold ſo little as not to pick it up, though it lies almoſt every where under their feet.

Among the diſadvantages of the iſland, beſides frequent and terrible earthquakes, here are ſeveral burning mountains. The face of the iſland, however, is far from being diſfigured by them, or by the conſequences of their exploſions.

The mountaineers, called *Tingiani*, have no particular place of abode, but always live under the ſhelter of trees, which ſerve them inſtead of houſes, and furniſh them with food; and when the fruit is eaten up, they remove where there is a freſh ſort.

Here are 40 different ſorts of palm-trees, the moſt excellent cocoas, wild cinnamon, wild nutmegs, and ſome ſay wild cloves alſo; ebony; ſandal-wood; the beſt caſſia, and in ſuch plenty that they feed their hogs with its fruit; all kinds of cattle, and prodigious quantities of gold, amber, and ambergriſe.

There are ſeveral ſorts of people in this iſland beſides the Spaniards, as the Tagalians or Tagaleſe, the Pintadoes or painted negroes, the Ilayas or Tinglianos, and the Negrellos. The Tagalians, who are thought to be Malayans by deſcent, are a modeſt, tractable, and well diſpoſed people. The Pintadoes, or painted negroes, are tall, ſtraight, ſtrong, active, and of an excellent diſpoſition. The Tinglianos, whom ſome ſuppoſe to be deſcended from the Japaneſe, are very brave, yet very courteous and humane. They live entirely on the gifts of nature, and never ſleep under any other ſhade than that of the trees or a cave. The Negrellos, who are held to be the aborigines of the iſland, are barbarous and brutal to the laſt degree. When they kill a Spaniard, they make a cup of his ſkull, and drink out of it.

This iſland is divided into ſeveral provinces, containing divers towns, the chief of which are Manila, Caceres, New Segovia, Bondo, Paſſacao, Ibalon, Bulaw, Serſocon or Bagatao, Lampon, Fernandina, Bolinao, Playahonda, Cavite, Mindora, Caleleya, and Balayan.

MANILA, the capital of an iſland of the ſame name in the Eaſt Indies, on the ſouth-eaſt ſide of the iſland, where a large river falls into the ſea, and forms a noble bay 30 leagues in compaſs, to which the Spaniards have given the name of *Babia*, becauſe the river runs out of the great lake Bahi, which lies at the diſtance of ſix leagues behind it. In compaſs it is two miles, in length one third of a mile; the ſhape irregular, being narrow at both ends, and wide in the middle. On the ſouth it is waſhed by the ſea, and on the north and eaſt by the river; being alſo ſtrongly fortified with walls, baſtions, forts, and batteries.—Manila contains about 30,000 ſouls, who are a very motley race, diſtinguiſhed by ſeveral ſtrange names, and produced by the conjunction of Spaniards, Chineſe, Malabars, blacks, and others inhabiting the city and iſlands depending on it. Without the walls are large ſuburbs, particularly that inhabited by the Chineſe merchants, called *Sangleys*. In proportion to the ſize of the place, the number of churches and religious houſes is very great. Only ſmall veſſels can come up to Manila; but three leagues ſouth of it is the town and port of Cavite, defended by the caſtle of St. Philip, and capable of receiving the largeſt ſhips. Here ſtands the arſenal where the galleons are built, for which there are from 300 to 600 or 800 men conſtantly employed, who are relieved every month, and while upon duty are maintained at the king's expence. By an earthquake which happened here in 1645, a third part of the city of Manila was deſtroyed, and no leſs than 3000 people periſhed in the ruins.

In the war before laſt, Spain having entered into engagements with France, in conſequence of the family-compact with the houſe of Bourbon, it was found expedient by Britain to declare war alſo againſt Spain. Whereupon a force was ſent out from our Eaſt India ſettlements, particularly Madras, for the conqueſt of the Philippine iſlands, under general Draper and admiral Corniſh; who, after a ſiege of 12 days, took Manila on the 6th of October 1762 by ſtorm; but, to ſave ſo fine a city from deſtruction, agreed to accept a ranſom, amounting to a million ſterling, a part of which, it is ſaid, was never paid. The Spaniſh viceroy reſides in this city, and lives like a ſovereign prince. The government is ſaid to be one of the beſt in the gift of the king of Spain. When the city was

taken, as above, the archbiſhop, who is a kind of pope in this part of the world, was alſo viceroy. Five large ſhips, loaded with the riches of the Eaſt, as diamonds from Golconda, cinnamon from Ceylon, pepper from Sumatra and Java, cloves and nutmegs from the Moluccas and Banda iſlands, camphire from Borneo, benjamin and ivory from Cambodia, ſilks, tea, and china ware from China, &c. ſail yearly from hence to Acapulco in Mexico, and return freighted with ſilver, making 400 per cent. profit.

The city of Manila is governed by two alcaides: the reſt of the cities and great towns have each an alcaide; and in every village there is a corregidore. Appeals from their ſentences are made to the royal court at Manila, in which there are four judges, and a fiſcal or attorney general; each of theſe judges has a ſalary of 3300 pieces of eight per annum. The viceroy is preſident; and in that quality has an income of 4000 pieces of eight, but he has no vote; yet if the judges are equally divided, the preſident names a doctor of the civil law, who, in virtue of his appointment, has a deciſive voice. The attorney-general, in right of his office, is protector of the Chineſe, in conſideration of which he receives 600 pieces of eight every year. As for the Indians that are in ſubjection, they pay tribute in the following proportions: Young men from 1 , and from thence; if they continue ſingle, to the age of 60, pay five rials of plate by way of capitation; as ſingle women likewiſe do from 24 to 50: married men pay ten rials. It is computed that there are within the compaſs of this government 250,000 Indians, ſubject to his Catholic majeſty, of whom two-fifths hold immediately from the king, and the reſt from lords or proprietors, who pay two rials each for the maintenance of the forces, and the like ſum for the pariſh-prieſt. The royal revenue is computed at about half a million of pieces of eight, excluſive of caſualties. In regard to the military eſtabliſhment, the garriſon of Manila conſiſts of about 800 or 1000 men, and there are about 3000 more in the Philippines. The viceroy is by his office captain-general, with a ſalary of about 4000 pieces of eight.

MANILIUS (Marcus), a Latin poet, whoſe poem had the ill luck to lie buried in ſome German libraries, and was not heard of in the world until Poggius, about two centuries ago, publiſhed him from ſome old manuſcripts he found there. There is no account to be found of him but what can be drawn from his poem, which is called *Aſtronomicon*; and contains a ſyſtem of the ancient aſtronomy and aſtrology, together with the philoſophy of the Stoics. It conſiſts of five books; though there was a ſixth, which has not been recovered. From the ſtyle, and no mention of the author being found in ancient writers, it is probable he died young. It is collected, however, that he was a Roman of illuſtrious extraction, and lived under the reign of Auguſtus, whom he invokes, though not by name, yet by circumſtances and character that ſuit no other emperor. The beſt editions of Manilius are, that of Joſeph Scaliger in 1600, and that of Bentley at London in 1738.

MANILLE, in commerce, a large braſs ring in the form of a bracelet, either plain or engraven, flat or round. Manilles are the principal commodities which the Europeans carry to the coaſt of Africa, and exchange with the natives for ſlaves. Theſe people wear them as ornaments on the ſmall of the leg, and on the thick part of the arm above the elbow. The great men wear manilles of gold and ſilver; but theſe are made in the country by the natives themſelves.

MANIOC, or Manihot. See Jatropha.

MANIPULUS, Manipule, among the Romans was a little body of infantry, which in the time of Romulus conſiſted of 100 men; and in the time of the conſuls, and firſt Cæſars, of 200. The word properly ſignifies "a handful;" and, according to ſome authors, was firſt given to the handful of hay which they bore at the end of a pole, to diſtinguiſh themſelves by, before the cuſtom was introduced of bearing an eagle for their enſign; and hence alſo the phraſe, *a handful of men*. But Vegetius, Modeſtus, and Varro, give other etymologies of the word: the laſt derives it from *manus*, a little body of men following the ſame ſtandard. According to the former, this corps was called *manipulus*, becauſe they fought hand in hand or all together: *Contubernium autem manipulus vocabatur ab eo, quod conjunctis manibus pariter dimicabant.*

Each manipule had two centurions, or captains, called *manipularii*, to command it; one whereof was lieutenant to the other. Each cohort was divided into three manipules, and each manipule into two centuries.

Aulus Gellius quotes an old author, one Cincius, who lived in the time of Hannibal (whoſe priſoner he was), and who, writing on the art of war, obſerves, that then each legion conſiſted of 60 centuries, of 30 manipules, and of 10 cohorts. And again, Varro and Vegetius mention it as the leaſt diviſion in the army, only conſiſting of the tenth part of a century; and Spartian adds, that it contained not more than ten men. This ſhows that the manipulus was not always the ſame thing.

Manipulus is alſo an eccleſiaſtical ornament, worn by the prieſts, deacons, and ſubdeacons in the Romiſh church. It conſiſts of a little fillet in form of a ſtole, three or four inches broad, and made of the ſame ſtuff with the chaſuble; ſignifying and repreſenting an handkerchief which the prieſts in the primitive church wore on the arm to wipe off the tears they were continually ſhedding for the ſins of the people. There ſtill remains a mark of this uſage in a prayer rehearſed by thoſe who wear it: *Merear, Domine, portare manipulum fletus & doloris.*—The Greeks and Maronites wear two manipules, one on each arm.

Manipulus, among phyſicians, is uſed to ſignify a handful of herbs or leaves, or ſo much as a man can graſp in his hand at once; which quantity is frequently denoted by the abbreviature, M, or m.

MANIS, the scaly lizard, in zoology: a genus of quadrupeds belonging to the order of bruta, the characters of which are theſe: They have no foreteeth either in the upper or under jaw: the tongue is long and cylindrical; the ſnout is long and narrow; and the body is covered with hard ſcales. There are two ſpecies: 1. The *pentadactyla*, or ſhort-tailed manis, with five toes on each foot. The head is ſmaller than the neck: the eyes are very ſmall; the length of the body, including the tail, is from ſix to eight feet. The whole body is covered with hard ſcales, excepting the under part of the head and neck, the breaſt, the belly, and the internal ſide of each leg. Betwixt the ſcales of this animal there are ſome hairs like the briſtles of a hog, brownith at the points. See plate 10. The ſcales are of a reddiſh colour, very hard, convex above, and concave below. All the parts which want ſcales are naked. The ſcales are unconnected, and the animal can raiſe or lower them at pleaſure like the quills of the porcupine. When irritated, he erects his ſcales, and rolls himſelf up like a hedge-hog. In this ſituation, neither the lion, tiger, nor any other animal can hurt him. It is ſaid to deſtroy the elephant by twiſting itſelf round his trunk, and compreſſing that tender organ with its hard ſcales. It feeds on lizards and inſects; turns up the ground with its noſe; walks with its claws bent under its feet; grows very fat, and is eſteemed delicate eating; makes no other noiſe than a kind of ſnorting. It is a mild inoffenſive creature, is ſlow of motion, and has no other method of eſcaping the purſuit of man but by concealing himſelf in crannies of rocks, and in holes which they dig in the ground, and where they likewiſe bring forth their young. It is a native of the Eaſt Indies, and is very rare. Mr. Pennant conjectures that it may be a native of

Guinea; the *quogeli* of the Negroes, which, Des Marchais ſays, grows to the length of eight feet, of which the tail is four. It lives in woods and marſhy places; feeds on ants, which it takes with laying its long tongue acroſs their paths, which is covered by a viſcous ſaliva, ſo that the inſects which attempt to paſs over it cannot extricate themſelves. 2. The *tetradactyla*, or long-tailed manis, with four toes on each foot. This ſpecies is very ſimilar to the former; only the tail of it is much longer in proportion to the body; and ſuch parts as want ſcales, inſtead of being naked, are covered with a ſoft hair. It inhabits Guinea, and is alſo found in the Eaſt Indies.

MANLEY (Mrs.), the celebrated writer of the *Atalantis*, was the daughter of Sir Roger Manley, the reputed author of the firſt volume of the *Turkiſh Spy*. She loſt her parents very early; and after having been deluded into a falſe marriage by her guardian, who was her couſin, and afterwards deſerted her, ſhe was patroniſed by the ducheſs of Cleveland, miſtreſs of Charles II. But the ducheſs, being a woman of very fickle temper, grew tired of Mrs. Manley in ſix months time; and diſcharged her upon a pretence, whether groundleſs or not is uncertain, that ſhe intrigued with her ſon. After this ſhe wrote her firſt tragedy, called *Royal Miſchief*, which was acted with great applauſe in 1696; and her apartment being frequented by men of wit and gaiety, ſhe ſoon engaged in amours, and was taken into keeping. Her pen now grew as licentious as her conduct; for, in her retired hours, ſhe wrote four volumes, called *Memoirs of the New Atalantis*; in which ſhe was not only very free in her wanton tales of love-adventures, but ſatirized the characters of many diſtinguiſhed perſonages, eſpecially thoſe who had a principal concern in the revolution. A proſecution was commenced againſt her for this work; but whether thoſe in power were aſhamed to bring a woman to trial for a few amorous trifles, or whether the laws could not reach her diſguiſed ſatire, ſhe was diſcharged; and a total change of the miniſtry enſuing, Mrs. Manley lived in high reputation and gaiety, amuſing herſelf with the converſation of wits, and writing plays, poems, and letters. She died in 1724.

MANLIUS (Capitolinus), the renowned Roman conſul and general, who ſaved the capitol when it was attacked by the Gauls in the night: he was alarmed by the cries of geeſe, which were ever after held ſacred. But being afterwards accuſed of aſpiring at the ſovereignty, he was thrown from the Tarpeian rock. See Gaul and Rome.

Manlius (Torquatus), a celebrated conſul and Roman captain; had great wit, but a difficulty in expreſſing himſelf, which induced Manlius Imperioſus, his father, to keep him almoſt by force in the country. Pompey, tribune of the people, enraged at this inſtance of ſeverity, formed a deſign of accuſing Manlius the father before the judges; but Torquatus being informed of it, went to that tribune, and, with a poniard in his hand, made him ſwear that he would not proceed in that accuſation againſt him to whom he owed his life. At length Torquatus was made military tribune, and killed a ſoldier of the Gauls in ſingle combat, from whom he took a gold chain that he wore about his neck. From this action he obtained the name of *Torquatus*. He was conſul in the war againſt the Latins; when he ordered his own ſon to be beheaded, for fighting contrary to his orders, though he had gained the victory. He conquered the enemies of the republic, and was ſeveral times made conſul; but at laſt refuſed the conſulſhip, ſaying, That it was no more poſſible for him to bear with the vices of the people, than it was for the people to bear with his ſeverity.

MANNA, in the materia medica, the juice of certain trees of the aſh kind (ſee Manna-*tree*), either naturally concreted on the plants, or exſiccated and purified by art. There are ſeveral ſorts of manna in the ſhops. The larger pieces, called *flake-manna*, are uſually preferred; though the ſmaller grains are equally good, provided they are white, or of a pale yellow colour; very light, of a ſweet, not unpleaſant taſte, and free from any viſible impurities. Some people injudiciouſly prefer the fat honey-like manna to the foregoing; this has either been expoſed to a moiſt air, or damaged by ſea or other water. This kind of manna is ſaid to be ſometimes counterfeited by a compoſition of ſugar and honey mixed with a little ſcammony; there is alſo a factitious manna, which is white and dry, ſaid to be compoſed of ſugar, manna, and ſome purgative ingredient, boiled to a proper conſiſtence. This may be diſtinguiſhed by its weight, ſolidity, untranſparent whiteneſs, and by its taſte, which is different from that of manna.

Manna is a mild, agreeable laxative; uſually given to children, or pregnant women. It operates ſo weakly, that it does not produce the full effect of a cathartic; and hence it is rarely given by itſelf. It may be commodiouſly diſſolved in the purging mineral waters, or joined to the cathartic ſalts, ſenna, rhubarb, or the like. Geoffroy recommends acuating it with a few grains of emetic tartar: by this management, he ſays, bilious ſerum will be plentifully evacuated, without any nauſea, gripes, or other inconvenience. It is remarkable, that the efficacy of this drug is greatly promoted (if the account of Vallifnieri is to be relied on) by a ſubſtance which is itſelf very ſlow of operation, *viz.* caſia. See Casia.

Manna is alſo a Scripture-term, ſignifying a miraculous kind of food which fell from heaven for the ſupport of the Iſraelites in their paſſage through the wilderneſs, being in form of coriander-ſeeds, its colour like that of bdellium, and its taſte like honey.

The Scripture gives to manna the name of the *bread of heaven*, and the *food of angels*, Pſal. lxxviii. 25, whether it would inſinuate to us, that the angels ſent and prepared this food, or that angels themſelves, if they had need of any food, could not have any that was more agreeable than manna was. The author of the Book of Wiſdom ſays, xvi. 20, 21. that manna ſo accommodated itſelf to every one's taſte, that every one found it pleaſing to him; and that it included every thing that was agreeable to the palate and fit for good nouriſhment; which expreſſion ſome have taken in the literal ſenſe, though others underſtand them figuratively.

The critics are divided about the original of the word *manna*. Some think that *man* is put inſtead of the Hebrew word *mah*, which ſignifies "What is this?" and that the Hebrews, then firſt ſeeing that new food which God had ſent them, cried to one another, מן הוא *man-hu*, inſtead of *mah-hu*, "What is this?" Others maintain, that the Hebrews very well knew before what manna was; and that, ſeeing it in great abundance about their camp, they ſaid one to another, *Man-hu*, "This is manna." Mr. Saumaiſe and ſome other moderns are of this laſt opinion. They imagine, that the manna which God ſent the Iſraelites was nothing elſe but that fat and thick dew which ſtill falls in Arabia, which preſently condenſed, and ſerved for food to the people; that this is the ſame thing as the wild honey, mentioned Matt. iii. 4. wherewith John the Baptiſt was fed; and that the miracle of Moſes did not conſiſt in the production of any new ſubſtance, but in the exact and uniform manner in which the manna was diſpenſed by Providence for the maintenance of ſuch a great multitude.

On the contrary, the Hebrews and Orientals believe, that the fall of the manna was wholly miraculous. The Arabians call it the *ſugar-plums of the Almighty*; and the Jews are ſo jealous of this miracle, that they pronounce a curſe againſt all ſuch as preſume to deny the interpoſition of a miraculous power.

Our tranſlation, and ſome others, make Moſes fall into a plain contradiction in relating this ſtory of the manna, which they render thus: "And when the children of Iſrael ſaw it, they ſaid one to another, It is manna; for they wiſt not what it was." Exodus xvi. 15. Whereas the Septuagint, and ſeveral authors both ancient and modern, have tranſlated the text according to the original: "The Iſraelites ſeeing this, ſaid one to another, What is this? for they knew not what it was." For we muſt obſerve, that the word by which they aſked *what is this?* was in their language *man*, which ſignifies likewiſe meat ready provided; and therefore it was always afterwards call d *man* or *manna*.

Whether this manna had thoſe extraordinary qualities in it or no, which ſome imagine, it muſt be allowed to be truly miraculous, upon the following accounts: 1. That it fell but ſix days in the week. 2. That it fell in ſuch a prodigious quantity, as ſuſtained almoſt three millions of ſouls. 3. That there fell a double quantity every Friday, to ſerve them for the next day, which was their Sabbath. 4. That what was gathered on the firſt five days ſtunk and bred worms if kept above one day: but that which was gathered on Friday kept ſweet for two days. And, laſtly, That it continued falling while the Iſraelites abode in the wilderneſs, but ceaſed as ſoon as they came out of it and had got corn to eat in the land of Canaan.

Manna-*Tree*, is a ſpecies of the aſh, and a native of Calabria in Italy (See Fraxinus). The ſhoots of this tree are much ſhorter, and the joints cloſer together, than thoſe of the common aſh; the ſmall leaves are ſhorter, and deeper ſawed on their edges, and are of a lighter green. The flowers come out from the ſide of the branches, which are of a purple colour, and appear in the ſpring before the leaves come out. This tree is of humble growth, ſeldom riſing more than 15 or 16 feet high in this country.

A great quantity of fine manna is gathered at Carini in Sicily, oozing from a kind of aſh-tree with a bark ſimilar to that of the ebony, and a leaf ſomewhat like the acacia. M. de Non, who gives an account of this manna, ſays, that it is produced from young trees, about ſeven or eight years old, when they are only about eight feet high. Inciſions are then made horizontally in the bark, and from theſe the manna flows. The inciſions are made from the earth to the top of the tree, and are repeated every two days from the end of July till the circulation is ſtopped in the courſe of the year, or till the manna becomes worſe in quality. It exſudes firſt as a white frothy liquor extremely light, pleaſant to the taſte, and of an agreeable flavour, which is coagulated by the heat of the ſun, and aſſumes an appearance ſomewhat reſembling ſtalactites. This is the beſt kind, and by the people of that country is called *lachrymatory* or *cane* manna. The inferior kind appears firſt in the form of a glutinous and higher coloured liquor, which is received on the leaves of the Indian fig, which are placed for that purpoſe at the foot of the tree. This alſo congeals by the heat of the ſun; though it is more heavy, purgative, and of much leſs value, than the former. It is called *fat* manna. In this part only reſides the faint and diſagreeable flavour obſervable in manna; for the cane manna is of an agreeable flavour, and an excellent ſtomachic. It is got off from the bark of the tree by bending and ſhaking it. In rainy ſeaſons they muſt gather the manna every day, which both leſſens the quantity and renders it of inferior quality. When the ſtem of the tree is entirely covered with inciſions, they cut it down cloſe to the ground; after which it puſhes out new tufts of wood, one or two ſtems of which are preſerved, and at a proper age produce manna as before. The tree itſelf is propagated by ſeed, and afterwards tranſplanting it. The wood is hard and heavy, of a bitter taſte, and recommended in the dropſy. It thrives only in hot climates, and requires to be expoſed to the north winds in order to make it productive; but M. de Non is of opinion, that it might be propagated, and would produce manna, in Provence in France. The Sicilian manna is dearer and more eſteemed than that of Calabria, though the latter is more generally known and cultivated. The tree does not grow in any other part of the iſland excepting about Carini, where it is a native.

MANNER, in painting, a habitude that a man acquires in the three principal parts of painting, the management of colours, lights, and ſhadows; which is either good or bad according as the painter has practiſed more or leſs after the truth, with judgment and ſtudy. But the beſt painter is he who has no manner at all. The good or bad choice he makes is called *goute*.

MANNERS, the plural noun, has various ſignifications; as, the general way of life, the morals, or the habits of any perſon or people; alſo ceremonious behaviour, or ſtudied civility. See the next article.

Good-Manners, according to Swift, is the art of making thoſe people eaſy with whom we converſe.

Whoever makes the feweſt perſons uneaſy, is the beſt bred in the company.

As the beſt law is founded upon reaſon, ſo are the beſt manners. And as ſome lawyers have introduced unreaſonable things into common law; ſo likewiſe many teachers have introduced abſurd things into common good-manners.

One principal point of this art is to ſuit our behaviour to the three ſeveral degrees of men; our ſuperiors, our equals, and thoſe below us.

For inſtance, to preſs either of the two former to eat or drink is a breach of manners; but a tradeſman or a farmer muſt be thus treated, or elſe it will be difficult to perſuade them that they are welcome.

Pride, ill-nature, and want of ſenſe, are the three great ſources of ill-manners: without ſome one of theſe defects, no man will behave himſelf ill for want of experience; or of what, in the language of fools, is called *knowing the world*.

"I defy (proceeds our author) any one to aſſign an incident wherein reaſon will not direct us what we are to ſay or to do in company, if we are not miſled by pride or ill-nature. Therefore, I inſiſt that good ſenſe is the principal foundation of good manners; but becauſe the former is a gift which very few among mankind are poſſeſſed of, therefore all the civilized nations of the world have agreed upon fixing ſome rules for common behaviour, beſt ſuited to their general cuſtoms, or fancies, as a kind of artificial good-ſenſe to ſupply the defects of reaſon. Without which, the gentlemanly part of dunces would be perpetually at cuffs, as they ſeldom fail when they happen to be drunk, or engaged in ſquabbles about women or play. And, God be thanked, there hardly happeneth a duel in a year, which may not be imputed to one of thoſe three motives. Upon which account, I ſhould be exceedingly ſorry to find the legiſlature make any new laws againſt the practice of duelling; becauſe the methods are eaſy, and many, for a wiſe man to avoid a quarrel with honour, or engage in it with innocence. And I can diſcover no political evil, in ſuffering bullies, ſharpers, and rakes, to rid the world of each other by a method of their own, where the law hath not been able to find an expedient.

"As the common forms of good-manners were intended for regulating the conduct of thoſe who have weak underſtandings; ſo they have been corrupted by the perſons for whoſe uſe they were contrived. For theſe people have fallen into a needleſs and endleſs way of multiplying ceremonies, which have been extremely troubleſome to thoſe who practiſe them, and inſupportable to every body elſe; inſomuch that wiſe men are

often more uneasy at the over-civility of these refiners, than they could possibly be in the conversations of peasants or mechanics.

"The impertinencies of this ceremonial behaviour are nowhere better seen than at those tables where ladies preside, who value themselves upon account of their good-breeding; where a man must reckon upon passing an hour without doing any one thing he hath a mind to, unless he will be so hardy as to break through all the settled decorum of the family. She determines what he loveth best, and how much he shall eat; and if the master of the house happeneth to be of the same disposition, he proceedeth in the same tyrannical manner to prescribe in the drinking part: at the same time you are under the necessity of answering a thousand apologies for your entertainment. And although a good deal of this humour is pretty well worn off among many people of the best fashion, yet too much of it still remaineth, especially in the country; where an honest gentleman assured me, that having been kept four days against his will at a friend's house, with all the circumstances of hiding his boots, locking up the stable, and other contrivances of the like nature, he could not remember, from the moment he came into the house to the moment he left it, any one thing wherein his inclination was not directly contradicted; as if the whole family had entered into a combination to torment him.

"But, besides all this, it would be endless to recount the many foolish and ridiculous accidents I have observed among these unfortunate proselytes to ceremony. I have seen a duchess fairly knocked down by the precipitancy of an officious coxcomb running to save her the trouble of opening a door. I remember, upon a birth-day at court, a great lady was rendered utterly disconsolate, by a dish of sauce let fall by a page directly upon her head-dress and brocade, while she gave a sudden turn to her elbow upon some point of ceremony with the person who sat next her. Monsieur Buys, the Dutch envoy, whose politics and manners were much of a size, brought a son with him about 13 years old to a great table at court. The boy and his father, whatever they put on their plates, they first offered round in order, to every person in the company; so that we could not get a minute's quiet during the whole dinner. At last their two plates happened to encounter, and with so much violence, that, being china, they broke in 20 pieces, and stained half the company with wet sweetmeats and cream.

"There is a pedantry in manners as in all arts and sciences, and sometimes in trades. Pedantry is properly the over-rating any kind of knowledge we pretend to. And if that kind of knowledge be a trifle in itself, the pedantry is the greater. For which reason I look upon fiddlers, dancing-masters, heralds, masters of the ceremony, &c. to be greater pedants than Lipsius, or the elder Scaliger. With these kind of pedants, the court, while I knew it, was always plentifully stocked: I mean from the gentleman-usher (at least) inclusive, downward to the gentleman-porter; who are, generally speaking, the most insignificant race of people that this island can afford, and with the smallest tincture of good manners, which is the only trade they profess. For, being wholly illiterate, conversing chiefly with each other, they reduce the whole system of breeding within the forms and circles of their several offices: and as they are below the notice of ministers, they live and die in court under all revolutions, with great obsequiousness to those who are in any degree of credit or favour, and with rudeness and insolence to every body else. From whence I have long concluded, that good-manners are not a plant of the court-growth; for, if they were, those people who have understandings directly of a level for such acquirements, and who have served such long apprenticeships to nothing else, would certainly have picked them up. For, as to the great officers who attend the prince's person or councils, or preside in his family, they are a transient body, who have no better a title to good-manners than their neighbours, nor will probably have recourse to gentlemen-ushers for instruction. So that I know little to be learned at court on this head, except in the material circumstance of dress; wherein the authority of the maids of honour must indeed be allowed to be almost equal to that of a favourite actress.

"I remember a passage my lord Bolingbroke told me: That going to receive prince Eugene of Savoy at his landing, in order to conduct him immediately to the queen, the prince said he was much concerned that he could not see her majesty that night; for Monsieur Hoffman (who was then by) had assured his highness, that he could not be admitted into her presence with a tied-up periwig; that his equipage was not arrived; and that he had endeavoured in vain to borrow a long one among all his valets and pages. My lord turned the matter to a jest, and brought the prince to her majesty: for which he was highly censured by the whole tribe of gentlemen-ushers; among whom Monsieur Hoffman, an old dull resident of the emperor's, had picked up this material point of ceremony; and which, I believe, was the best lesson he had learned in 25 years residence.

"I make a difference between *good-manners* and *good-breeding*; although, in order to vary my expression, I am sometimes forced to confound them. By the first, I only understand the art of remembering, and applying, certain settled forms of general behaviour. But *good-breeding* is of a much larger extent: for, besides an uncommon degree of literature sufficient to qualify a gentleman for reading a play, or a political pamphlet, it taketh in a great compass of knowledge; no less than that of dancing, fighting, gaming, making the circle of Italy, riding the great horse, and speaking French; not to mention some other secondary or subaltern accomplishments, which are more easily acquired. So that the difference between good-breeding and good-manners lieth in this, That the former cannot be attained by the best understandings without study and labour; whereas a tolerable degree of reason will instruct us in every part of good-manners without other assistance.

"I can think of nothing more useful upon this subject, than to point out some particulars wherein the very essentials of good manners are concerned, the neglect or perverting of which doth very much disturb the good commerce of the world, by introducing a traffic of a mutual uneasiness in most companies.

"First, a necessary part of good-manners is a punctual observance of time at our own dwellings, or those of others, or at third places; whether upon matters of civility, business, or diversion; which rule, though it be a plain dictate of common reason, yet the greatest minister I ever knew was the greatest trespasser against it; by which all his business doubled upon him, and placed him in a continual arrear. Upon which I often used to rally him as deficient in point of good-manners. I have known more than one ambassador, and secretary of state, with a very moderate portion of intellectuals, execute their office with great success and applause, by the mere force of exactness and regularity. If you duly observe time for the service of another, it doubles the obligation; if upon your own account, it would be manifest folly, as well as ingratitude, to neglect it; if both are concerned, to make your equal or inferior attend on you to his own disadvantage, is pride and injustice.

"Ignorance of forms cannot properly be styled *ill-manners*: because forms are subject to frequent changes; and consequently, being not founded upon reason, are beneath a wise man's regard. Besides, they vary in every country; and after a short period of time vary frequently in the same: so that a man who travelleth, must needs be at first a stranger to them in

every court through which he paſſeth; and perhaps, at his return, as much a ſtranger in his own; and, after all, they are eaſier to be remembered or forgotten than faces or names.

"Indeed, among the many impertinencies that ſuperficial young men bring with them from abroad, this bigotry of forms is one of the principal, and more predominant than the reſt; who look upon them not only as if they were matters capable of admitting of choice, but even as points of importance; and therefore are zealous upon all occaſions to introduce and propagate the new forms and faſhions they have brought back with them: ſo that, uſually ſpeaking, the worſt-bred perſon in the company is a young traveller juſt arrived from abroad."

MANNORY (Lewis), late advocate of the parliament of Paris, where he was born in 1696, and died in 1777. From him we have 18 vols. 12mo. of *Pleadings* and *Memoirs*. A great number of ſingular caſes occur in this collection: and the author has the talent of rendering them more ſtriking by the agreeable manner in which they are ſtated. He was Travenol's counſel in his proceſs againſt Voltaire, and was very ſatirical againſt that poet. The latter took revenge by deſcribing him as a mercenary babbler, who ſold his pen and his abuſe to the higheſt bidder.—Whatever may be the caſe, Mannory would certainly have been more eſteemed both as an advocate and as a writer, if he had paid more attention to his ſtyle, and had been leſs prolix; if he had thought more deeply, and been more ſparing of his pleaſantry in cauſes where nothing was required but knowledge and ſound reaſoning. He publiſhed alſo a tranſlation into French of Father Parée's Funeral Oration on Louis XIV. and very judicious Obſervations on the Semiramis of Voltaire. In company Mannory was full of wit and ſpirit, but ſometimes a little too cutting and ſevere.

MANOEUVRE, in a military ſenſe, conſiſts ſolely in diſtributing equal motion to every part of a body of troops, to enable the whole to form, or change their poſition, in the moſt expeditious and beſt method, to anſwer the purpoſes required of a battalion, brigade, or line, of cavalry, artillery, or infantry. It has always been lamented, that men have been brought on ſervice without being informed of the uſes of the different manœuvres they have been practiſing; and, having no ideas of any thing but the uniformity of the parade, inſtantly fall into diſorder and confuſion when they loſe the ſtep, or ſee a deviation from the ſtraight lines they have been accuſtomed to at exerciſe. It is a pity to ſee ſo much attention given to ſhow, and ſo little to inſtruct the troops in what may be of uſe to them in real ſervice. No manœuvre ſhould be executed in preſence of the enemy, unleſs protected by ſome diviſion of the troops.

MANOMETER, or Manoscope, an inſtrument to ſhow or meaſure the alterations in the rarity or denſity of the air. The manometer differs from the barometer in this, That the latter only ſerves to meaſure the *weight* of the atmoſphere, or of the column of air over it; but the former, the denſity of the air in which it is found; which denſity depends not only on the weight of the atmoſphere, but alſo on the action of heat and cold, &c. Authors, however, generally confound the two together; and Mr. Boyle himſelf gives us a very good manometer of his contrivance, under the name of a *ſtatical barometer*, conſiſting of a bubble of thin glaſs, about the ſize of an orange, which, being counterpoiſed when the air was in a mean ſtate of denſity, by means of a nice pair of ſcales, ſunk when the atmoſphere became lighter, and roſe as it grew heavier.

Another kind of manometers were made uſe of by colonel Roy, in his attempts to correct the errors of the barometer, and are deſcribed in the Philoſophical Tranſactions, vol. lxvii. p. 689. "They were (ſays he) of various lengths, from four to upwards of eight feet: they conſiſted of ſtraight tubes, whoſe bores were commonly from $\frac{1}{15}$th to $\frac{1}{25}$th of an inch in diameter. The capacity of the tube was carefully meaſured, by making a column of quickſilver, about three or four inches in length, move along it from one end to the other. Theſe ſpaces were ſeverally marked, with a fine-edged file, on the tubes; and tranſferred from them to long ſlips of paſteboard, for the ſubſequent conſtruction of the ſcales reſpectively belonging to each. The bulb, attached to one end of the manometer at the glaſs-houſe, was of the form of a pear, whoſe point being occaſionally opened, dry or moiſt air could be readily admitted, and the bulb ſealed again, without any ſenſible alteration in its capacity.

"The air was confined by means of a column of quickſilver, long or ſhort, and with the bulb downwards or upwards, according to the nature of the propoſed experiment. Here it muſt be obſerved, that, from the adheſion of the quickſilver to the tube, the inſtrument will not act truly, except it be in a vertical poſition; and even then it is neceſſary to give it a ſmall degree of motion, to bring the quickſilver into its true place; where it will remain in equilibrio, between the exterior preſſure of the atmoſphere on one ſide, and the interior elaſtic force of the confined air on the other.

"Pounded ice and water were uſed to fix a freezing point on the tube: and by means of ſalt and ice, the air was farther condenſed, generally four and ſometimes five or ſix degrees below zero. The thermometer and manometer were then placed in a tin veſſel among water, which was brought into violent ebullition; where having remained a ſufficient time, and motion being given to the manometer, a boiling point was marked thereon. After this the fire was removed, and the gradual deſcents of the piece of quickſilver, correſponding to every 20 degrees of temperature in the thermometer, were ſucceſſively marked on a deal rod applied to the manometer. It is to be obſerved, that both inſtruments, while in the water, were in circumſtances perfectly ſimilar; that is to ſay, the ball and bulb were at the bottom of the veſſel.

"In order to be certain that no air had eſcaped by the ſide of the quickſilver during the operation, the manometer was frequently placed a ſecond time in melting ice. If the barometer had not altered between the beginning and end of the experiment, the quickſilver always became ſtationary at or near the firſt mark. If any ſudden change had taken place in the weight of the atmoſphere during that interval, the ſame was noted, and allowance made for it in afterwards proportioning the ſpaces.

"Long tubes, with bores truly cylindrical, or of any uniform figure, are ſcarcely ever met with. Such however as were uſed in theſe experiments, generally tapered in a pretty regular manner from one end to the other. When the bulb was downwards, and the tube narrowed that way, the column of quickſilver confining the air lengthened in the lower half of the ſcale, and augmented the preſſure above the mean. In the upper half, the column being ſhortened, the preſſure was diminiſhed below the mean. In this caſe, the obſerved ſpaces both ways from the centre were diminiſhed in the inverſe ratio of the heights of the barometer at each ſpace, compared with its mean height. If the bore widened towards the bulb when downwards, the obſerved ſpaces, each way from the centre, were augmented in the ſame inverſe ratio; but in the experiments on air leſs denſe than the atmoſphere, the bulb being upwards, the ſame equation was applied with contrary ſigns: and if any extraordinary irregularity took place in the tube, the correſponding ſpaces were proportioned both ways from that point, whether high or low, that anſwered to the mean.

"The obſerved and equated manometrical ſpaces being thus laid down on the paſteboard containing the meaſures of the tube; the 212° of the thermometer, in exact proportion to the ſections of the bore, were conſtructed along-ſide of them: hence the coincidences with each other were eaſily ſeen; and the

number of thermometrical degrees anſwering to each manometrical ſpace readily transferred into a table prepared for the purpoſe."

MANOR, Manerium, *(à manendo*, becauſe the uſual reſidence of the owner), ſeems to have been a diſtrict of ground held by lords or great perſonages; who kept in their own hands ſo much land as was neceſſary for the uſe of their families, which were called *terræ dominicales*, or *demeſne lands*; being occupied by the lord, or *dominus manerii*, and his ſervants. The other, or *tenemental* lands, they diſtributed among their tenants; which, from the different modes of tenure, were called and diſtinguiſhed by two different names.—Firſt, *book-land*, or charter-land, which was held by deed under certain rents and free ſervices, and in effect differed nothing from free ſocage lands: and from hence have ariſen moſt of the freehold tenants who hold of particular manors, and owe ſuit and ſervice to the ſame. The other ſpecies was called *folk-land*, which was held by no aſſurance in writing, but diſtributed among the common folk or people at the pleaſure of the lord, and reſumed at his diſcretion; being indeed land held in villenage. See Villenage.

The reſidue of the manor, being uncultivated, was termed the *lord's waſte*, and ſerved for public roads, and for common of paſture to the lord and his tenants. Manors were formerly called *baronies*, as they ſtill are *lordſhips*; and each lord or baron was empowered to hold a domeſtic court, called the *court-baron*, for redreſſing miſdemeanors and nuiſances within the manor, and for ſettling diſputes of property among the tenants. This court is an inſeparable ingredient of every manor; and if the number of ſuitors ſhould ſo fail, as not to leave ſufficient to make a jury or homage, that is, two tenants at the leaſt, the manor itſelf is loſt.

In the early times of our legal conſtitution, the king's greater barons, who had a large extent of territory held under the crown, granted out frequently ſmaller manors to inferior perſons to be held of themſelves; which do therefore now continue to be held under a ſuperior lord, who is called in ſuch caſes the *lord paramount* over all theſe manors; and his ſeignory is frequently termed an *honour*, not a *manor*; eſpecially if it hath belonged to an ancient feodal baron, or hath been at any time in the hands of the crown. In imitation whereof, theſe inferior lords began to carve out and grant to others ſtill more minute eſtates, to be held as of themſelves, and were ſo proceeding downwards *in infinitum*, till the ſuperior lords obſerved, that, by this method of ſubinfeudation, they loſt all their feodal profits of wardſhips, marriages, and eſcheats, which fell into the hands of theſe meſne or middle lords, who were the immediate ſuperiors of the *terre-tenant*, or him who occupied the land; and alſo that the meſne lords themſelves were ſo impoveriſhed thereby, that they were diſabled from performing their ſervices to their own ſuperiors. This occaſioned, firſt, that proviſion in the 32d chapter of *magna charta*, 9 Hen. III. (which is not to be found in the firſt chapter granted by that prince, nor in the great charter of king John) that no man ſhould either give or ſell his land without reſerving ſufficient to anſwer the demands of his lord; and, afterwards, the ſtatute of Weſtm 3. or *quia emptores*, 18 Edw. 1. c. 1. which directs, that, upon all ſales, or feoffments of land, the feoffee ſhall hold the ſame, not of his immediate feoffor, but of the chief lord of the fee, of whom ſuch feoffor himſelf held it. But theſe proviſions not extending to the king's own tenants *in capite*, the like law concerning them is declared by the ſtatutes of *prærogativa regis*, 17 Edw II. c. 6. and of 34 Edw. III. c. 15. by which laſt all ſubinfeudations, previous to the reign of king Edward I. were confirmed; but all ſubſequent to that period were left open to the king's prerogative. And from hence it is clear, that all manors exiſting at this day muſt have exiſted as early as king Edward the Firſt: for it is eſſential to a manor, that there be tenants who hold of the lord; and, by the operation of theſe ſtatutes, no tenant *in capite* ſince the acceſſion of that prince, and no tenant of a common lord ſince the ſtatute of *quia emptores*, could create any new tenants to hold of himſelf. See Villenage.

MANS, an ancient, rich, and populous town of France, capital of the county of Maine, with a biſhop's ſee. Its wax and ſtuffs are famous. It is ſeated on a high hill near the river Sarr, in E. lon. 0. 10. N. lat. 47. 58. It is an earldom beſtowed on William Murray, chief juſtice of England, with remainder to the family of Stormont in Scotland.

MANSE, Mansus, *Manſa*, or *Manſum*; in ancient law-books, denotes an *houſe*, or habitation, either with or without land. See House, and Mansion. The word is formed *a manendo*, "abiding;" as being the place of dwelling or reſidence.

Capital Manse, *(Manſum Capitale)*, denotes the *manor-houſe*, or lord's court. See Manor.

Mansus *Preſbyteri*, is a parſonage or vicarage houſe for the incumbent to reſide in. This was originally, and ſtill remains, an eſſential part of the endowment of a pariſh-church, together with the glebe and tythes. It is ſometimes called *Preſbyterium*. See Presbytery.

MANSFELD, a city of Germany, and capital of a county of the ſame name, in the circle of Upper Saxony. E. lon. 12. 55. N. lat. 51. 35.

Mansfeld (Peter Erneſt, count of), was deſcended from one of the moſt illuſtrious families in Germany, and which has produced the greateſt number of diſtinguiſhed characters. In 1552, he was taken priſoner at Ivoy, where he commanded; and he was afterwards of great ſervice to the Catholics at the battle of Montcontour. In conſequence of his great talents, he was employed in affairs of the utmoſt delicacy and importance. Being made governor of Luxembourg, he maintained tranquillity in that province, while the reſt of the Low Countries was a prey to the horrors of civil war. In teſtimony of their gratitude, the States cauſed the following inſcription to be placed on the gate of the hotel de ville: *In Belgio omnia dum vaſtat civile bellum*, Mansfeldus, *bello et pace fidus, hanc provinciam in fide continet ſervatque illæſam, cum ſummo populi conſenſu et hilari jucunditate.* He was afterward appointed to the command of the Low Countries; and died at Luxembourg, March 21, 1604, at the age of 87, with the title of *Prince of the Holy Empire*. His mauſoleum in bronze, which is to be ſeen in the chapel bearing his name, and adjoining to the church of the Recollets at Luxembourg, is an admirable work. Four highly-finiſhed weepers, with which this monument was ornamented, were carried off by Louis XIV. when he took this city in 1684. To a love of war Mansfeld united a taſte for the ſciences; and he was a lover and encourager of the arts: he poſſeſſed a great and elevated mind; but, like many heroes ancient and modern, he was greedy of gain and laviſh of blood. Abbé Schannat has written the hiſtory of the count of Manſfeld in Latin; printed at Luxembourg 1707. Charles prince of Mansfeld, his lawful ſon, ſignalized himſelf in the wars of Flanders and Hungary; and died without iſſue in 1595, after having beaten the Turks who attempted to relieve the city of Gran (Strigonia), which he was beſieging.

Mansfeld (Erneſt de), the illegitimate ſon of Peter Erneſt by a lady of Malines, was educated at Bruſſels, in the principles of the Roman Catholic religion, by his godfather Erneſt archduke of Auſtria. He was employed in the ſervice of the king of Spain in the Low Countries, and in that of the emperor in Hungary, together with his brother Charles count of

Mansfeld. He was legitimated on account of his bravery by the emperor Rodolphus II.; but his father's posts and possessions in the Spanish Netherlands having been refused him, contrary to promises which he had received, he in 1610 joined the party of the Protestant princes. Being now become one of the most dangerous enemies of the house of Austria, who called him the *Attila of Christianity*, he set himself, in 1618, at the head of the rebels in Bohemia, and got possession of Pilsen in 1619. Though his troops were defeated in several battles, he was able to penetrate into the palatinate. He there took several places, ravaged Alsace, made himself master of Haguenau, and defeated the Bavarians. At length he was totally defeated by Walstein, at the battle of Dassou, which happened in the month of April 1626. He gave over his remaining troops to the Duke of Weimar, and intended to pass into the Venetian States; but fell sick in a village between Zara and Spalatro, and there expired, A. D. 1626, aged 46. The procurator Nani thus describes him: "He was bold, intrepid in danger, and the most skilful negotiator of the age in which he lived. He possessed a natural eloquence, and well knew how to insinuate himself into the hearts of those whom he wished to gain. He was greedy of others wealth, and prodigal of his own. He was full of vast projects and great hopes, and yet possessed neither lands nor money at his death." He did not wish to die in his bed; but dressed himself in his finest robes, put on his sword, sat up, leaning upon two domestics, and in this position, highly becoming a warrior, breathed his last. But of all the actions of this great captain and singular man, the following is without doubt the most extraordinary: Having got the most certain information that Cazel, in whom of all his officers he placed the greatest confidence, had communicated his plans to the Austrian chief, he shewed neither passion nor resentment at his treachery, but gave him 300 rix-dollars, and sent him to count Buquoy, with a letter expressed in these words, "Cazel being attached to you and not to me, I send him to you, that you may have the benefit of his services." The opinions of men were divided about this action, and it was as much censured as applauded. Be this as it may, Ernest is deservedly esteemed one of the greatest generals of his age. There never was a leader more patient, more indefatigable, more inured to toil and hardship, to watchings, to cold, and to hunger. He raised armies and ravaged the enemy's territories with an incredible celerity. The Hollanders said of him, that he was *bonus in auxilio, carus in pretio*; that is, that he rendered great services to those who employed him, but that he made them pay well for it.

Mansfeld (Henry-Francis, count of), was of the same house with the former, and signalized himself in the wars for the Spanish succession. He died at Vienna on the 8th of June 1715, at the age of 74, after being a prince of the Holy Empire, a grandee of Spain, field-marshal general of the emperor's armies, general of artillery, ambassador to France and Spain, president of the Aulic council, and great chamberlain to the emperor.

MANSFIELD, a town of Nottinghamshire, in England, seated in the forest of Sherwood, 140 miles from London. It was anciently a royal demesne. It has a market on Thursdays, and two fairs. By an ancient custom of this manor, the heirs were declared of age as soon as born. It is a well-built town, and drives a great trade in malt. Its market is well stocked with corn, cattle, &c. Here is a charity-school for 36 boys.

MANSIO, a term often mentioned in itineraries, denoting *inns* on the public roads to lodge in, at the distance of eighteen miles from each other (Lactantius). Also, in the lower ages, it came to denote "an encampment for one night," (Lampridius.)

Mansio, or *Mansus*, was sometimes also used in the same sense with *hide*; that is, for as much land as one plough could till in a year. See Hide.

MANSION, Mansio, a dwelling-house, or habitation, especially in the country. See Manse. Mansion is more particularly used for the lord's chief dwelling-house within his fee; otherwise called the *capital messuage* or *manse*, or chief manor-place. See Manor.

MANSLAUGHTER, the unlawful killing of another, without malice either express or implied: Which may be either voluntarily, upon a sudden heat; or involuntarily, but in the commission of some unlawful act. These were called, in the Gothic constitutions, *homicidia vulgaria; quæ aut casu aut etiam sponte committuntur, sed in subitaneo quodam iracundiæ calore et impetu.* And hence it follows, that in manslaughter there can be no accessories before the fact; because it must be done without premeditation.

1. As to the first, or voluntary branch: If upon a sudden quarrel two persons fight, and one of them kills the other, this is manslaughter: and so it is, if they upon such an occasion go out and fight in a field; for this is one continued act of passion: and the law pays that regard to human frailty, as not to put a hasty and deliberate act upon the same footing with regard to guilt. So also if a man be greatly provoked, as by pulling his nose, or other great indignity, and immediately kills the aggressor; though this is not excusable *se defendendo*, since there is no absolute necessity for doing it to preserve himself; yet neither is it murder, for there is no previous malice; but it is manslaughter. But in this, and in every other case of homicide upon provocation, if there be a sufficient cooling-time for passion to subside and reason to interpose, and the person so provoked afterwards kills the other, this is deliberate revenge, and not heat of blood; and accordingly amounts to murder. So if a man takes another in the act of adultery with his wife, and kills him directly upon the spot; though this was allowed by the law of Solon, as likewise by the Roman civil law (if the adulterer was found in the husband's own house), and also among the ancient Goths; yet in England it is not absolutely ranked in the class of justifiable homicide, as in case of a forcible rape, but it is manslaughter. It is, however, the lowest degree of it; and therefore in such a case the court directed the burning in the hand to be gently inflicted, because there could not be a greater provocation. Manslaughter, therefore, on a sudden provocation, differs from excusable homicide *se defendendo* in this: That in one case there is apparent necessity, for self-preservation, to kill the aggressor; in the other no necessity at all, being only a sudden act of revenge.

2. The second branch, or involuntary manslaughter, differs also from homicide excusable by misadventure, in this: That misadventure always happens in consequence of a lawful act, but this species of manslaughter in consequence of an unlawful one. As if two persons play at sword and buckler, unless by the king's command, and one of them kills the other: this is manslaughter, because the original act was unlawful; but it is not murder, for the one had no intent to do the other any personal mischief. So where a person does an act lawful in itself, but in an unlawful manner, and without due caution and circumspection; as when a workman flings down a stone or piece of timber into the street, and kills a man; this may be either misadventure, manslaughter, or murder, according to the circumstances under which the original act was done. If it were in a country village, where few passengers are, and he calls out to all people to have a care, it is misadventure only: but if it were in London, or other populous town, where people are continually passing, it is manslaughter, though he gives loud warning; and murder, if he knows of their passing and

gives no warning at all, for then it is malice againſt all mankind. And, in general, when an involuntary killing happens in conſequence of an unlawful act, it will be either murder or manſlaughter according to the nature of the act which occaſioned it. If it be in proſecution of a felonious intent, or in its conſequences naturally tending to bloodſhed, it will be murder; but if no more was intended than a mere civil treſpaſs, it will only amount to manſlaughter.

3. As to the puniſhment of this degree of homicide: The crime of manſlaughter amounts to felony, but within the benefit of clergy; and the offender ſhall be burnt in the hand, and forfeit all his goods and chattels.

But there is one ſpecies of manſlaughter which is puniſhed as murder, the benefit of clergy being taken away from it by ſtatute; namely, the offence of mortally ſtabbing another, though done upon ſudden provocation. See STABBING.

MANSTEIN (CHRISTOPHER HERMAN of), was born at Peterſburgh, Sept. 1, 1711, and for a long time ſerved with great diſtinction as a colonel in the Ruſſian armies. In 1745 he went into the ſervice of the king of Pruſſia; was appointed major-general of infantry in 1754; and diſtinguiſhed himſelf on all occaſions by his bravery and his knowledge of the art of war. He was wounded at the battle of Kolin, and ſoon after killed near Leutmeritz. He was univerſally regretted by thoſe who knew him; and even the enemy ſhed tears upon the occaſion.—Thoſe leiſure moments which the laborious profeſſion of war allowed him to enjoy, Manſtein dedicated to ſtudy. He was acquainted with almoſt all the languages of Europe. From him we have Hiſtorical, Political, and Military Memoirs of Ruſſia (Lyons, 1772), 2 vols. 8vo. with plans and charts. Theſe memoirs commence with the death of Catherine I. 1727, and end in 1744. He was an eye-witneſs, or had a very intimate knowledge, of all the events contained in them. A ſupplement is added, which goes back to the times of the ancient Czars, and in particular treats at a conſiderable length on Peter I. At the concluſion of the work, the author gives an idea of the military and naval force, of the trade, &c. of this extenſive empire. The facts contained in this little hiſtorical tract, are not more intereſting in themſelves than they are valuable on account of the candour of the hiſtorian, who witneſſed every event which he relates. Mr. Hume having received the original French of theſe memoirs, cauſed them to be tranſlated into Engliſh, and publiſhed at London; ſoon after there appeared a German tranſlation of them, publiſhed at Hamburgh. A French edition was publiſhed by M. Huber at Leipſic in 1771; and there appeared a new and enlarged edition in 1782.

MANTA, in ichthyology; a flat fiſh mentioned by Ulloa and others, as exceedingly hurtful to the pearl-fiſhers, and which ſeems to be the ſame with that which Pliny has deſcribed under the name of *nubes* or *nebula*: *Ipſi ferunt* (Urinatores) *et nubem quandam craſſeſcere ſuper capita, planorum piſcium ſimilem, prementem eos, arcentemque a reciprocando, et ob ſtilos præacutos lineis annexos habere ſeſe; quia niſi perfoſſæ ita, non recedant caliginis et pavoris, ut arbitror, opere. Nubem enim ſive nebulam (cujus nomine id malum appellant) inter animalia haud ullam reperit quiſquam.* (Plin. Hiſtor. Nat. lib. ix. cap. 46.) The account given of this *cloud* by thoſe divers is much the ſame with that which the divers in the American ſeas give of the manta, and the name of the cloud is perfectly applicable to it, as it really ſeems to be a cloud to thoſe who are in the water below it; the ſwimmers likewiſe carry long knives, or ſharp ſticks, for the purpoſe of diſperſing this animal. It is not improbable, that this fiſh has made its way into theſe ſeas from thoſe of the old world in the ſame manner as ſome others appear to have done. The ſtrength of this fiſh is ſo great, that it will not only ſtrangle a man whom it embraces or winds itſelf about, but it has even been ſeen to take the cable of an anchor and move it from the place where it had been caſt. It has been called *manta*, becauſe, when it lies ſtretched upon the ſea, as it frequently does, it ſeems like a fleece of wool floating upon the water.

MANTES, a conſiderable town of France, in the department of Seine and Oiſe, and late province of the Iſle of France. King Philip Auguſtus died here in 1223; and here is the tomb of king John, in the church of a late chapter which he founded. The wines from the vineyard of the late Celeſtins, out of the town, are famous. Mantes is ſeated in the Seine, and over it is a bridge, the great arch of which, although elliptic, is 120 feet wide. It is 31 miles N. W. of Paris. E. lon. 1. 51. N. lat. 49. 1.

MANTEGAR, or MAN-TIGER, as it is ſometimes written, in zoology, is the tufted ape, a ſpecies of ſimia. See SIMIA.

MANTEGNA (ANDREW), was born in a village near Padua in 1451, and at firſt employed in keeping ſheep. It was obſerved, that inſtead of watching over his flock he amuſed himſelf with drawing; and he was placed with a painter, who being delighted with his eaſe and taſte in work, and with his gentle and agreeable conduct in ſociety, adopted him for his ſon, and made him his heir. At the age of 17, Mantegna was employed to paint the altar of St. Sophia in Padua, and the four evangeliſts. James Bellini, who admired his talents, gave him his daughter in marriage. Mantegna painted, for the duke of Mantua, the *Triumph of Cæſar*, which is the chef-d'oeuvre of this painter, and has been engraved in claro-obſcuro in nine plates. From reſpect to his extraordinary merit, the duke made him knight of his order. The invention of engraving prints with the graver is commonly aſcribed to Mantegna, who died at Mantua in 1517.

MANTELETS, in the art of war, a kind of moveable parapets, made of planks about three inches thick, nailed one over another, to the height of almoſt ſix feet, generally caſed with tin, and ſet upon little wheels, ſo that in a ſiege they may be driven before the pioneers, and ſerve as blinds to ſhelter them from the enemy's ſmall ſhot.

MANTICHORA, in natural hiſtory, a name given by the Roman authors to a fierce and terrible creature, which they deſcribe from the Greeks, who call it ſometimes alſo *mantichora*; but when they write more correctly, *martichora* and *martiora*. We have formed the name *man-tiger* on the ſound of the Roman name, though expreſſing a very different ſenſe; and our authors of the hiſtories of animals figure to us under this name a terrible creature, partly from the accounts of Pliny exaggerated, and partly from their own imagination, with three rows of teeth, and with ſuch a ſhape as no animal ever poſſeſſed. See MANTEGAR. The whole ſtory of this animal ſeems founded on the love of the wonderful; and very probably the *mantichora*, properly ſpeaking, was no other than ſome of the larger hyænas, which was at firſt ill deſcribed, and afterwards more and more wonders were added to the ſtory, till all ſhadow of truth was loſt.

MANTINEA (anc. geog.), a town ſituated in the ſouth of Arcadia, on the confines of Laconia (Ptolemy); called afterwards *Antigonea*, in honour of king Antigonus. It is memorable for a battle fought in its neighbourhood between the Thebans and Spartans, in which fell the celebrated commander Epaminondas. See THEBES.

MANTIS, in zoology, a genus of inſects belonging to the order of hemiptera, the characters of which are theſe: The head is unſteady, or appears from its continual nodding motion to be ſlightly attached to the thorax. The mouth is armed with jaws, and furniſhed with filiform palpi. The antennæ are ſetaceous. The four wings are membranaceous, and wrapped round the body; the under ones folded. The anterior

or firſt pair of feet are compreſſed, armed on the under ſide with teeth like a ſaw, and terminated by a ſingle nail or crotchet; the four hindermoſt are greſſorii, or formed rather for advancing ſlowly than for performing quick movements. The thorax is extended to a conſiderable length, narrow, and throughout of equal ſize. The name *mantis*, given to this genus, denotes *ſoothſayer*; becauſe it has been imagined, that this inſect, by ſtretching out its fore feet, divined and pointed out thoſe things that were aſked of it. The inſect often reſts on its four hinder legs only, and, holding the two fore ones raiſed up, joins them together; which has occaſioned its being called by the people of Languedoc, where it is very common, *pregadieu*, as if it prayed to God. The country folks moreover maintain, that this creature ſhows the way when aſked, becauſe it ſtretches thoſe ſame fore legs ſometimes to the right and ſometimes to the left: and indeed it is looked upon as an inſect almoſt ſacred, that muſt not be hurt. Its colour is all over of a browniſh green. The young ones have more of the green, the old more of the brown, caſt. It depoſits its eggs collected into a hemiſpherical parcel, flat on one ſide. There are in the parcel two rows of oblong eggs placed tranſverſely, and one row of ſhells placed longitudinally, in form of a roof, one over the other, which cover the joining of the two rows of eggs. The whole parcel is light, and as it were compoſed of very thin parchment.

There are 53 ſpecies of this genus. In plate 11. is repreſented the *gongylodes*, the ſhape of which is extraordinary, being narrow and long. The head is ſmall, flat, with two filiform ſhort antennæ. On the ſides of the head are ſituated two large poliſhed eyes. The thorax is ſubciliated, long, narrow, margined, with a longitudinal riſing in the middle, and a tranſverſe depreſſion at one-third of its length. The elytra, which cover two thirds of the inſect, are veined, reticulated, croſſed one over the other, and cover the wings, which are veined, and diaphanous. The hinder legs are very long, the middle ones ſhorter; and the foremoſt pair of thighs are terminated with ſpines, the reſt winged, as it were, with membranaceous lobes. The top of the head has the ſhape of an awl; is membranaceous, often ſplit in two at the extremity. It is an inhabitant of China.

The inſects belonging to this genus, in their moſt perfect ſtate, are generally of very beautiful green colours, which ſoon fade, and become the colour of dead leaves. Their elytra bearing ſo ſtrong a reſemblance to the leaves of ſome plants has procured them the name of *walking leaves*.

MANTLE, or MANTLE-*Tree*, in architecture, the lower part of the chimney, or that piece of timber which is laid acroſs the jaumbs, and ſuſtains the compartments of the chimney-piece.

MANTLE, or *Mantling*, in heraldry, that appearance of folding of cloth, flouriſhing, or drapery, which in any achievement is drawn about a coat of arms. See HERALDRY.

MANTO, in poetic hiſtory, the daughter of Tireſias, and, like her father, ſtrongly inſpired with prophecy. She was in ſo great eſteem, that, when the Argives pillaged Thebes, they thought they could not acquit their vow to Apollo, of conſecrating to him the moſt precious thing in their plunder, without offering him this young woman. She was therefore ſent to the temple of Delphi. But this did not engage her in any vow of continency; or, if it did, ſhe obſerved it very ill; for ſhe bore a ſon called *Amphilocus* to Alcmeon, who had been generaliſſimo of the army which took Thebes; and a daughter to the ſame, named *Tiſiphone*. Theſe children were the fruits of an amour carried on during the madneſs which had ſeized Alcmeon, after he had put his mother to death. Virgil tranſports her into Italy, not for the ſake of ſecuring her virginity, but to produce a ſon of her who built Mantua.

MANTUA, anciently a town of the Tranſpadana in Italy, ſituated on the Mincius, a river running from the Lacus Benacus. It is ſaid to have been founded about 300 years before Rome by Bianor or Ocnus, the ſon of Manto; and was the ancient capital of Etruria. When Cremona, which had followed the intereſt of Brutus, was given to the ſoldiers of Octavius, Mantua alſo, which was in the neighbourhood, ſhared the common calamity, and many of the inhabitants were tyrannically deprived of their poſſeſſions. Virgil, who was among them, and a native of the town, applied for redreſs to Auguſtus, and obtained it by means of his poetical talents.

It is ſtill called MANTUA, and is the capital of the duchy of that name. It is now a large place, having eight gates and about 16,000 inhabitants. The ſtreets are broad and ſtraight, and the houſes well built. It is very ſtrong by ſituation as well as by art; lying in the middle of a lake, or rather moraſs, formed by the river Mincio. There is no acceſs to the city but by two cauſeways which croſs this moraſs, and which are ſtrongly fortified; ſo that the city is looked upon to be one of the moſt conſiderable fortreſſes of Europe; and the allies in 1745, though their army was in the duchy, durſt not undertake the ſiege. The French, however, have lately poſſeſſed themſelves of this place, which was reduced by blockade. It was greatly noted for its ſilk-manufactures, which are now much decayed. The air in the ſummer-time is very unwholſome. The celebrated poet Virgil was born at a village near this city. E. lon. 10. 47. N. lat. 45. 10.

MANTUA, the duchy of, a country of Italy, lying along the river Po, which divides it into two parts. It is bounded on the north by the Veroneſe; on the ſouth by the duchies of Reggio, Modena, and Mirandola; on the eaſt by the Ferrareſe; and on the weſt by the Cremoneſe. It is about 50 miles in length, and 25 in breadth; is fruitful in corn, paſtures, flax, fruits, and excellent wine. Charles IV. the laſt duke of Mantua, being a vaſſal of the empire, took part with the French in the diſpute relating to the ſucceſſion of Spain; for which reaſon he was put under the ban of the empire, and died at Venice in 1708. He having no heirs, the emperor kept the Mantuan in his own hands, and the duke of Savoy had Montferrat, which were confirmed to them by ſubſequent treaties. After the death of the emperor in 1740, his eldeſt daughter, now empreſs queen, kept poſſeſſion of the Mantuan; and the governor of the Milaneſe had the adminiſtration of affairs. The Mantuan comprehends the duchies of Mantua, Guaſtalla, and Sabioneta: the principalities of Caſtiglione, Solforino, and Boſolo; likewiſe the county of Novellara. The principal rivers are the Po, the Oglio, and the Minchio; and the principal town is Mantua.

MANTUAN (BAPTIST), a famous Italian poet, born at Mantua in 1448. He took his name from the town; not having a right to that of his father, as being a natural ſon. In his youth he applied himſelf to Latin poetry, which he cultivated all his life; for it does not appear that he wrote any thing in Italian. He entered among the Carmelites, and became general of the order; though he quitted that dignity upon ſome diſguſt in 1515, and died the year following. The duke of Mantua, ſome years after, erected a marble ſtatue to his memory, crowned with laurel, and placed it next to Virgil. His works were collected and publiſhed at Paris in three volumes folio in 1513, with the commentaries of St. Murrhon, S. Brant, and I. Badius.

MANUAL, a word ſignifying any thing performed by the hand.

MANUAL (*manualis*), in law, ſignifies what is employed or uſed by the hand, and whereof a preſent profit may be made: as ſuch a thing in the manual occupation of one is where it is actually uſed or employed by him.

Manual is the name of a ſervice-book uſed in the church of Rome, containing the rites, directions to the prieſts, and prayers uſed in the adminiſtration of baptiſm and other ſacraments; the form of bleſſing holy water, and the whole ſervice uſed in proceſſions.

Manual *Exerciſe*, in the army, conſiſts in the obſervance of certain words of command, appointed for this purpoſe. When a regiment is drawn up, or paraded for exerciſe, the men are placed three deep, either by companies, or divided into platoons, with the grenadiers on the right. When ſoldiers are drawn up for exerciſe, the ranks and files ſhould be exactly even; and each ſoldier ſhould be inſtructed to carry his arms well, to keep his firelock ſteady and even upon his ſhoulder, with the right hand hanging down, and the whole body without conſtraint. The diſtances between the files muſt be equal, and the ranks eight feet diſtant from each other. Every motion ſhould be performed with life, and the greateſt exactneſs obſerved in all firings, wheelings, and marching; and therefore a regiment ſhould never be under arms longer than two hours.

The following is an abſtract of the words of command at the manual exerciſe, with their explanations. 1. *Poiſe your firelock:* i. e. Seize the firelock with your right hand, and turn the lock outwards, keeping the firelock perpendicular; then bring up the firelock with a quick motion from the ſhoulder, and ſeize it with the left hand, juſt above the lock, ſo that the fingers may lie upon the ſtock, with the elbows down, and the thumb upon the ſtock; the firelock muſt not be held too far from the body, and the left-hand muſt be of an equal height with the eyes. 2. *Cock your firelock:* i. e. Turn the barrel oppoſite to your face, and place your thumb upon the cock, raiſing your elbow ſquare at this motion; then cock your firelock, by drawing your elbow down, placing your right-thumb on the breech-pin, and the fingers under the guard. 3. *Preſent:* i. e. Step back about ſix inches to the rear with the right-foot, bringing the left-toe to the front; at the ſame time the butt-end of the firelock muſt be brought to an equal height with the ſhoulder, placing the left-hand on the ſwell, and the fore-finger of the right-hand before the trigger, ſinking the muzzle a little. 4. *Fire:* i. e. Pull the trigger briſkly, and immediately after, bringing up the right-foot to the inſide of the left, come to the priming poſition, with the lock oppoſite to the right breaſt, the muzzle to the height of the hat, keeping it firm and ſteady; and at the ſame time ſeize the cock with the fore-finger and thumb of the right-hand, the back of the hand being turned up. 5. *Half-cock your firelock:* i. e. Half-bend the cock briſkly with a draw-back of the right-elbow, bringing it cloſe to the butt of the firelock. 6. *Handle your cartridge:* i. e. Bring your right-hand with a ſhort round to your pouch, ſlapping it hard: ſeize the cartridge, and bring it with a quick motion to your mouth; bite the top well off, and bring the hand as low as the chin, with the elbow down. 7. *Prime:* i. e. Shake the powder into the pan, placing the three laſt fingers behind the rammer, with the elbow up. 8. *Shut your pans:* i. e. Shut your pans briſkly, drawing your right-arm at this motion towards your body, holding the cartridge faſt in your hand, as before; then turn the piece nimbly round to the loading poſition, with the lock to the front, and the muzzle to the height of the chin, bringing the right-hand behind the muzzle, with both feet kept faſt in this motion. 9. *Charge with cartridge:* i. e. Turn up your hand, and put the cartridge into the muzzle, ſhaking the powder into the barrel; place your hand, cloſed, with a quick and ſtrong motion, upon the rammer. 10. *Draw your rammer:* i. e. Draw the rammer with a quick motion half out, ſeizing it at the muzzle back-handed; draw it quite out, turn it, and enter it into the muzzle. 11. *Ram down your charge:* i. e. Ram the cartridge well down in the barrel, inſtantly recovering and ſeizing the rammer back-handed at the centre, turning it, and entering it as far as the lower pipe, placing at the ſame time the edge of the hand on the butt-end of the rammer, with fingers extended. 12. *Return your rammer:* i. e. Return the rammer, bringing up the piece with the left-hand to the ſhoulder, ſeizing it with the right-hand under the cock, keeping the left-hand faſt at the ſwell, turning the body ſquare to the front. 13. *Shoulder your firelock:* i. e. Quit the left-hand, and place it ſtrong upon the butt; quit the right-hand, and throw it down the right-ſide. 14. *Reſt your firelock:* i. e. Seize the firelock with the right-hand, turning the lock outwards; raiſe the firelock from the ſhoulder, and place your left-hand with a quick motion above the lock, holding the piece right up and down in both hands before you, and your left-hand even with your eyes; ſtep briſkly back with your right-foot, placing it a hand's-breadth diſtance from your left-heel, and at the ſame time bring down your firelock as quick as poſſible to the reſt, ſinking it as far down before your left-hand as your right-hand will permit without conſtraint; your left-hand being at the feather-ſpring, and your right, with fingers extended, held under the guard, taking care to draw in the muzzle well towards your body, and to dreſs in a line with the butt-end. 15. *Order your firelock:* i. e. Place your firelock nimbly with your left-hand againſt your right-ſhoulder; quit the firelock with the right-hand, ſinking it at the ſame time with your left; ſeize it at the muzzle, which muſt be of an equal height with your chin, and hold it cloſe againſt your right-ſide; lift up your right-foot, and place it by your left; at the ſame time throw back your left-hand by your left-ſide, and with your right bring down the butt-end ſtrong upon the ground, placing it even with the toe of your right-foot; the thumb of your right-hand lying along the barrel, and the muzzle kept at a little diſtance from your body. 16. *Ground your firelock:* i. e. Half-face to the right upon your heels, and at the ſame time turn the firelock, ſo that the lock may point to the rear, and the flat of the butt-end lie againſt the inſide of your foot; at the ſame time ſlipping the right-foot behind the butt of the firelock, the right-toe pointing to the right, and the left to the front: ſtep directly forward with your left-foot, about as far as the ſwell of the firelock, and lay it upon the ground, your left-hand hanging down by your left-leg, and your right kept faſt, with the butt-end againſt it; raiſe yourſelf up again nimbly, bringing back your left-foot to its former poſition, keeping your body faced to the right; face again to the left upon your heels, and come to your proper front, letting your hands hang down without motion. 17. *Take up your firelock:* i. e. Face to the right upon both heels; ſink your body down, and come to the poſition deſcribed in the ſecond motion of grounding; raiſe yourſelf and firelock, bringing it cloſe to your right ſide; come to your proper front, ſeizing your firelock at the muzzle, as in explanation 15. 18. *Reſt your firelock:* i. e. Bring your right-hand as far as the ſwell; raiſe the firelock high up in a perpendicular line from the ground with your right-hand, and ſeize it with your left above the ſpring, the cock being at the height of the waiſt-belt; ſtep back with your right-foot, placing it behind your left-heel, and come to the reſt. 19. *Shoulder your firelock:* i. e. Lift up your right-foot, and place it by your left; bring the firelock at the ſame time to your left-ſhoulder, and ſeize the butt-end with the left-hand, keeping it in the ſame poſition as above deſcribed; throw your right hand briſkly back. 28. *Secure your firelock:* i. e. Bring the right-hand briſkly up, and place it under the cock, keeping the firelock ſteady in the ſame poſition; quit the butt with the left-hand, and ſeize the firelock with it at the ſwell, bringing the elbow cloſe down upon the lock; the right-hand being kept faſt in this motion,

and the piece ſtill upright; quit the right-hand, and bring it down your right-ſide, bringing the firelock nimbly down to the ſecure; the left-hand in a line with the waiſt-belt. 21. *Shoulder your firelock:* i. e. Bring the firelock up to a perpendicular line, ſeizing it with the right-hand under the cock; quit the left-hand, and place it ſtrong upon the butt; quit the right-hand, and bring it ſmartly down the right-ſide. 22. *Fix your bayonet:* i. e. Firſt and ſecond motions, as in the two firſt of the ſecure; quit the right-hand, and bring the firelock ſmartly down to the left-ſide with the left-hand, as far as it will admit without conſtraint, ſeizing the bayonet at the ſame time with the right-hand, and fixing it, placing that hand juſt below the braſs, with the piece kept cloſe to the hollow of the ſhoulder. 23. *Shoulder your firelock:* i. e. Quit the right-hand, and bring up the firelock with the left; ſeize it again under the cock with your right, as in the ſecond motion of the ſecure; quit the left-hand, and place it ſtrong upon the butt; quit the right-hand, and bring it down the right-ſide. 24. *Preſent your arms*; i. e. as explained in three motions of the 14th word of command. 25. *To the right face:* i. e. Bring up the firelock with a quick motion high before you, till your left-hand comes even with your eyes, with the fingers of that hand extended along the ſtock, juſt above the feather-ſpring, the right-foot to be brought cloſe up to the left-heel in this motion; face to the right, taking care in facing to hold the firelock right up and down, and ſteady in your hands; ſtep back with your right-foot, and come down to your *preſent*, as in the foregoing explanation. 26. *To the right face*; i. e. as in the foregoing explanation, facing to the right. 27. *To the right-about face*; i. e. as in the 25th explanation, only coming to the right-about inſtead of to the right. 28. *To the left face:* i. e. Bring the right-foot briſkly to the hollow of your left, with the firelock in the ſame poſition as in the firſt motion of *facing to the right*; face to the left; come down to the *preſent*, as before. 29. *To the left face*; i. e. as in the foregoing explanation. 30. *To the left-about face*; i. e. as before, coming to the left-about inſtead of to the left. 31. *Shoulder your firelock*; i. e. as in the two motions of the 19th explanation. 32. *Charge your bayonet*; i. e. as in the firſt explanation: bring the ſwell of the firelock down ſtrong upon the palm of the hand, graſping the piece at the ſmall, behind the lock, and as high as the waiſt-belt; the firelock upon a level with the barrel upwards. 33. *Shoulder your firelock:* i. e. Bring up the firelock to the ſhoulder, place the left-hand upon the butt, bringing the feet ſquare to the front; quit the right-hand, and throw it down the right-ſide. 34. *Advance your arms*; i. e. firſt and ſecond motions, as in the firſt explanation: bring the firelock down the right-ſide, with the right-hand as low as it will admit without conſtraint, ſlipping up the left-hand at the ſame time to the ſwell, the guard between the thumb and fore-finger of the right-hand, the three laſt fingers under the cock, with the barrel to the rear; quit the left-hand. 35. *Shoulder your firelock*; i. e. bring up the left-hand, and ſeize it at the ſwell; come ſmartly up to the poiſe; ſhoulder. 36. *Prime and load:* i. e. Come ſmartly to the *recover*, by ſpringing the firelock ſtraight up with the left-hand, turning the barrel inwards to the proper height of the recover: at the ſame time that the left-hand ſprings the firelock, the right-hand is raiſed briſkly from the right-ſide, and ſeizes the firelock acroſs the breaſt: as it riſes below the cock, the left hand comes with a quick motion from the butt, and ſeizes the firelock ſtrong above the lock, the little finger of the left hand at the ſpring of the lock, the left-hand at an equal height with the face, the butt cloſe to the body, but not preſſed, the firelock perpendicular oppoſite the left-ſide of the face: bring the firelock down with a briſk motion to the priming poſition, the left-hand holding the firelock, as in priming; the thumb of the right-hand placed againſt the face of the ſteel, the fingers clinched, and the elbow a little turned out, that the wriſt may be clear of the cock: open the pan, by throwing up the ſteel with a ſtrong motion of the right arm, turning the elbow in, and keeping the firelock ſteady in the left hand; handle your cartridge, prime, ſhut your pan, caſt about, load, draw rammers, ram down the cartridge, return the rammers, ſhoulder. N. B. The motion of recover, and coming down to the priming poſition and opening pans, are to be done in the uſual time. The motions of handling cartridge to ſhutting the pans, are to be done as quick as poſſible: when the pans are ſhut, a ſmall pauſe is to be made, and then caſt about together; then the loading motions are to be done as quick as poſſible; but before the rammer is returned, another ſmall pauſe is to be made, counting 1, 2, between each motion, till the firelock is ſhouldered.—*Front rank, make ready:* i. e. Spring the firelock briſkly to the *recover*, keeping the left-foot faſt in this motion; as ſoon as the firelock is at the *recover*, without any ſtop, ſink the body briſkly without ſtooping forward, with a quick motion down upon the right-knee; the butt-end of the firelock at the ſame time falls upon the ground, the front part of the butt being in a line with the heel of the left-foot. As ſoon as the butt comes to the ground, the firelock is to be cocked, immediately ſeizing the cock and ſteel in the right-hand; the firelock to be held firm in the left-hand, about the middle of that part of the firelock between the lock and the ſwell of the ſtock; the point of the left-thumb to be cloſe to the ſwell, pointing upwards. As the body is ſinking, the right-knee is to be thrown as far back as the left-leg may be right up and down; the right-foot to be thrown a little to the right; the body to be kept ſtraight; the head up, looking to the right along the rank, the ſame as if ſhouldered; the firelock to be upright, and the butt about four inches to the right of the inſide of the left-foot. *Preſent:* i. e. Bring the firelock briſkly down to the *preſent*, by extending the left-arm to the full-length with a ſtrong motion; at the ſame time ſpring up the butt by the cock with the right-hand, and raiſe the butt ſo high upon the right-ſhoulder, that you may not be obliged to ſtoop too much with the head; the right-cheek to be cloſe to the butt, and the left-eye ſhut, and look along the barrel with the right-eye from the breech-pin to the muzzle; keep the left-elbow down in an eaſy poſition, and ſtand as ſteady as poſſible; the thumb of the right-hand to remain in the poſition as deſcribed in the third explanation of the manual. *Fire:* i. e. Pull the trigger as directed in the manual; and as ſoon as the piece is fired, give yourſelf a ſtrong ſpring upon your left-leg, raiſing your body briſkly, and ſtraight up, keeping your left-foot faſt, and bringing the right-heel to the inſide of the left; at the ſame time the firelock is to be brought up to the priming-poſition, and half-cocked immediately; a ſhort pauſe is to be made; then handle cartridge, and go on with the loading motions deſcribed in the explanation of *prime and load*.—*Centre rank, make ready:* i. e. Spring the firelock briſkly to the recover; ſo ſoon as the left-hand ſeizes the firelock above the lock, the right-elbow is to be nimbly raiſed a little, placing the thumb of that hand upon the cock; the fingers open by the plate of the lock, and as quick as poſſible force the piece to the cock, by dropping the elbow, and forcing down the cock with the thumb, ſtepping at the ſame time a moderate pace to the right, keeping the left-foot faſt; as the firelock is cocked, the thumb is to fall below the cock, the right-hand ſeizing the firelock cloſe under the cock firmly, the fore-finger not to be before the trigger; the piece to be held in this poſition perpendicular, oppoſite the left ſide of the face, the butt cloſe to the left-breaſt, but not preſſed; the body to be ſtraight, and as full to the front as poſſible; the head kept up, looking to the right of the rank, that the body and the firelock may not ſtoop forward, nor lean much out of the rank. *Pre-*

ſent: i. e. Spring the firelock from the body to the arm's length with a quick motion, preſſing down the muzzle with the left-hand, and ſpring up the butt with the right hand, as in the foregoing explanation of the *front-rank.—Fire:* As in explanation 4, in the manual, with this difference, that the left-foot is to be brought up to the right, at the ſame time that the firelock is brought down to the priming poſition. The loading motions as in the explanations of priming and loading; and at the laſt motion of ſhouldering, to ſpring to the left again, and cover the file-leaders.—*Rear rank, make ready:* i. e. Recover the firelock, and cock as before directed for the centre-rank; as the firelock is recovered and cocked, ſtep briſkly ſtraight to the right, with the right-foot, a full pace; bring the left-heel about ſix inches before the right-foot; the body ſtraight, and as ſquare to the front as poſſible, as in the explanation of the *centre-rank. Preſent:* As in explanation *preſent*, before. *Fire:* As in explanation of the *centre rank*; and as the firelock is coming down to the priming-poſition, the left is to be brought back to the right; and at the laſt motion of ſhouldering, to ſpring to the left again, and cover the file-leader.

There are ſome peculiar words of command at the manual exerciſe of the grenadiers, when apart from the battalion; and alſo for the cavalry and artillery.

MANUDUCTOR, a name given to an ancient officer in the church; who, from the middle of the choir, where he was placed, gave the ſignal for the choriſters to ſing, and marked the meaſure, beat time, and regulated the muſic. The Greeks called him *meſachoros*, becauſe ſeated in the middle of the choir: but in the Latin church he was called *manuductor*; from *manus*, and *duco* "I lead;" becauſe he led and guided the choir by the motions and geſture of the hand.

MANUFACTURE, a commodity produced from raw or natural materials, either by the work of the hand or by machinery.

MANUFACTURER, one who works up a natural product into an artificial commodity.

MANUMISSION, an act whereby a ſlave or villein is ſet at liberty, or let out of bondage. The word comes from the Latin *manus* "hand;" and *mittere* "to ſend;" *quia ſervus mittebatur extra manum ſeu poteſtatem domini ſui.* Some authors define manumiſſion an act by which a lord enfranchiſes his tenants, who till that time had been his vaſſals, and in a ſtate of ſlavery inconſiſtent with the ſanctity of the Chriſtian faith.

Among the Romans, the manumiſſion of ſlaves was performed three ſeveral ways: 1. When, with his maſter's conſent, a ſlave had his name entered in the cenſus or public regiſter of the citizens. 2. When the ſlave was led before the prætor, and that magiſtrate laid his wand called *vindicta* on his head. 3. When the maſter gave the ſlave his freedom by his teſtament. Servius Tullus is ſaid to have ſet on foot the firſt manner; and P. Valerius Publicola the ſecond. A particular account is given of the third in the Inſtitutes of Juſtinian. It was not neceſſary that the prætor ſhould be on his tribunal to perform the ceremony of manumiſſion: he did it any where indifferently, in his houſe, in the ſtreet, in going to bathe, &c. He laid the rod on the ſlave's head, pronouncing theſe words, *Dico eum liberum eſſe more Quiritum*, "I declare him a freeman, after the manner of the Romans." This done, he gave the rod to the lictor, who ſtruck the ſlave with it on the head, and afterwards with his hand on his face and back; and the notary or ſcribe entered the name of the new freedman in the regiſter, with the reaſons of his manumiſſion. The ſlave had likewiſe his head ſhaved, and a cap given him by his maſter as a token of freedom. Tertullian adds, that he had then alſo a third name given him: if this were ſo, three names were not a token of nobility, but of freedom. The emperor Conſtantine ordered the manumiſſions at Rome to be performed in the churches.

Of manumiſſion there have alſo been various forms in England. In the time of the Conqueror, villeins were manumitted, by the maſter's delivering them by the right-hand to the viſcount, in full court, ſhowing them the door, giving them a lance and a ſword, and proclaiming them free. Others were manumitted by charter. There was alſo an implicit manumiſſion; as when the lord made an obligation for payment of money to the bondman at a certain day, or fued him where he might enter without ſuit, and the like.

MANURE, any thing uſed for fattening and improving land. See HUSBANDRY.

MANUSCRIPT, a book or paper *written with the hand*; by which it ſtands oppoſed to a *printed* book or paper. A manuſcript is uſually denoted by the two letters MS. and in the plural by MSS. What makes public libraries valuable is the number of ancient manuſcripts repoſited in them. See ALEXANDRIAN, CAMBRIDGE, CLERMONT, COTTONIAN, HARLEIAN, VATICAN, &c.

MANUTIUS (ALDUS), the firſt of thoſe celebrated Venetian printers who were as illuſtrious for their learning as for uncommon ſkill in their profeſſion. He was born at Baſſano in Italy about the middle of the 15th century; and hence is ſometimes called *Baſſianus*, though generally better known by the name of *Aldus*. He was the firſt who printed Greek neatly and correctly; and acquired ſo much reputation by it, that whatever was finely printed was proverbially ſaid to have "come from the preſs of Aldus." We have a kind of Greek grammar of his; with Notes upon Homer, Horace, &c. He died at Venice, where he exerciſed his profeſſion, in 1516.

MANUTIUS (Paulus), ſon of the former, was brought up to his father's profeſſion. He was more learned than him; and he acquired, by continual reading of Tully, ſuch a purity in writing Latin, that even Scaliger allows a Roman could not exceed. Pope Pius IV. placed him at the head of the apoſtolical preſs, and gave him the charge of the Vatican library. His Epiſtles are infinitely laboured, and very correct; but, as may be ſaid of moſt of the Ciceronians, they contain ſcarcely any thing but mere words. This conſtant reading of Tully, however, together with his profound knowledge of antiquity, qualified him extremely well for an editor of Tully; whoſe works he accordingly publiſhed, with Commentaries on them, in 4 vols. folio, at Venice in 1523. He died in 1574.

MANUTIUS (Aldus), the Younger, the ſon of Paulus, and the grandſon of Aldus, was eſteemed one of the greateſt geniuſes and moſt learned men of his time. Clement VIII. gave him the direction of the Vatican printing-houſe; but probably the profits of that place were very ſmall, ſince Manutius was obliged, for his ſubſiſtence, to accept of a profeſſor of rhetoric's chair, and to ſell the excellent library that was in his family, which his father, his uncle, and his great-uncle, had collected with extraordinary care, and which it is ſaid contained 80,000 volumes. He died at Rome in 1597, without any other recompenſe than the praiſes due to his merit. He wrote, 1. Commentaries on Cicero. 2. A treatiſe on orthography. 3. Three books of epiſtles; and other works in Latin and Italian, which are eſteemed.

MAON (anc. geog.), a town of the tribe of Judah, to the ſouth-eaſt towards the Dead Sea. It gave name to the *wilderneſs of Maon*, 1 Sam. xxii.

MAP, a plain figure, repreſenting the ſurface of the earth, or a part thereof, according to the laws of perſpective. See GEOGRAPHY.

MAPLE. See ACER.

MAPLE-*Sugar*. See SUGAR.

MAPLETOFT (Dr. JOHN), deſcended from a good family

in Huntingdonſhire, was born in 1631. He was educated in Trinity-college, Cambridge, and qualified himſelf for the profeſſion of phyſic; and in 1675 was choſen profeſſor of that art at Greſham college. He tranſlated Dr. Sydenham's *Obſervationes medicæ circa morborum acutorum hiſtoriam et curationem* into the Latin, and Sydenham dedicated them to Mapletoft. He married in 1679, and ſoon after transferred his ſtudies from phyſic to divinity; took orders; obtained the vicarage of St. Laurence Jewry, with the Lecturſhip of St. Chriſtopher's in London; and having been a benefactor to Sion college, was, in 170-, elected preſident. He continued to preach in his church of St. Laurence Jewry till he was above 80 years of age; and in his decline printed a book entitled *The principles and duties of the Chriſtian religion*, &c. 8vo. 1710, a copy of which he ſent to every houſe in his pariſh. He was a polite ſcholar; and beſides ſome other pieces on moral and theological ſubjects, there are in the Appendix to Ward's Lives of the profeſſors of Greſham-college, three Latin lectures read there by him, on the origin of the art of medicine, and the hiſtory of its invention.

MAPPA, in the public games of the Roman circus, was a napkin hung out at the prætor's or other great magiſtrate's ſeat, as a ſignal for the race or other diverſions to begin. The mappa was received by the mapparius, or perſon who held it, from the conſul, prætor, or other great officer. Notice was anciently given by ſound of trumpet; but Nero is ſaid to have introduced the mappa, by throwing his napkin out of the window to ſatisfy the people, who grew noiſy at the delay of the ſports while he was at dinner.

MAPPARIUS, in Roman antiquity, the officer who gave the ſignal to the gladiators to begin fighting; which he did by throwing a handkerchief that he had received from the emperor or other magiſtrate.

MARACANDA (anc. geog.), capital of the Sogdiana. Now thought to be *Samarcand*, a city of Uſbec Tartary in Aſia, the country and royal reſidence of Tamerlane. See SAMARCAND.

MARACAYBO, a rich and conſiderable town in South America, and capital of the province of Venezuela, ſeated near a lake of the ſame name. It carries on a great trade in ſkins and chocolate, which is the beſt in America; and they have likewiſe very fine tobacco. It was taken by the French bucaneers in 1666 and 1678. W. lon. 70. 45. N. lat. 10. 0.

MARACAYBO, a lake in South America, 200 miles long and 100 broad, which diſcharges itſelf by a river into the North Sea. It is well defended by ſtrong forts; which, however, did not hinder Sir Henry Morgan, a bucaneer, from entering it, and plundering ſeveral Spaniſh towns on the coaſt, after defeating a ſquadron ſent out againſt him.

MARAGNAN, a province of Brazil in South America, which comprehends a fertile populous iſland, 112 miles in circumference. The French ſettled here in 1612, and built a town; but they were ſoon driven from thence by the Portugueſe, who have poſſeſſed it ever ſince. The town is little, but ſtrong; and has a caſtle, a harbour, and a biſhop's ſee. The climate is very agreeable and wholeſome, and the ſoil produces plenty of all the neceſſaries of life. W. lon. 54. 35. S. lat. 2. 0.

MARALDI (JAMES-PHILIP), a learned mathematician and aſtronomer, of the academy of ſciences at Paris, was born in 1665. He was the ſon of Francis Maraldi and Angela Catharine Caſini, the ſiſter of the famous aſtronomer of that name. His uncle made him go to France in 1687, where he acquired great reputation on account of his learning and obſervations. He made a catalogue of the fixed ſtars, which is more particular and exact than Bayer's; and has given a great number of curious and intereſting obſervations in the memoirs of the academy; in particular, thoſe on bees and petrifactions have been univerſally applauded. He died in 1729.

MARANA (JOHN PAUL), an ingenious writer of the 17th century, was of a diſtinguiſhed family, and born at Genoa; where he received an education ſuitable to his birth, and made a great progreſs in the ſtudy of polite literature and the ſciences. Having been engaged in the conſpiracy of Raphael della Terra, to deliver up Genoa to the duke of Savoy, he was in 1670, when 28 years of age, impriſoned in the tower of that city, and remained there four years. Being at length ſet at liberty, he was ordered to write the hiſtory of that conſpiracy; but, when finiſhed, it was ſeized and prevented from being publiſhed. When the republic of Genoa was at variance with the court of France, Marana, who had always an inclination for that court, was afraid of being impriſoned a ſecond time; and retired to Monaco, where he again wrote the hiſtory of the conſpiracy in Italian; and in 1682 went to Lyons to get it printed. From Lyons he went to Paris, where his merit ſoon acquired him powerful protectors. He ſpent the reſt of his life in a happy and tranquil mediocrity, devoted to ſtudy and the ſociety of men of learning; and died in 1693. His hiſtory of the conſpiracy contains many curious and intereſting anecdotes, which are nowhere elſe to be found. He alſo wrote ſeveral other works; the moſt known of which is the Turkiſh Spy, in 6 vols. 12mo. which was in 1742 augmented to ſeven. Of this ingenious work we have an excellent Engliſh tranſlation.

MARANO, a town of Italy, in the territory of Venice and province of Friuli, with a ſtrong citadel; ſeated in a marſh at the bottom of the Gulph of Venice, which renders it difficult of acceſs.

MARANTA, INDIAN ARROW-ROOT: A genus of the monogynia order, belonging to the monandria claſs of plants; and in the natural method ranking under the eighth order, *Scitamineæ*. The corolla is ringent and quinquefid, with two ſegments alternately patent. There are three ſpecies, the arundinacea, galanga, and comoſa, all of them herbaceous perennial exotics of the Indies, kept here in hot-houſes for curioſity: they have thick, knotty, creeping roots, crowned with long, broad, arundinaceous leaves, ending in points, and upright ſtalks, half a yard high, terminated by bunches of monopetalous, ringent, five-parted flowers. They are propagated by parting the roots in ſpring, and planting them in pots of light rich earth, and then plunging them in the bark-bed. The root of the galanga is uſed by the Indians to extract the virus communicated by their poiſoned arrows; from whence it has derived its name of *arrow root*. The arundinacea, or ſtarch plant, riſes to two feet, has broad pointed leaves, ſmall white flowers, and one ſeed. It is cultivated in gardens and in proviſion-grounds in the Weſt Indies; and the ſtarch is obtained from it by the following proceſs deſcribed by Dr. Wright: "The roots when a year old are dug up, well waſhed in water, and then beaten in large deep wooden mortars to a pulp. This is thrown into a large tub of clean water. The whole is then well ſtirred, and the fibrous part wrung out by the hands, and thrown away. The milky liquor being paſſed through a hair ſieve, or coarſe cloth, is ſuffered to ſettle, and the clear water is drained off. At the bottom of the veſſel is a white maſs, which is again mixed with clean water and drained: laſtly, the maſs is dried on ſheets in the ſun, and is pure ſtarch." —A decoction of the freſh roots (the Doctor informs us) makes an excellent ptiſan in acute diſeaſes.

MARASMUS, among phyſicians, denotes an atrophy or conſumption in its laſt and moſt deplorable ſtage.

MARATHON (anc. geog.), one of the demi or hamlets of Attica; about ten miles to the north-eaſt of Athens, to-

wards Bœotia, near the ſea. It ſtill retains its ancient name (Dr. Chandler informs us); but is very inconſiderable, conſiſting only of a few houſes and gardens. The plain of Marathon, famous for Miltiades's victory over the Perſians, by which the liberties of Athens and other cities of Greece were ſaved, is long and narrow, but conſiſting chiefly of level ground, and therefore admitting the operations of cavalry, which formed the main ſtrength of the barbarian army, and with which the Greeks were very poorly provided. Here the Perſians, under the command of Datis, pitched their camp, by the advice of Hippias the baniſhed king of Athens, whoſe ſolicitations and intrigues had promoted the expedition, and whoſe perfect knowledge of the country, and intimate acquaintance with the affairs of Greece, rendered his opinion on all occaſions reſpectable. The Perſian army is ſaid to have conſiſted of 100,000 infantry, and 10,000 horſe.—Athens was in the utmoſt conſternation and diſmay. She had, upon the firſt appearance of the Perſian fleet, ſent to implore aſſiſtance from the other nations of Greece; but ſome had ſubmitted to Darius, and others trembled at the very name of the Medes or Perſians. The Lacedæmonians alone promiſed troops; but various obſtacles did not allow them immediately to form a junction with thoſe of Athens. This city therefore could only rely on its own ſtrength; and happily at this moment there appeared three men deſtined to give new energy to the ſtate. Theſe were Miltiades, Ariſtides, and Themiſtocles; whoſe example and harangues kindled the flame of the nobleſt heroiſm in the minds of the Athenians. Levies were immediately made. Each of the ten tribes furniſhed 1000 foot ſoldiers with a commander at their head. To complete this number it was neceſſary to enrol the ſlaves. No ſooner were the troops aſſembled than they marched out of the city into the plain of Marathon, where the inhabitants of Platæa in Bœotia ſent them a reinforcement of 1000 infantry.

Scarcely were the two armies in ſight of each other, before Miltiades propoſed to attack the enemy. Ariſtides and ſeveral of the commanders warmly ſupported this meaſure: but the reſt, terriſied at the exceſſive diſproportion of the armies, were deſirous of waiting for the ſuccours from Lacedæmon. Opinions being divided, they had recourſe to that of the polemarch, or chief of the militia, who was conſulted on ſuch occaſions, to put an end to the equality of ſuffrages. Miltiades addreſſed himſelf to him, with the ardour of a man deeply impreſſed with the importance of preſent circumſtances: Athens (ſaid he to him) is on the point of experiencing the greateſt of viciſſitudes. Ready to become the firſt power of Greece, or the theatre of the tyranny and fury of Hippias, from you alone, Callimachus, ſhe now awaits her deſtiny. If we ſuffer the ardour of the troops to cool, they will ſhamefully bow beneath the Perſian yoke; but if we lead them on to battle, the gods and victory will favour us. A word from your mouth muſt now precipitate your country into ſlavery, or preſerve her liberty." Callimachus gave his ſuffrage, and the battle was reſolved. To enſure ſucceſs, Ariſtides, and the other generals after his example, yielded to Miltiades the honour of the command which belonged to them in rotation: but, to ſecure them from every hazard, he preferred waiting for the day which of right placed him at the head of the army.

When that day arrived, Miltiades drew up his troops at the foot of a mountain, on a ſpot of ground ſcattered over with trees to impede the Perſian cavalry. The Platæans were placed on the left wing; Callimachus commanded the right; Ariſtides and Themiſtocles were in the centre of the battle, and Miltiades every where. An interval of nearly a mile ſeparated the Grecian army from that of the Perſians. At the firſt ſignal the Greeks advanced over this ſpace, running. The Perſians, aſtoniſhed at a mode of attack ſo novel to both nations, for a moment remained motionleſs; but to the impetuous fury of the enemy they ſoon oppoſed a more ſedate and not leſs formidable fury. After an obſtinate conflict of ſome hours, victory began to declare herſelf in the two wings of the Grecian army. The right diſperſed the enemy in the plain, while the left drove them back on a moraſs that had the appearance of a meadow, in which they ſtuck faſt and were loſt. Both theſe bodies of troops now flew to the ſuccour of Ariſtides and Themiſtocles, ready to give way before the flower of the Perſian troops placed by Datis in the centre of his battle. From this moment the rout became general. The Perſians, repulſed on all ſides, found their only aſylum in the fleet which had approached the ſhore. The conquerors purſued them with fire and ſword, and took, burnt, or ſunk the greater part of their veſſels: the reſt eſcaped by dint of rowing.

The Perſian army loſt about 6400 men; that of the Athenians 192. Miltiades was wounded; Hippias was left dead on the field, as were Steſileus and Callimachus, two of the Athenian generals. Scarcely was the battle over, when a ſoldier worn out with fatigue forms the project of carrying the firſt news of ſo ſignal a ſucceſs to the magiſtrates of Athens; and without quitting his arms, he runs, flies, arrives, announces the victory, and falls dead at their feet.

This battle was fought on the 6th of Boedromion, in the third year of the 72d Olympiad (or 29th September, anno 490 B. C.) The next day 2000 Spartans arrived. In three days and nights they had marched 1200 ſtadia. Though informed of the defeat of the Perſians, they continued their march to Marathon, nor did they enviouſly ſhun to behold thoſe fields where a rival nation had ſignalized itſelf by ſo heroic an action: they there beheld the tents of the Perſians ſtill ſtanding, the plain ſtrewed over with dead, and covered with coſtly ſpoils: they there found Ariſtides, who with his tribe was guarding the priſoners and booty; and did not retire until they had beſtowed juſt applauſes on the victors.

The Athenians neglected nothing to eterniſe the memory of thoſe who fell in the battle. It had been uſual to inter the citizens who periſhed in war, at the public expence, in the Ceramicus without the city; but the death of theſe was deemed uncommonly meritorious. They were buried, and a barrow was made for them, where their bravery had been manifeſted. Their names were engraven on half columns erected on the plain of Marathon. Theſe monuments, not excepting thoſe of the generals Callimachus and Steſileus, were in a ſtyle of the greateſt ſimplicity. In the intervals between them were erected trophies bearing the arms of the Perſians. An artiſt of eminence had painted all the circumſtances of the battle in one of the moſt frequented porticoes of the city: Miltiades was there repreſented at the head of the generals, and in the act of exhorting the troops to fight for their country.

Pauſanias examined the field of battle about 600 years after this event. His account of it is as follows: "The barrow of the Athenians is in the plain, and on it are pillars containing the names of the dead under thoſe of the tribes to which they belonged; and there is another for the Platæenſians and ſlaves; and a diſtinct monument of Miltiades the commander, who ſurvived this exploit. There may be perceived nightly the neighing of horſes and the claſhing of arms. No perſon has derived any good from waiting on purpoſe to behold the ſpectres; but their anger does not fall on any one who happens to ſee them without deſign. The Marathonians worſhip thoſe who were ſlain in the battle, ſtyling them *heroes*.—A trophy alſo of white marble has been erected. The Athenians ſay the Medes were buried, religion requiring that the corpſe of a man be covered with earth; though I was not able to find any place of ſepulture; for there is no barrow or

other ſign viſible, but they threw them promiſcuouſly into a pit.—Above the lake are the marble mangers of the horſes of Artaphernes, with marks of a tent on the rocks."

Many centuries have elapſed ſince the age of Pauſanias; but the principal barrow, it is likely that of the gallant Athenians, ſtill towers above the level of the plain. It is of light fine earth, and has a buſh or two growing on it. Dr. Chandler informs us that he enjoyed a pleaſing and ſatisfactory view from the ſummit; and looked, but in vain, for the pillars on which the names were recorded, lamenting that ſuch memorials ſhould ever be removed. At a ſmall diſtance northward is a ſquare baſement of white marble, perhaps part of the trophy. A Greek church has ſtood near it; and ſome ſtones and rubbiſh, diſpoſed ſo as to form an open place of worſhip, remain.

MARATTA. See MARHATTAS.

MARATTI (CARLO), a celebrated painter, was born at Camorano, near Ancona, in 1625. He came a poor boy to Rome, when only 11 years old; and at 12 recommended himſelf ſo effectually to Andrea Sacchi, by his drawings after Raphael in the Vatican, that he took him into his ſchool, where he continued 25 years till his maſter's death. His graceful and beautiful ideas occaſioned his being generally employed in painting madonas and female ſaints. No man ever performed in a better ſtyle, or with a greater elegance. From the fineſt ſtatues and pictures, he made himſelf maſter of the moſt perfect forms, and the moſt charming airs of heads, which he ſketched with equal eaſe and grace. He has produced a noble variety of draperies, more artfully managed, more richly ornamented, and with greater propriety than even the beſt of the moderns. He was inimitable in adorning the head, in the diſpoſal of the hair, and the elegance of his hands and feet, which are equal to thoſe of Raphael; and he particularly excelled in gracefulneſs. In his younger days he etched a few prints, as well of his own invention as after others, with equal ſpirit and correctneſs. It would be endleſs to recount the celebrated paintings done by this great man. Yet he executed nothing ſlightly, often changed his deſign, and almoſt always for the better; whence his pictures were long in hand. By the example of his maſter, he made ſeveral admirable portraits of popes, cardinals, and other people of diſtinction, from whom he received the higheſt teſtimonies of eſteem, as he likewiſe did from almoſt all the monarchs and princes of Europe. Innocent XI. appointed him keeper of the paintings in his chapel and the Vatican. Maratti erected two noble monuments for Raphael and Hannibal, at his own expence, in the Pantheon. How well he maintained the dignity of his profeſſion, appears by his anſwer to a Roman prince, who complaining of the exceſſive price of his pictures, he told him there was a vaſt debt due from the world to the famous artiſts his predeceſſors, and that he, as their rightful ſucceſſor, was come to claim thoſe arrears. His abilities in painting were accompanied with many virtues, and particularly with an extenſive charity. This great painter died at Rome in 1713, in the 88th year of his age.

MARAUDING, in a military ſenſe, means a party of ſoldiers, who, without any order, go into the neighbouring houſes and villages, when the army is either in camp or garriſon, to plunder and deſtroy, &c. Marauders are a diſgrace to the camp, to the military profeſſion, and deſerve no better quarter from their officers than they give to poor peaſants, &c.

MARAVEDI, a little Spaniſh copper coin, worth ſomewhat more than a French denier, or half a farthing Engliſh. The Spaniards always count by maravedis, both in commerce and in their finances, though the coin itſelf is no longer current among them. Sixty-three maravedis are equivalent to a rial of ſilver; ſo that the piaſter, or piece of eight rials, contains 504; and the piſtole of four pieces of eight, 2016 maravedis. This ſmallneſs of the coin produces vaſt numbers in the Spaniſh accounts and calculation; inſomuch that a ſtranger or correſpondent would think himſelf indebted ſeveral millions for a commodity that coſt but a few pounds.

In the laws of Spain, we meet with ſeveral kinds of maravedis; Alphonſine maravedis, white maravedis, maravedis of good money, maravedis Combrenos, black maravedis, and old maravedis. When we find maravedis alone, and without any addition, it is to be underſtood of thoſe mentioned above. The reſt are different in value, fineneſs of metal, time, &c. Mariana aſſerts, that this coin is older than the Moors; that it came from the Goths; that it was anciently equal to a third part of the rial, and conſequently of 12 times the value of the preſent maravedi. Under Alphonſus XI. the maravedi was 17 times, under Henry II. ten times, under Henry III. five times, and under John II. two times and an half, the value of the preſent maravedi.

MARBELLA, a town of Andaluſia in Spain, ſituated at the mouth of the Rio Verde, 30 miles north-eaſt of Gibraltar, and 28 ſouth-weſt of Malaga. W. lon. 5. 25. N. lat. 30. 25.

MARBLE, in natural hiſtory, a genus of foſſils; being bright and beautiful ſtones compoſed of ſmall ſeparate concretions, moderately hard, not giving fire with ſteel, fermenting with and ſoluble in acid menſtrua, and calcining in a ſlight fire.—The word comes from the French *marbre*, and that from the Latin *marmor*, of the Greek μαρμαιρειν to "ſhine or glitter."

The colours by which marbles are diſtinguiſhed are almoſt innumerable; but the moſt remarkable are, 1. The black marble of Flanders. 2. Plain yellow. 3. Yellow with ſome white veins. 4. Yellow with black dendrites. 5. Yellow with brown figures reſembling ruins. 6. Black and yellow. 7. Black and white. 8. Pale yellow, with ſpots of a blackiſh-grey colour. 9. Yellow, white, and red. 10. Pale yellow. 11. Olive colour, with deeper coloured croſs lines, and dendrites. 12. Browniſh red. 13. Fleſh-coloured and yellow. 14. Common red marble. 15. Crimſon, white, and grey. 16. Reddiſh-brown lumps, on a whitiſh ground. 17. Blueiſh grey. 18. Snowy-white.

The varieties of marble, numerous as they are, have been improperly augmented by virtuoſos, and ſome people who collect ſpecimens for the ſake of gain. The Italians are particularly curious in this way; and moſt of the names impoſed upon marbles are given by them. Every marble brought from an unknown place is called by them *antico*; when diſtinguiſhed by a number of bright colours, it is called *broccatello*, or *broccatellato*. When they want ſome of the originals to complete a whole ſet of marbles, they either ſubſtitute others which have the neareſt reſemblance to them; or, laſtly, they ſtain white marbles according to their own fancy, and impoſe them on the world as natural. The fineſt ſolid modern marbles are thoſe of Italy, Blankenburg, France, and Flanders. It has alſo been lately diſcovered, that very fine marble is contained in ſome of the Weſtern Iſlands of Scotland. Thoſe of Germany, Norway, and Sweden, are of an inferior kind, being mixed with a kind of ſcaly lime-ſtone; and even ſeveral of thoſe above mentioned are partly mixed with this ſubſtance, though in an inferior degree. Cronſtedt, however, mentions a new quarry of white marble in Sweden, which, from the ſpecimens he had ſeen, promiſed to be excellent.

The ſpecific gravity of marble is from 2700 to 2800; that of Carriera, a very fine Italian marble, is 2717. Black marble owes its colour to a ſlight mixture of iron. Mr. Bayen

found ſome which contained 5 *per cent.* of the metal; notwithſtanding which, the lime prepared from it was white, but in time it acquired an ochry or reddiſh-yellow colour.

Marble, when chemically examined, appears to conſiſt of calcareous earth united with much fixed air; and is, like limeſtone or chalk, capable of being converted into a ſtrong quicklime.—Dr. Black derives the origin of marbles, as well as limeſtone and marle, from the ſame ſource, *viz.* from the calcareous matter of ſhells and lithophyta. In one kind of limeſtone known by the name of *Portland-ſtone*, and conſiſting of round grains united together, it was ſuppoſed to be compoſed of the ſpawn of fiſh; but compariſons of other phenomena have explained it. It is plain that it has been produced from a calcareous ſand, which is found on the ſhore of ſome of the iſlands in the ſouthern climates. By the conſtant agitation the ſofter parts are worn off, and the harder parts remain in the form of particles that are highly poliſhed, and which are afterwards gradually made to concrete together by cauſes of which we have yet no knowledge.—There are indeed ſome few of the limeſtones and marbles in which we cannot diſcover any of the relics of the ſhells; but there are many ſigns of their having been in a diſſolved or liquefied ſtate; ſo we cannot expect to ſee the remains of the form of the ſhells: but even in many of the marbles that have the greateſt appearance of a complete mixture, we ſtill find often the confuſed remains of the ſhells of which they have been originally compoſed. We ſhould ſtill find it difficult to conceive how ſuch maſſes ſhould have derived their origin from ſhells; but, conſidering the many collections that we have an opportunity of ſeeing in their ſteps towards this proceſs, and a little concreted together, ſo that by their going a ſtep farther they might form limeſtone and marbles, we ſhall ſoon ſee the poſſibility of their being all produced in the ſame manner. Thus vaſt quantities of ſhells have been found in the province of Turin in France; and indeed there is no place where they have not been found. The lithophyta likewiſe ſeem to be a very fruitful ſource of this kind of earth. In the cold climates, where the moderate degree of heat is not ſo productive of animal-life, we have not ſuch an opportunity of obſerving this: but in the hot climates, the ſea, as well as the land, ſwarms with innumerable animals; and, at the bottom, with thoſe that produce the corals and madripores. We learn from the hiſtory of a ſhip that was ſunk in a ſtorm in the Gulf of Mexico, the vaſt growth there is of theſe bodies. About 30 years after, they attempted to dive into it to get out a quantity of ſilver; but they found great difficulty in getting it, from the ſhip being overgrown with coral. Sir Hans Sloan, in the Philoſophical Tranſactions, and in his Hiſtory of Jamaica, obſerves, that the ſhip's timber, the iron, and money, were all concreted by the growth of the calcareous matter. So in a tract of many thouſands of years the quantity of it ſhould be very great; and as this is going on through a very great extent of the bottom of the ſea, it will produce very extenſive as well as maſſy collections of calcareous matter.

According to Sir William Hamilton, many variegated marbles and precious ſtones are the produce of volcanoes.

Artificial Marbles. The ſtucco, whereof they make ſtatues, buſts, baſſo-relievos, and other ornaments of architecture, ought to be marble pulverized, mixed in a certain proportion with plaſter; the whole well ſifted, worked up with water, and uſed like common plaſter. See Stucco.

There is alſo a kind of artificial marble made of the flaky ſelenities, or a tranſparent ſtone reſembling plaſter; which becomes very hard, receives a tolerable poliſh, and may deceive a good eye. This kind of ſelenites reſembles Muſcovy talc.

There is another ſort of artificial marble formed by corroſive tinctures, which, penetrating into white marble to the depth of a line or more, imitate the various colours of other dearer marbles.

There is alſo a preparation of brimſtone in imitation of marble.

To do this, you muſt provide yourſelf with a flat and ſmooth piece of marble; on this make a border or wall, to encompaſs either a ſquare or oval table, which may be done either with wax or clay. Then having ſeveral ſorts of colours, as white lead, vermilion, lake, orpiment, maſticot, ſmalt, Pruſſian blue, &c. melt on a ſlow fire ſome brimſtone in ſeveral glazed pipkins; put one particular ſort of colour into each, and ſtir it well together; then having before oiled the marble all over within the wall, with one colour quickly drop ſpots upon it of larger and leſs ſize; after this, take another colour and do as before, and ſo on till the ſtone is covered with ſpots of all the colours you deſign to uſe. When this is done, you are next to conſider what colour the maſs or ground of your table is to be; if of a grey colour, then take fine ſifted aſhes, and mix it up with melted brimſtone; or if red, with Engliſh red ochre; if white, with white-lead; if black, with lamp or ivory black. Your brimſtone for the ground muſt be pretty hot, that the coloured drops on the ſtone may unite and incorporate with it. When the ground is poured even all over, you are next, if judged neceſſary, to put a thin wainſcot board upon it: this muſt be done whilſt the brimſtone is hot, making alſo the board hot, which ought to be thoroughly dry, in order to cauſe the brimſtone to ſtick the better to it. When the whole is cold, take it up, and poliſh it with a cloth and oil, and it will look very beautiful.

Elaſtic Marble, an extraordinary ſpecies of foſſil which has ſurpriſed all the naturaliſts who have ſeen it. There are ſeveral tables of it preſerved in the houſe of prince Borgheſe at Rome, and ſhown to the curious. F. Jacquer, a celebrated mathematician, has given a deſcription in the Literary Gazette of Paris, but the naturaliſts cannot be contented with it. If permiſſion was given to make the requiſite experiments, this curious phenomenon might be better illuſtrated. There are five or ſix tables of that marble; their length is about two feet and a half, the breadth about ten inches, and the thickneſs a little leſs than three. They were dug up, as the Abbé Fortis was told, in the feod of Mondragone; the grain is of Carrareſe marble, or perhaps of the fineſt Greek. They ſeem to have ſuffered ſome attack of fire: though the firſt degree of pulverization obſervable in the angles, can, perhaps, ſcarcely be called that of imperfect calcination. They are very dry, do not yield to external impreſſion, reſound to the hammer, like other congenerous marble, and are perhaps ſuſceptible of a poliſh. Being ſet on end, they bend, oſcillating backward and forward; when laid horizontally, and raiſed at one end, they form a curve, beginning towards the middle; if placed on a table, and a piece of wood or any thing elſe is laid under them, they make a ſalient curve, and touch the table with both ends. Notwithſtanding this flexibility, they are liable to be broken if indiſcreetly handled; and therefore one table only, and that not the beſt, is ſhown to the curious. Formerly they were all together in the prince's apartment on the ground-floor.

Colouring of Marble. This is a nice art; and, in order to ſucceed in it, the pieces of marble on which the experiments are tried, muſt be well poliſhed, and free from the leaſt ſpot or vein. The harder the marble is, the better will it bear the heat neceſſary in the operation; therefore alabaſter and the common ſoft white marble are very improper for performing theſe operations upon.

Heat is always neceſſary for opening the pores of marble, ſo as to render it fit to receive the colours: but the marble muſt never be made red-hot; for then the texture of it is injured, and the

colours are burnt and loſe their beauty. Too ſmall a degree of heat is as bad as one too great; for, in this caſe, though the marble receives the colour, it will not be fixed in it, nor ſtrike deep enough. Some colours will ſtrike even cold; but they are never ſo well ſunk in as when a juſt degree of heat is uſed. The proper degree is that which, without making the marble red, will make the liquor boil upon its ſurface. The menſtruums uſed to ſtrike in the colours muſt be varied according to the nature of the colour to be uſed. A lixivium made with horſe's or dog's urine, with four parts of quicklime and one of pot-aſhes, is excellent for ſome colours; common ley of wood-aſhes is very good for others; for ſome, ſpirit of wine is beſt; and laſtly, for others, oily liquors, or common white wine.

The colours which have been found to ſucceed beſt with the peculiar menſtruums are theſe: Stone-blue diſſolved in ſix times the quantity of ſpirit of wine, or of the urinous lixivium, and that colour which the painters call *litmus*, diſſolved in common ley of wood-aſhes. An extract of ſaffron, and that colour made of buckthorn berries, and called by painters *ſap green*, both ſucceed well when diſſolved in urine and quicklime; and tolerably well when diſſolved in ſpirit of wine. Vermilion, and a very fine powder of cochineal, alſo ſucceed very well in the ſame liquors. Dragon's-blood ſucceeds in ſpirit of wine, as does alſo a tincture of logwood in the ſame ſpirit. Alkanet-root gives a fine colour: but the only menſtruum to be uſed for it is oil of turpentine; for neither ſpirit of wine nor any lixivium will do with it. There is another kind of *ſanguis draconis*, commonly called *dragon's-blood in tears*, which, mixed with urine, gives a very elegant colour.

Beſides theſe mixtures of colours and menſtruums, there are other colours which muſt be laid on dry and unmixed. Theſe are, dragon's-blood of the pureſt kind, for a red; gamboge, for a yellow; green wax, for a green; common brimſtone, pitch, and turpentine, for a brown colour. The marble for theſe experiments muſt be made conſiderably hot, and then the colours are to be rubbed on dry in the lump. Some of theſe colours, when once given, remain immutable, others are eaſily changed or deſtroyed. Thus, the red colour given by dragon's-blood, or by a decoction of logwood, will be wholly taken away by oil of tartar, and the poliſh of the marble not hurt by it.

A fine gold colour is given in the following manner: Take crude ſal ammoniac, vitriol, and verdigriſe, of each equal quantities. White vitriol ſucceeds beſt; and all muſt be thoroughly mixed in fine powder.

The ſtaining of marble to all the degrees of red or yellow, by ſolutions of dragon's blood or gamboge, may be done by reducing theſe gums to powder, and grinding them with the ſpirit of wine in a glaſs mortar. But, for ſmaller attempts, no method is ſo good as the mixing a little of either of thoſe powders with ſpirit of wine in a ſilver ſpoon, and holding it over burning charcoal. By this means a fine tincture will be extracted: and, with a pencil dipt in this, the fineſt traces may be made on the marble while cold; which, on the heating of it afterwards, either on ſand or in a baker's oven, will all ſink very deep, and remain perfectly diſtinct on the ſtone. It is very eaſy to make the ground-colour of the marble red or yellow by this means, and leave white veins in it. This is to be done by covering the places where the whiteneſs is to remain with ſome white paint, or even with two or three doubles only of paper; either of which will prevent the colour from penetrating. All the degrees of red are to be given to marble by this gum alone; a ſlight tincture of it, without the aſſiſtance of heat to the marble, gives only a pale fleſh colour: but the ſtronger tinctures give it yet deeper; to this the aſſiſtance of heat adds greatly; and finally, the addition of a little pitch to the tincture gives it a tendency to blackneſs, or any degree of deep red that may be deſired.

A blue colour may be given alſo to marble by diſſolving turnſol in lixivium, in lime and urine, or in the volatile ſpirit of urine; but this has always a tendency to purple, whether made by the one or the other of theſe ways. A better blue, and uſed in an eaſier manner, is furniſhed by the Canary turnſol, a ſubſtance well known among the dyers. This needs only to be diſſolved in water, and drawn on the place with a pencil: it penetrates very deeply into the marble; and the colour may be increaſed, by drawing the pencil wetted afreſh ſeveral times over the ſame lines. This colour is ſubject to ſpread and diffuſe itſelf irregularly: but it may be kept in regular bounds, by circumſcribing its lines with beds of wax, or any ſuch ſubſtance. It is alſo to be obſerved, that this colour ſhould always be laid on cold, and no heat given even afterwards to the marble: and one great advantage of this colour is, that it is therefore eaſily added to marbles already ſtained with other colours, is a very beautiful tinge, and laſts a long time.

Arundel MARBLES, marbles with a chronicle of the city of Athens inſcribed on them (as was ſuppoſed) many years before our Saviour's birth; preſented to the univerſity of Oxford by Thomas earl of Arundel: whence the name. See ARUNDELIAN *Marbles*.

MARBLED, ſomething veined or clouded, reſembling marble. See MARBLING.

MARBLED *China-ware*, a name given by many to a ſpecies of porcelain or china-ware, which ſeems to be full of cemented flaws. It is called by the Chineſe, who are very fond of it, *tſou tchi*. It is generally plain white, ſometimes blue, and has exactly the appearance of a piece of china which had been firſt broken, and then had all the pieces cemented in their places again, and covered with the original varniſh. The manner of preparing it is eaſy, and might be imitated with us. Inſtead of the common varniſh of the china-ware, which is made of what they call *oil of ſtone* and *oil of fern* mixed together, they cover this with a ſimple thing made only of a ſort of coarſe agates, calcined to a white powder, and ſeparated from the groſſer parts by means of water, after long grinding in mortars. When the powder has been thus prepared, it is left moiſt, or in form of a ſort of cream, with the laſt water that is ſuffered to remain in it, and this is uſed as the varniſh. Our cryſtal would ſerve full as well as thoſe coarſe agates, and the method of preparation is perfectly eaſy. The occaſion of the ſingular appearance of this ſort of porcelain is, that the varniſh never ſpreads evenly, but runs into ridges and veins. Theſe often run naturally into a ſort of moſaic-work, which can ſcarce be taken for the effect of chance. If the marbled China be deſired blue, they firſt give it a general coat of this colour, by dipping the veſſel into a blue varniſh; and when this is thoroughly dry, they add another coat of this agate-oil.

Playing MARBLES, are moſtly imported from Holland; where it is ſaid they are made by breaking the ſtone alabaſter, or other ſubſtance, into pieces or chips of a ſuitable ſize; theſe are put into an iron mill which turns by water: there are ſeveral partitions with raſps within, cut ſloatways, not with teeth, which turn conſtantly round with great ſwiftneſs; the friction againſt the raſps makes them round; and as they are formed, they fall out of different holes, into which ſize or chance throws them. They are brought from Nuremberg to Rotterdam, down the Rhine, and from thence diſperſed over Europe.

MARBLING, the method of preparing and colouring the marbled paper. There are ſeveral kinds of marbled paper; but the principal difference of them lies in the forms in which the colours are laid on the ground: ſome being diſpoſed in whirls or circumvolutions; ſome in jagged lengths; and others only in ſpots of a roundiſh or oval figure. The general manner of managing each kind is, nevertheleſs, the ſame; being the dipping the paper in a ſolution of gum-tragacanth, or, as

it is commonly called, *gum-dragon*; over which the colours, previouſly prepared with ox-gall and ſpirit of wine, are firſt ſpread.

The peculiar apparatus neceſſary for this purpoſe, is a trough for containing the gum-tragacanth and the colours; a comb for diſpoſing them in the figure uſually choſen; and a burniſhing ſtone for poliſhing the paper. The trough may be of any kind of wood; and muſt be ſomewhat larger than the ſheets of paper, for marbling which it is to be employed: but the ſides of it need only riſe about two inches above the bottom; for, by making it thus ſhallow, the leſs quantity of the ſolution of the gum will ſerve to fill it. The comb may be alſo of wood, and five inches in length; but ſhould have braſs teeth, which may be about two inches long, and placed at about a quarter of an inch diſtance from each other. The burniſhing ſtone may be of jaſper or agate; but as thoſe ſtones are very dear when of ſufficient largeneſs, marble or glaſs may be uſed, provided their ſurface be poliſhed to a greater degree of ſmoothneſs.

Theſe implements being prepared, the ſolution of gum-tragacanth muſt be made, by putting a ſufficient proportion of the gum, which ſhould be white, and clear from all foulneſſes, into clean water, and letting it remain there a day or two, frequently breaking the lumps, and ſtirring it till the whole ſhall appear diſſolved and equally mixed with the water. The conſiſtence of the ſolution ſhould be nearly that of ſtrong gum-water uſed in miniature-painting; and if it appear thicker, water muſt be added; or if thinner, more of the gum. When the ſolution is thus brought to a due ſtate, it muſt be paſſed through a linen cloth; and being then put into the trough, it will be ready to receive the colours.

The colours employed for red are carmine, lake, roſe-pink, and vermilion; but the two laſt are too hard and glaring, unleſs they be mixed with roſe-pink or lake to bring them to a ſofter caſt; and with reſpect to the carmine and lake, they are too dear for common purpoſes: for yellow, Dutch pink and yellow ochre may be employed:—for blue, Pruſſian blue and verditer may be uſed:—for green, verdigriſe, a mixture of Dutch pink and Pruſſian blue, or verditer, in different proportions:—for orange, the orange-lake, or a mixture of vermilion, or red lead, with Dutch pink:—for purple, roſe-pink and Pruſſian blue.

Theſe ſeveral colours ſhould be ground with ſpirit of wine till they be of a proper fineneſs; and then, at the time of uſing them, a little fiſh-gall, or in default of it the gall of a beaſt, ſhould be added, by grinding them over again with it. The proper proportion of the gall muſt be found by trying them; for there muſt be juſt ſo much as will ſuffer the ſpots of colour, when ſprinkled on the ſolution of the gum-tragacanth, to join together, without intermixing or running into each other.

When every thing is thus prepared, the ſolution of the gum-tragacanth muſt be poured into the trough; and the colours, being in a ſeparate pot, with a pencil appropriated to each, muſt be ſprinkled on the ſurface of the ſolution, by ſhaking the pencil, charged with its proper colour, over it; and this muſt be done with the ſeveral kinds of colour deſired, till the ſurface be wholly covered.

When the marbling is propoſed to be in ſpots of a ſimple form, nothing more is neceſſary: but where the whirls or ſnail-ſhell figures are wanted, they muſt be made by means of a quill; which muſt be put among the ſpots to turn them about, till the effect be produced. The jagged lengths muſt be made by means of the comb above deſcribed, which muſt be paſſed through the colours from one end of the trough to the other, and will give them that appearance: but if they be deſired to be pointed both ways, the comb muſt be again paſſed through the trough in a contrary direction; or if ſome of the whirls or ſnail-ſhell figures be required to be added, they may be yet made by the means before directed.

The paper ſhould be previouſly prepared for receiving the colours, by dipping it over night in water; and laying the ſheets on each other with a weight over them. The whole being thus ready, the paper muſt be held by two corners, and laid in the moſt gentle and even manner on the ſolution covered with the colours; and there ſoftly preſſed with the hand, that it may bear every where on the ſolution. After which it muſt be raiſed and taken off with the ſame care, and then hung to dry acroſs a proper cord, ſubtended near at hand for that purpoſe: and in that ſtate it muſt continue till it is perfectly dry. It then remains only to give the paper a proper poliſh: in order to which, it is firſt rubbed with a little ſoap; and then muſt be thoroughly ſmoothed by the glaſs poliſhers, ſuch as are uſed for linen, and called the *calendar glaſſes*. After which it ſhould be again rubbed by a burniſher of jaſper or agate; or, in default of them, of glaſs ground to the higheſt poliſh: for on the perfect poliſh of the paper depends in a great meaſure its beauty and value.

Gold or ſilver powders may be uſed, where deſired, along with the colour, and require only the ſame treatment as them, except that they muſt be firſt tempered with gum water.

Marbling of books or paper is performed thus: Diſſolve four ounces of gum arabic into two quarts of fair water; then provide ſeveral colours mixed with water in pots or ſhells; and, with pencils peculiar to each colour, ſprinkle them by way of intermixture upon the gum-water, which muſt be put into a trough or ſome broad veſſel; then with a ſtick curl them, or draw them out in ſtreaks, to as much variety as may be done. Having done this, hold your book or books cloſe together, and only dip the edges in, on the top of the water and colours, very lightly; which done, take the moſt, and the plain impreſſion of the colours in mixture will be upon the leaves; doing as well the ends as the front of the book in the like manner.

Marbling a book on the covers is performed by forming clouds with aqua fortis or ſpirit of vitriol mixed with ink, and afterwards glazing the covers. See the article BOOK-BINDING.

MARC-ANTONIO. See RAIMONDI.

MARCA (PETER DE), one of the greateſt ornaments of the Gallican church, was born in Bearn, of an ancient family, in 1594. He firſt ſtudied the law, was made preſident of the parliament of Bearn, and, going to Paris in 1639, was made a counſellor of ſtate: the good opinion entertained of his knowledge was confirmed by his *Hiſtory of Bearn*. By the king's order he publiſhed a work, *De concordia ſacerdotii et imperii, ſive de libertatibus eccleſiæ Gallicæ*, in refutation of a book that appeared under the title of *Optatus Gallus*; and on this account, when on the death of his wife he was nominated biſhop of Conſerans, the court of Rome refuſed the bulls in his favour, until by another book he explained away all he had ſaid on behalf of the ſtate, to the limitation of the papal power. He obtained his confirmation, after ſeven years ſuſpenſe, in 1648; was tranſlated to the archbiſhopric of Toulouſe in 1652; and was made miniſter of ſtate in 1658. He died at Paris in 1662, a ſhort time after he had received the bulls as the archbiſhop of that metropolis. After his death appeared his *Poſthumous works*, with prefaces, notes, &c. by M. Baluze. In all he wrote he ſhowed great abilities and learning, but is reproached for accommodating them to his views of intereſt and ambition.

MARCASITE, in mineralogy. This name has long been given indifferently to all ſorts of minerals; to ores, pyrites, and to ſemimetals. Lately it ſeems to be confined to pyrites, and Wallerius propoſes to confine it to ſuch pyrites as are regularly formed. This ſeems to be better than to leave it a vague and indeterminate ſignification, on account of the am-

biguity and obſcurity which might thereby be introduced. See PYRITES.

MARCELLIANISM, the doctrines and opinions of the Marcellians, a ſect of ancient heretics, towards the cloſe of the ſecond century, ſo called from Marcellus of Ancyra, their leader, who was accuſed of reviving the errors of Sabellius. Some, however, are of opinion, that Marcellus was orthodox, and that they were his enemies the Arians who fathered their errors upon him. St. Epiphanius obſerves, that there was a great deal of diſpute with regard to the real tenets of Marcellus; but that, as to his followers, it is evident they did not own the three hypoſtaſes: for Marcellus conſidered the Son and Holy Ghoſt as two emanations from the divine nature, which, after performing their reſpective offices, were to return again into the ſubſtance of the Father; and this opinion is altogether incompatible with the belief of three diſtinct perſons in the Godhead.

MARCELLO (BENEDICT), a celebrated muſician, and deſcended from one of the moſt illuſtrious families in Venice. He lived in the beginning of the preſent century. We have of his compoſition, anthems, cantatas, and other works which the connoiſſeurs rank as high as any of the numerous and excellent muſical compoſitions which the Italian ſchool has produced. "He is the Pindar of muſic, (ſays M. de la Borde.) In boldneſs and regularity of deſign, he is the Michael Angelo of it. In analyſing his works, we diſcover a profound knowledge and great addreſs; but there is a difficulty attending the execution of them which is almoſt inſurmountable. It requires a voice poſſeſſed of great powers, and accuſtomed to the moſt extraordinary intervals." The chief of the family which ſtill exiſts was the ambaſſador of Venice to the Porte in 1770.

MARCELLUS (MARCUS CLAUDIUS), a famous Roman general, who, after the firſt Punic war, had the management of an expedition againſt the Gauls. Here he obtained the *Spolia opima*, by killing with his own hand Viridomarus the king of the enemy. Such ſucceſs rendered him popular, and ſoon after he was entruſted to oppoſe Hannibal in Italy. He was the firſt Roman who obtained ſome advantage over this celebrated Carthaginian, and ſhowed his countrymen that Hannibal was not invincible. The troubles which were raiſed in Sicily by the Carthaginians at the death of Hieronymus, alarmed the Romans; and Marcellus, in his third conſulſhip, was ſent with a powerful force againſt Syracuſe. He attacked it by ſea and land; but his operations proved long ineffectual, and the invention and induſtry of Archimedes were able to baffle all the efforts, and to deſtroy all the great and ſtupendous machines and military engines of the Romans during three ſucceſſive years. The perſeverance of Marcellus at laſt obtained the victory. After this conqueſt, Marcellus was called upon by his country to oppoſe a ſecond time Hannibal. In this campaign he behaved with greater vigour than before; the greateſt part of the towns of the Samnites, which had revolted, were recovered by force of arms, and 3000 of the ſoldiers of Hannibal made priſoners. Some time after, in an engagement with the Carthaginian general, Marcellus had the diſadvantage: but on the morrow a more ſucceſsful ſkirmiſh vindicated his military character and the honour of the Roman ſoldiers. Marcellus, however, was not ſufficiently vigilant againſt the ſnares of his adverſary. He imprudently ſeparated himſelf from his camp, and was killed in an ambuſcade, in the 60th year of his age, in his 5th conſulſhip, A. U. C. 544. His body was honoured with a magnificent funeral by the conqueror, and his aſhes were conveyed in a ſilver urn to his ſon. Marcellus claims our commendation for his private as well as public virtues; and the humanity of a general will ever be remembered, who, at the ſurrender of Syracuſe, wept on the thought that many were going to be expoſed to the avarice and rapaciouſneſs of an incenſed ſoldiery, which the policy of Rome and the laws of war rendered inevitable.

MARCGRAVE, or MARGRAVE, a kind of dignity in Germany, anſwering to our marquis; (ſee MARQUIS.) The word is derived from the German *Marcke*, or *Marcke*, which ſignifies "a frontier;" and *Greffe*, "count, governor;" *Marcgraves* being originally governors of cities lying on the frontiers of a country or ſtate.

MARCH, MARTIUS, the third month of the year, according to the common way of computing. See MONTH, and YEAR. Among the Romans, March was the firſt month; and in ſome eccleſiaſtical computations, that order is ſtill preſerved; as particularly reckoning the number of years from the incarnation of our Saviour; that is, from the 25th of March. It was Romulus who divided the year into months; to the firſt of which he gave the name of his ſuppoſed father *Mars*. Ovid, however, obſerves, that the people of Italy had the month of March before Romulus's time; but that they placed it very differently, ſome making it the third, ſome the fourth, ſome the fifth, and others the tenth month of the year. In this month it was that the Romans ſacrificed to Anna Perenna; that they begun their comitia; that they adjudged their public farms and leaſes; that the miſtreſſes ſerved the ſlaves and ſervants at table, as the maſters did in the Saturnalia; and that the veſtals renewed the ſacred fire. The month of March was always under the protection of Minerva, and always conſiſted of 31 days.—The ancients held it an unhappy month for marriage, as well as the month of May.

MARCH, in the military art, is the moving of a body of men from one place to another. Nothing is laid down particularly concerning the marches of the Jewiſh armies; only thus much we may collect, that they made uſe of trumpets, to the different ſounds of which they prepared themſelves by packing up their baggage, putting themſelves in readineſs, and attending at the ſtandards, to wait the ſignal for marching. We are told that the army of the Iſraelites marched in general no more than one league in a day and an half; but this appears to hold good only of their progreſs through difficult roads: For Follard ſays they might, in an open country, march four leagues in a day or more. The Rabbins ſuppoſe that the Iſraelites marched in the ſame order they were placed in their camp. The Greeks, let the poſture of their affairs be what it would, never marched againſt their enemies till favourable omens encouraged the enterpriſe. An eclipſe of the moon, or any untoward accident, or the intervening of what they eſteemed an unlucky day, entirely prevented their march. But of all the Greeks the Lacedemonians were the moſt nice and ſcrupulous. The heavenly bodies directed all their motions; and it was an invariable maxim with them never to march before the full moon. The Greeks are particularly remarked by Homer for marching in good order and profound ſilence; whereas the Barbarian forces were all noiſe, clamour, and confuſion. It is needleſs to ſay any thing concerning the marches of the Roman armies, more than that they were performed with the greateſt order and diſpatch, inſomuch that their unexpected preſence frequently damped the ſpirits of their enemies. The Roman ſoldiers were enured to the military pace, that is, to walk 20 miles in five hours, though at the ſame time they carried burdens of ſixty pounds weight.

Of all the mechanical parts of war, in modern times, none is more eſſential than that of marching. It may be juſtly called the *key* which leads to all ſublime motions and manœuvres of an army; for they depend entirely on this point. A man can be attacked in four different ways; in the front, on both flanks, and in the rear: but he can defend himſelf, and annoy the enemy, only when placed with his face towards

him. Hence it follows, that the general object of marching is reduced to three points only; to march forwards, and on both ſides, becauſe it is impoſſible to do it for any time backwards, and by that means face the enemy wherever he preſents himſelf.—The different ſteps to be made uſe of are three; ſlow, faſt, and oblique. The firſt is proper in advancing, when at a conſiderable diſtance from the enemy, and when the ground is unequal, that the line may not be broke, and a regular fire kept up without intermiſſion. The ſecond is chiefly neceſſary when you want to anticipate the enemy in occupying ſome poſt, in paſſing a defile, and above all, in attacking an entrenchment, to avoid being a long while expoſed to the fire of the artillery and ſmall arms, &c. The third ſtep is of infinite conſequence, both in the infantry and cavalry; columns may be opened and formed into lines, and, *vice verſa*, lines into columns, by this kind of ſtep, in a leſſer ſpace, and conſequently in leſs time, than by any other method whatever. In coming out of a defile, you may inſtantly form the line without preſenting the flank to the enemy. The line may be formed, though ever ſo near to the enemy, with ſafety, becauſe you face him, and can with eaſe and ſafety protect and cover the motion of the troops, while they are coming out of the defiles, and forming. The ſame thing may be equally executed, when a column is to be formed in order to advance or retreat; which is a point of infinite conſequence, and ſhould be eſtabliſhed as an axiom.

The order of march of the troops muſt be ſo diſpoſed, that each ſhould arrive at their rendezvous, if poſſible, on the ſame day. The quarter-maſter-general, or his deputy, with an able engineer, ſhould ſufficiently reconnoitre the country, to obtain a perfect knowledge of it and the enemy, before he forms his routes.

Before a march, the army generally receives ſeveral days bread. The quarter-maſters, camp colour-men, and pioneers, parade according to orders, and march immediately after, commanded by the quarter-maſter-general or his deputy. They are to clear the roads, level the ways, make preparations for the march of the army, &c. The *general*, for inſtance, beats at 2, the *aſſembly* at 3, and the army to march in 20 minutes after. Upon beating the *general*, the village, and general officer's guards, quarter and rear-guards, join their reſpective corps; and the army pack up their baggage. Upon beating the *aſſembly*, the tents are to be ſtruck, and ſent with the baggage to the place appointed, &c.

The companies draw up in their ſeveral ſtreets, and the rolls are called. At the time appointed, the drummers are to beat a march, and fifers play at the head of the line, upon which the companies march out from their ſeveral ſtreets, form battalions as they advance to the head of the line, and then halt.

The ſeveral battalions will be formed into columns by the adjutant-general, and the order of march, &c. be given to the general officers who lead the columns.

The cavalry generally march by regiments or ſquadrons. The heavy artillery always keeps the great roads, in the centre of the columns, eſcorted by a ſtrong party of infantry and cavalry. The field-pieces march with the columns.

Each ſoldier generally marches with 36 rounds of powder and ball, and 2 good flints; one of which is to be fixed in the cock of his firelock. The routes muſt be formed ſo that no columns croſs one another on the march.

MARCHAND (John-Louis), a native of Lyons, who ſhares with the celebrated *d'Aquin* the glory of having carried the art of playing on the organ to the higheſt degree of perfection. When very young he went to Paris; and happening to be in the chapel of the college of Louis the Great, when they were waiting for the organiſt to begin divine ſervice, he offered himſelf in his place. His playing gave ſo great ſatisfaction, that the Jeſuits kept him in the college, and ſupplied him with every neceſſary to perfect his talents. Marchand continued to play the organ of their chapel; and though many advantageous places were offered to him, he always refuſed to accept them. This diſintereſted conduct was not ſolely owing to his gratitude; for he was of ſo whimſical and independent a diſpoſition of mind, that he was equally careleſs about reputation and glory. He died at Paris in 1732, at the age of 63. From him we have two books of Pieces for the Harpſichord, much eſteemed by the connoiſſeurs.

Marchand (Profeſſor), was from his youth brought up at Paris, in the profeſſion of a bookſeller, and in the knowledge of books. He kept a regular correſpondence with ſeveral learned men, among whom was Bernard the continuator of the *Nouvelles de la Republique des Lettres*, and furniſhed this writer with the literary anecdotes of France. Marchand, having embraced the Proteſtant religion, went to join Bernard in Holland, where he might be at liberty to profeſs his religious opinions. He continued the trade of bookſeller for ſome time; but afterwards quitted it, that he might dedicate himſelf wholly to the purſuits of literature. The hiſtory of France, together with a knowledge of books and authors, was always his favourite ſtudy. In the latter he was ſo eminently diſtinguiſhed, that he was conſulted from all parts of Europe. He was alſo one of the principal authors of the *Journal Litteraire*, one of the beſt periodical works which have appeared in Holland; and he furniſhed excellent extracts for the other journals. This valuable and learned man died at an advanced age, the 14th of June 1756; and left the little fortune which he had, to a ſociety inſtituted at the Hague, for the education and inſtruction of a certain number of poor people. His library, which was excellently choſen for literary hiſtory, together with his manuſcripts, was left by his will to the univerſity of Leyden. From him we have, 1. *The Hiſtory of Printing*, a new edition of which has been promiſed by one of his friends. This work, which is full of notes and critical diſcuſſions, appeared in 1740 at the Hague, in 4to. There is ſuch a prodigious diſplay of erudition, and remarks and quotations are heaped together in ſuch confuſion, that when you get to the end of the chaos, you know not what concluſion to form concerning the points which have been diſcuſſed. Abbe Mercier, abbot of Saint-Leger de Soiſſons, gave, in 1775, 4to. a ſupplement to this hiſtory, which is equally curious and accurate. 2. An Hiſtorical Dictionary, or Memoirs Critical and Literary, printed at the Hague in 1758, in two ſmall volumes, folio. In this work we meet with hiſtorical ſingularities, literary anecdotes, and a diſcuſſion of points of bibliography; but too great minuteneſs prevails in it, the ſtyle is deficient in point of purity, and the author is too much carried away by the heat and eagerneſs of his character. More erudition could not well be collected; eſpecially upon ſubjects which, at leaſt to the generality of readers, are ſo unintereſting. 3. A new edition of Bayle's Dictionary, and Letters of the *Cymbalum mundi*, &c.

MARCHANTIA, in botany: A genus of the natural order of algæ, belonging to the cryptogamia claſs of plants. The male calyx is peltated, and covered below with monopetalous corollæ; the antheræ are multifid; the female calyx is ſeſſile, campanulated, and polyſpermous. There are eight ſpecies; of which the moſt remarkable are, 1. The polymorpha, or great ſtar-handed marchantia, is a native of Britain, growing on the banks of rivulets, on ſhady moiſt rocks, the ſides of wells, and ſometimes bogs. The leaves are about three inches long; from half an inch to an inch broad, lying flat on the ground, and adhering cloſely to it by numerous downy radicles, which grow out of the middle and baſe of the leaf on the under ſide. Theſe leaves are ſituated on their edges, their upper ſurface of a dark ſhining green colour, reticulated with

numerous minute rhomboidal or lozenge-like ſcales, variouſly divided into obtuſe lobes, and in the middle by a blackiſh purple vein; their under ſide of a paler green, and their ſubſtance coriaceous, and nearly opaque. There are three varieties, from one of which is produced a yellow powder, ſhowing a moſt curious and wonderful mechaniſm when examin d by the microſcope. The leaves have a ſtrong aromatic ſmell, and acrid taſte; and are recommended, in a decoction of ſkimmed milk, as good in the jaundice and other diſorders of the liver. 2. The conica, or conic-muſhroom marchantia, with warted leaves, grows on moiſt ſhady banks by the ſides of rivulets. The leaves are broad, flat, about two inches long, dichotomous, obtuſely lobed, and lie upon one another. Their ſurface is of a pale-green gloſſy colour, curiouſly teſſelated with rhomboidal and hexagonal tubercles each having a white veſicle or wart in the centre, with a puncture on its head. The leaves have a peculiar ſtrong fragrant ſmell, and acrid aromatic taſte. They are ſuppoſed to poſſeſs the ſame attenuating quality as the firſt, but in a higher degree. They are alſo recommended as an antiſcorbutic, and for thinning the blood.

MARCHE, a late province of France, bounded on the north by Berry, on the eaſt by Auvergne, on the weſt by Angoumois, and on the ſouth by Limoſin. It is 55 miles in length and 25 in breadth, and is pretty fertile in corn and wine. It now forms the department of Creuſe.

MARCHE, a town of France, in the department of the Voſges and late province of Lorrain, 20 miles ſouth of Neufchateau, and 40 ſouth by weſt of Toul. E. lon. 5. 50. N. lat. 48. 6.

MARCHE, or MARCHE-EN-FAMINE, a town of Luxemburg, ſeated on the Marſette, 45 miles N. N. W. of Luxemburgh.

MARCHENA, an handſome, ancient, and conſiderable town of Spain, in Andaluſia, with the title of a duchy, and a ſuburb as large as the town, ſeated in the middle of a plain, particularly fertile in olives, though very deſtitute of water. W. lon. 5. 20. N. lat. 37. 20.

MARCHERS, or LORDS MARCHERS, were thoſe noblemen that lived on the marches of Wales or Scotland; who, in times paſt, according to Cambden, had their laws, and *poteſtatem vitæ*, &c. like petty kings, which are aboliſhed by the ſtat. 27 H. 8. *c.* 26. and 1 Edw. 6. *c.* 10. In old records the lords marches of Wales were ſtyled *Marchiones de Marchia Walliæ*. See 1 & 2 *P. & M. c.* 15.

MARCHES *(marchia)*, from the German *march*, i. e. *limes*, or from the French *marque*, viz. *ſignum*, (being the notorious diſtinction between two countries or territories), are the limits between England and Wales, or between England and Scotland, which laſt are divided into weſt and middle marches, 4 Hen. 5. *c.* 7. 22 Ed. 4. *c.* 8. 34 Hen. 8. *c.* 9. And there was formerly a court called the *court of the marches of Wales*, where pleas of debt or damages, not above the value of 50 pounds, were tried and determined; and if the council of the marches held plea for debts above that ſum, &c. a prohibition might be awarded. *Hill.* 14 *Car.* 1. *Cro. Car.* 38.

MARCHET, or MARCHETTA, a pecuniary fine, anciently paid by the tenant to his lord, for the marriage of one of the tenant's daughters. This cuſtom obtained, with ſome difference, throughout all England and Wales, as alſo in Scotland; and it ſtill continues to obtain in ſome places. According to the cuſtom of the manor of Dinover in Caermarthenſhire, every tenant at the marriage of his daughter pays ten ſhillings to the lord; which, in the Britiſh language, is called *gwabr merched*, i. e. *maille-fee*. In Scotland, and the north parts of England, the cuſtom was, for the lord to lie the firſt night with the bride of his tenant: but this uſage was abrogated by king Malcom III. at the inſtance of his queen; and, inſtead thereof, a mark was paid by the bridegroom to the lord: whence it was called *marcheta mulieris*. See BOROUGH-*Engliſh*.

MARCIANA SILVA, (anc. geog.) a foreſt ſituated between the Rauraci and the Danube, before it comes to be navigable; a part of the Hercynia. Now Schwartzwald, or *Black Foreſt*, in the ſouth-weſt of Suabia, near the riſe of the Danube and Neckar.

MARCIANUS, a native of Thrace, born of an obſcure family. After he had for ſome time ſerved in the army as a common ſoldier, he was made private ſecretary to one of the officers of Theodoſius. His winning addreſs and uncommon talents raiſed him to higher ſtations; and on the death of Theodoſius II. A. D. 450, he was inveſted with the imperial purple in the eaſt. The ſubjects of the Roman empire had reaſon to be ſatisfied with their choice. Marcianus ſhowed himſelf active and reſolute; and when Attila, the barbarous king of the Huns, aſked of the emperor the annual tribute, which the indolence and cowardice of his predeceſſors had regularly paid, the ſucceſſor of Theodoſius firmly ſaid, that he kept his gold for his friends, but that iron was the metal which he had prepared for his enemies. In the midſt of univerſal popularity Marcianus died, after a reign of ſix years, in the 69th year of his age, as he was making warlike preparations againſt the barbarians that had invaded Africa. His death was long lamented; and indeed his merit was great, ſince his reign has been diſtinguiſhed by the appellation of the golden age. Marcianus married Pulcheria, the ſiſter of his predeceſſor. It is ſaid, that in the years of his obſcurity he found a man who had been murdered, and that he had the humanity to give him a private burial; for which circumſtance he was accuſed of the homicide, and impriſoned. He was condemned to loſe his life; and the ſentence would have been executed, had not the real murderer been diſcovered, and convinced the world of the innocence of Marcianus —Another emperor of the eaſt, A. D. 479, &c.

MARCIONITES, or MARCIONISTS, *Marcioniſtæ*, a very ancient and popular ſect of heretics, who, in the time of St. Epiphanius, were ſpread over Italy, Egypt, Paleſtine, Syria, Arabia, Perſia, and other countries: they were thus denominated from their author Marcion. Marcion was of Pontus, the ſon of a biſhop, and at firſt made profeſſion of the monaſtical life; but he was excommunicated by his own father, who would never admit him again into the communion of the church, not even on his repentance. On this he abandoned his own country, and retired to Rome, where he began to broach his doctrines.

He laid down two principles, the one good, the other evil: between theſe they imagined an intermediate kind of deity of a mixed nature, who was the creator of this inferior world, and the god and legiſlator of the Jewiſh nation: the other nations, who worſhipped a variety of gods, were ſuppoſed to be under the empire of the evil principle. Theſe two conflicting powers exerciſe oppreſſions upon rational and immortal ſouls; and therefore the ſupreme God, to deliver them from bondage, ſent to the Jews a being more like unto himſelf, even his ſon Jeſus Chriſt, clothed with a certain ſhadowy reſemblance of a body: this celeſtial meſſenger was attacked by the prince of darkneſs, and by the god of the Jews, but without effect. Thoſe who follow the directions of this celeſtial conductor, mortify the body by faſtings and auſteritics, and renounce the precepts of the god of the Jews, and of the prince of darkneſs, ſhall after death aſcend to the manſions of felicity and perfection. The rule of manners which Marcion preſcribed to his followers was exceſſively auſtere, containing an expreſs prohibition of wedlock, wine, fleſh, and all the external comforts of life.

Marcion denied the real birth, incarnation, and paſſion of Jeſus Chriſt, and held them to be all apparent only. He denied the reſurrection of the body; and allowed none to be baptized but thoſe who preſerved their continence; but theſe, he granted, might be baptized three times. In many things he followed the ſentiments of the heretic Cerdon, and rejected the law and the prophets. He pretended the goſpel had been corrupted by falſe prophets, and allowed none of the evangeliſts but St. Luke, whom alſo he altered in many places, as well as the epiſtles of St. Paul, a great many things in which he threw out. In his own copy of St. Luke he threw out the two firſt chapters entire.

MARCITES, Marcitæ, a ſect of heretics in the ſecond century, who alſo called themſelves the *perfecti*, and made profeſſion of doing every thing with a great deal of liberty, and without any fear. This doctrine they borrowed from Simon Magus, who however was not their chief; for they were called *Marcites* from one Marcus, who conferred the prieſthood, and the adminiſtration of the ſacraments, on women.

MARCO Polo, Paolo, or *Paulo*. See Paulo.

MARCOMANNI, an ancient people of Germany, who ſeem to have taken their name from their ſituation on the limits or marches, to the eaſt of the Higher Rhine, and the north of the Danube. Cluverius allots to them the duchy of Wurtemburg, a part of the palatinate between the Rhine and the Necker, the Briſgau, and a part of Suabia, lying between the ſprings of the Danube and the river Bregentz: they afterwards removed to the country of the Boii, whom they expelled and forced to withdraw more to the eaſt, occupying what is now called *Bohemia*. (Strabo, Velleius.)

MARCOSIANS, or Colobarsians, an ancient ſect in the church, making a branch of the Valentinians. St. Irenæus ſpeaks at large of the leader of this ſect, Marcus, who it ſeems was reputed a great magician. The Marcoſians had a great number of apocryphal books which they held for canonical, and of the ſame authority with ours. Out of theſe they picked ſeveral idle fables touching the infancy of Jeſus Chriſt, which they put off for true hiſtories. Many of theſe fables are ſtill in uſe and credit among the Greek monks.

MARCULUS, among the Romans, a knocker or inſtrument of iron to knock at the doors with.

MARDIKERS, or topasses, a mixed breed of Dutch, Portugueſe, Indians, and other nations, incorporated with the Dutch at Batavia, in the Eaſt Indies.

MARE, the female of the horſe kind. See the article Barb and Horse. Before a mare is covered, ſhe ſhould be in the houſe about ſix weeks, during which time ſhe ſhould be well fed with good hay and oats well ſifted; and in order to render her conception the more certain, near a quart of blood may be taken from each ſide of her neck, about five or ſix days before covering. Another method to bring a mare in ſeaſon and make her retain, is to give her, for the ſpace of eight days before you bring her to the horſe, about two quarts of hempſeed in the morning, and as much at night; and if ſhe refuſes to eat it, to mingle it with a little bran or oats, or elſe to let her faſt for a while: and if the ſtallion alſo eat of it, it will greatly contribute to generation.

Mares go with foal 11 months and as many days as they are years old; and therefore the propereſt time for covering them is in the beginning of June, that they may foal the May following, when there will be plenty of graſs, which will afford the mares a great abundance of milk for nouriſhing their foals. After covering, let her, for three weeks or a month, have the ſame diet as before, and be kept clean in the ſtable, with her feet well pared and thin ſhod. If ſhe cannot readily bring forth, hold her noſtrils ſo as to ſtop her taking wind; and if that will not do, diſſolve madder, to the quantity of a walnut, in a point of ale, and give it her warm. In caſe ſhe cannot void her ſecundine, or after-burden, boil two or three handfuls of fennel in running water; then put half a pint of that liquor into as much ſack, or, for want thereof, into a pint of ale, with a fourth part of ſalad-oil, mixed together, and pour it lukewarm into her noſtrils, holding them cloſe for ſome time. Otherwiſe, give her green wheat, or rye, the laſt of which is beſt.

If the mare has but little milk, boil as much as you can get from her with the leaves of lavender and ſpike, and bathe the udder with it warm, till the knobs and knots are diſſolved. She ſhould now drink only white water, which is bran put into water; give her alſo ſweet maſhes: and a month after foaling, let her have a maſh with ſome brimſtone or ſavin in it.

MAREOTIS, a lake in Egypt near Alexandria. Its neighbourhood was famous for wine; though ſome make the *Mareoticum vinum* grow in Epirus, or in a certain part of Libya, called alſo *Marcotis*, near Egypt.

MARETS (Jean de), a Pariſian, one of the fineſt geniuſes of the 17th century, became at laſt a viſionary and a fanatic. He was a great favourite of cardinal Richelieu, and poſſeſſed an employment of genius under him; for he was called upon to relax and divert him, after the fatigue of buſineſs, by facetious converſation. He uſed, in order to triumph over the virtue of women, when they objected to him the intereſt of their ſalvation, to lead them into atheiſtical principles. He was a member of the French academy from its firſt erection. He wrote ſeveral dramatic pieces, which were well received. He attempted an epic poem; but after ſpending ſeveral years about it, dropped the deſign to write books of devotion. He likewiſe wrote romances; but not ſuch virtuous ones as uſed to be written at that time. He was a declared enemy of the Janſeniſts. His viſions are well deſcribed by the Meſſieurs de Port Royal. He promiſed the king of France, by the explication of prophecies, the honour of overthrowing the Mahometan empire. In his laſt years he wrote ſomething againſt Boileau's Satires.

Marets (Samuel de), one of the moſt celebrated divines of the reformed church, was born in Picardy in 1599. In 1620 he was ſettled in the church of Laon; but in 1624 accepted a call to that of Sedan: in 1642 he obtained a profeſſorſhip at Groningen; and, from that time to his death, exerted himſelf ſo much in the ſervice of that univerſity, that it was reckoned one of the moſt flouriſhing in the Netherlands. His Syſtem of Divinity was found to be ſo methodical, that it was made uſe of at other academies; and at the end of it may be found a chronological table of all his works. Their number is prodigious: and their variety ſhows the extent of his genius. He was moreover engaged in many diſputes and controverſies, and died in 1673.

MARGARET (St.), a celebrated virgin, who, as is ſuppoſed, received the crown of martyrdom at Antioch in the year 275: the manner of her death is not known. The ancient martyrologiſts make no mention of her name, and ſhe did not become famous till the 11th century. There is no more foundation for what is ſaid concerning her relics and girdles than for the ſtories which are told of her life. A feſtival, however, is ſtill held in honour of her memory on the 20th of July: See *Baillet's Lives of the Saints* for that day. "Her actions (ſays this author) have been ſo falſified and altered, in the opinion even of Metaphraſtus, that the Romiſh church have not thought proper to inſert any of them into their breviary. The Orientals pay reverence to her by the name of *Saint Pelagia* or *Saint Marina*, and the weſtern church by that of *Saint Geruma* or *Saint Margaret*.

MARGARET, the daughter and heireſs of Florent count of Holland, who is famous on account of a ſtory repeated by a hundred compilers even of the preſent century. Having refuſed charity to a woman whom ſhe at the ſame time accuſed of adultery, ſhe was, as a puniſhment from God, brought to bed (A. D. 1276) of 365 children, partly boys and partly girls. The boys, it is added, were all named *John*, and the girls *Elizabeth*. This ſtory is repreſented in a large painting in a village not far from the Hague; and by the ſide of the painting are ſeen two large baſons of braſs, on which it is pretended the 365 children were preſented to be baptiſed. But if a picture is a ſufficient authority for the truth of any thing, it is impoſſible to tell how many fables would be fully atteſted. It has been remarked, that the moſt ancient annals are altogether ſilent concerning this fact; and that it is related only by modern writers, who, beſides, do not agree with one another concerning either the date of time, or the life of the counteſs, or the number of the children; and, in ſhort, that Naſſau, who was at that time biſhop of Utrecht, was called *John*, and not *Gui*, as the chronicles declare. Several learned men have endeavoured to trace the cauſe which could have given riſe to a relation ſo extraordinary. M. Struik fixed upon the epitaphs of the mother and ſon, which appeared to him worthy of ſome attention; and, in conformity to the dates which they bear, he ſuppoſed that the counteſs was brought to bed on Good-Friday 1276, which was the 26th of March. Now, as the year then began on the 25th of the ſame month, there were only two days of the year elapſed when the counteſs was brought to bed, which circumſtance cauſed it to be ſaid, *that ſhe had brought into the world as many children as there were days in the year*. In fact, only two children are mentioned in hiſtory, John and Elizabeth. The fable thus explained is only a common event, wherein there is nothing of the marvellous, but in conſequence of a double meaning in the expreſſion. Later writers, who have not examined this circumſtance, have aſcribed 365 children to the counteſs. (*Journal des Savans*, February 1758, on the General Hiſtory of the United Provinces.

MARGARET (counteſs of Richmond and Derby), the learned and pious mother of Henry VII. was born at Betſhoe in Bedfordſhire, in 1441; and was the ſole heireſs of John Beaufort duke of Somerſet, grandſon to John of Gaunt. Her mother was the heireſs of lord Beauchamp of Powick. Whilſt yet very young, the great duke of Suffolk, miniſter to Henry VI. or rather to queen Margaret, ſought her in marriage to his ſon; and ſhe was at the ſame time ſolicited by the king for his half-brother Edmund earl of Richmond. To the latter ſhe gave her hand. Henry VII. was the ſole fruit of this marriage, his father dying when he was but 15 weeks old. Her ſecond huſband was Sir Henry Stafford, knight, ſecond ſon to the duke of Buckingham; by whom ſhe had no iſſue. Soon after his death, which happened in the year 1482, ſhe ſought conſolation in a third huſband, Thomas lord Stanley, who, in the firſt year of her ſon's reign, was created earl of Derby. He died in the year 1504, without iſſue, being then high conſtable of England. She ſurvived her lord not quite five years, dying at Weſtminſter in June 1509, in the 69th year of her age. She was buried in Henry VII.'s chapel; on the ſouth ſide of which was erected to her memory an altar-tomb of black marble, with her ſtatue of braſs.

From her funeral ſermon preached by her confeſſor biſhop Fiſher, who, ſays Ballard, knew the very ſecrets of her ſoul, we learn "that ſhe poſſeſſed almoſt all things that were commendable in a woman, either in mind or body." She underſtood the French language perfectly, and had ſome knowledge of the Latin. She was devout even to auſterity, in humility romantic, profuſe in the encouragement of learning, and ſingularly chaſte; but this laſt virtue became conſpicuous only towards the latter end of a third marriage. "In her laſt huſband's days (ſays Baker), ſhe obtained a licence of him to live chaſte, whereupon ſhe took upon her the vow of celibacy." 'A boon (ſays Mr. Walpole), as ſeldom requeſted, I believe, of a third huſband, as it probably would be eaſily granted.' Her life, from the turbulence of the times, and viciſſitude of her ſon's fortune, muſt neceſſarily have been ſubject to infinite diſquiet, which however ſhe is ſaid to have ſupported with ſingular fortitude.—She wrote, 1. The mirroure of golde for the ſinful ſoule, tranſlated from a French tranſlation of a book called *Speculum aureum peccatorum*. Emprynted at London, in Fletеſtrete, at the ſigne of St. George, by Richard Pynſon, quarto, with cuts on vellum. 2. Tranſlation of the fourth book of Dr. Gerſon's treatiſe of the imitation and following the bleſſed life of our moſt merciful Saviour Chriſt. Printed at the end of Dr. William Atkinſon's Engliſh tranſlation of the three firſt books, 1504. 3. A letter to the king; in Howard's collection. 4. By her ſon's order and authority, ſhe alſo made the Orders for great eſtates of ladies and noble women, for their precedence, and wearing of barbes at funerals, over the chin and under the ſame.

MARGARET, the daughter of Woldemar III. king of Denmark, ſtyled the *Semiramis of the North*: ſhe ſucceeded her father in the throne of Denmark, her huſband in that of Norway, and the crown of Sweden was given her as a recompence for delivering the Swedes from the tyranny of Albert their king. Thus poſſeſſed of the three kingdoms, ſhe formed the grand political deſign of a perpetual union, which ſhe accompliſhed, *pro tempore* only, by the famous treaty ſtyled the *Union of Colmar*. She died in 1412, aged 59.

MARGARET *of Anjou*, daughter of René D'Anjou, king of Naples, and wife of Henry VI. king of England; an ambitious, enterpriſing, courageous woman. Intrepid in the field, ſhe ſignaliſed herſelf by heading her troops in ſeveral battles againſt the houſe of York; and if ſhe had not been the authoreſs of her huſband's misfortunes, by putting to death the duke of Glouceſter his uncle, her name would have been immortaliſed for the fortitude, activity and policy with which ſhe ſupported the rights of her huſband and ſon, till the fatal defeat at Tewkſbury; which put an end to all her enterpriſes, the king being taken priſoner, and prince Edward their only ſon baſely murdered by Richard duke of York. Margaret was ranſomed by her father, as hiſtory informs us, and died in Anjou in 1482.

MARGARITA, or PEARL-ISLAND, an iſland of South-America, the middle of which is ſeated in W. lon. 64. 2. N. lat. 11. 30. It was diſcovered by Columbus, and is about 35 leagues in compaſs. The ſoil is very fertile in maize and fruits, and abounds in paſture and verdant groves; yet is totally deſtitute of freſh water, which the inhabitants are obliged to bring from the continent. When the Spaniards firſt landed here, they found the natives buſy in fiſhing for oyſters. Columbus ordered ſome of the ſavages aboard his ſhip, who were ſo far from being terrified, that they very ſoon became familiar with the Spaniards. The latter at firſt imagined that the oyſters ſerved them for food; but on opening the ſhells, they found they contained valuable pearls. Upon this diſcovery they immediately landed, and found the natives ready to part with their pearls for the mereſt trifles. In proceſs of time the Spaniards built a caſtle, called *Monpadre*, and employed prodigious numbers of Guinea and Angola negroes in the pearl-fiſhery; cruelly forcing them to tear up the oyſters from the rocks to which they ſtuck, during which time many of them were deſtroyed by the ſharks and other voracious fiſhes. In 1620 this iſland was invaded by the Dutch, who demoliſhed the caſtle upon it: ſince which time it has been in a manner

abandoned by the Spaniards; and is now principally inhabited by the natives, to whom ſome particular indulgences were granted by the court of Spain, on account of their ready ſubmiſſion to Columbus.

MARGARITA, the PEARL, in natural hiſtory. See PEARL, and MYA.

MARGARITINI, are glaſs ornaments, made at Venice of ſmall glaſs tubes of different colours, which are blown at Murano, and which the women of the lower claſs wear about their arms and necks. The largeſt ſort are uſed for making roſaries. This work is performed with great diſpatch, the artiſan taking a whole handful of thoſe tubes at once, and breaking them off one after another with an iron tool. Theſe ſhort cylinders are mixed with a kind of aſhes, and put over the fire in an iron pan; and when the two ends begin to melt, by ſtirring them about with an iron wire, they are brought to a round figure; but care is taken not to leave them too long over the fire, leſt the hole through which they are to be ſtrung ſhould be entirely cloſed by the melting of the glaſs. There are ſeveral ſtreets at Franceſco de Vigna entirely inhabited by people whoſe ſole occupation is to make and ſtring theſe margaritini.

MARGATE, a ſea-port town of Kent, on the north ſide of the iſle of Thanet, near the North-Foreland. It is noted for ſhipping vaſt quantities of corn (moſt, if not all, the product of that iſland) for London; and has a ſalt-water bath at the poſt-houſe; which has performed great cures in nervous and paralytic caſes, and numbneſs of the limbs. It lies in St. John's pariſh, which is a member of the port of Dover, at the diſtance of 14 miles, and 12 from Canterbury, and 72 from London; and in the ſummer ſeaſon is frequented for ſea-bathing, having become one of the principal watering-places for the idle, the opulent, and the invalid, where they meet with every requiſite accommodation; and the adjacent country abounds with moſt extenſive proſpects and pleaſant rides. E. lon. 1. 30. N. lat. 51. 24.

MARHATTAS, MERHATTAHS, MARATTAS, or MAHRATTAS; a people of India, and by far the moſt conſiderable of all the Hindoo powers. The Marhattas boaſt a very high antiquity; they profeſs the religion of Brama; ſpeak a dialect of the Sanſcrit language, in which they have introduced all the technical terms of Moghul adminiſtration; uſe a character of their own in writing, though not very different from ſome of the other tribes around them; and are divided into four caſts or claſſes of people, with the various ſubdiviſions of profeſſional diſtinction found over the reſt of Hindoſtan, but with this remarkable difference, that among the Marhattas every individual may, as in fact he occaſionally does, follow the life of a ſoldier.

As a nation inhabiting immemorially the country properly denominated *Marhat* or *Merhat*, and comprehending the greater part of the Paiſhwa's preſent dominion in the Decan, they were completely ſubjugated, and afterwards for many centuries depreſſed, firſt by the Patans, then by the Moghul conquerors of Delhi. At length, towards the end of Alemgeer's reign, they united, rebelled, and under the famous *Sewajee* or *Seeva-jee*, a leader of their own tribe, laid the foundations of their preſent vaſt empire, which has riſen gradually on the ruins of the Mahomedan power.

Seeva-je was ſucceeded by his ſon Rajah Sahou, who conſiderably extended the Marhatta dominions. When Rajah Sahou grew old and infirm, and the fatigues of government began to preſs heavy upon him, he appointed Biſſonat Balajee, a Brahman born at Gokum, and leader of about 25,000 horſe, to the office of Paiſhwa or vicegerent.

Rajah Sahou died without iſſue, but left nephews by his brother. The courage and wiſdom of Balajee had gained him, during the latter years of the old Rajah, the affection and eſteem of all the nation. But, under an appearance of modeſty and ſelf-denial, his prevailing paſſion was ambition; and the ſentiments of gratitude and loyalty were abſorbed in the deſire to command. He made uſe of the influence he had acquired under his benefactor ſo firmly to eſtabliſh his own power, that he not only retained the high office of Paiſhwa during his life, but tranſmitted it to his poſterity. The Marhattas, gradually forgetting a prince they knew nothing of, became accuſtomed to obey his vicegerent only: yet a certain reſpect for the royal race, or the dread of the conſequence of violating the ſtrong prejudice which the nation ſtill retains in favour of the family of its founder, have ſerved perhaps to preſerve it; and the deſcendants of Rajah Sahou's nephews yet exiſt, but are kept in captivity in the palace at Sattarah. The eldeſt is ſtyled Ram Rajah, or ſovereign; his name is on the ſeal and coin of the Marhatta ſtate; but his perſon is unknown, except to thoſe who immediately ſurround him. He reſides in his ſplendid priſon, encompaſſed with the appendages of eaſtern grandeur, but debarred of all power, and kept totally ignorant of buſineſs. The ſeat of government was tranſferred from the ancient royal reſidence of Sattarah to Poonah; and the uſurper, as well as his ſucceſſors, ſeem ſtill to have acted under the ſuppoſed authority of the depoſed prince, by their aſſuming no other title or character than that of Paiſhwa or prime-miniſter. From this change, the empire of the Ram-Rajah has been diſtinguiſhed only by the appellation of the *Paiſhwaſhip*, or otherwiſe the *Government of Poonah*, from the name of its preſent capital.

Biſſonat Balajee was ſucceeded, as Paiſhwa, by his eldeſt ſon Balajee Row (called alſo *Nana Saheb*, or *Nanah Row*), who left three ſons, the eldeſt of whom, Balajee Pundit, ſometimes called Nanah Pundit, ſucceeded him. The two others were Rogobah or Ragonat Row, and Shamſheer Row.

Balajee Pundit left two ſons; Mahadavah Row, who was Paiſhwa twelve years; and Narrain Row, who ſucceeded him.

During the latter part of the life of Mahadavah Row, his uncle Rogobah was confined to the palace at Poonah, for reaſons with which we are not acquainted. Mahadava Row died without iſſue; and upon the acceſſion of Narrain his brother, a youth of about 19 years of age, Rogobah in vain applied to be releaſed from his confinement. He is therefore ſuſpected of having entered into a conſpiracy with two officers in his nephew's ſervice, Somair Jing and Yuſuph Gardie, in order to procure that by force which he could not obtain by entreaty. The correſpondence between the conſpirators was carried on with ſo much ſecrecy, that the court had not the leaſt intimation or ſuſpicion of their deſign, till every avenue leading to the palace had been ſecured, and the whole building ſurrounded by the troops under the command of thoſe two officers. It is ſaid, that, on the firſt alarm, Narrain Row, ſuſpecting his uncle, ran to his apartment, threw himſelf at his feet, and implored his protection: "You are my uncle (ſaid he), ſpare the blood of your own family, and take poſſeſſion of a government which I am willing to reſign to you."

Somair and Yuſuph entered the room whilſt the young Paiſhwa was in this ſuppliant poſture. Rogobah, with apparent ſurpriſe and anger, ordered them to withdraw; but as they either knew him not to be ſincere, or thought they had proceeded too far to retreat, they ſtabbed Narrain with their poignards whilſt he clung to his uncle's knees.

The office of Paiſhwa being now vacant, the chiefs of the nation then at Poonah were aſſembled, and Rogobah being the only ſurvivor of the family of Biſſonat Balajee, to whoſe memory the Marhattas in thoſe parts are enthuſiaſtically at-

tached, he was named to fill it. Being naturally of a warlike temper, he refolved to undertake fome foreign expedition; for befides gratifying his paffion for the field, he probably hoped, by the fplendour of his exploits, to draw off the attention of the public from inquiring into the late cataftrophe.

A pretence for war was not difficult to be found. He renewed the claim of his nation to the *chout*, and marched his army towards Hydrobad, the capital of the Nizam. The vigour of his meafures procured him an accommodation of his demand; and he was proceeding to enforce a fimilar one upon the Carnatic, when he received intelligence which obliged him to return haftily to Poonah.

Although the Marhatta chiefs had acknowledged Rogobah as Paifhwa, yet they and the people in general were much difatisfied with his conduct. The murderers of Narrain Row had not only efcaped punifhment, but, as was reported, had been rewarded. The crime was unexampled, and the perpetrators were beheld with uncommon horror and deteftation. The Paifhwa had hitherto fo fully poffeffed the love of the people, that, till then, guards were confidered as unneceffary about the perfon of a man whofe character rendered him inviolable. Every one therefore had free acceis to his palace, and he relied with confidence for his fafety upon the affections of thofe who approached him.

Thefe reflections operated powerfully upon the minds of the Marhattas; but perhaps no violent confequences would have enfued, had it not been difcovered, foon after the departure of Rogobah from Poonah, that the widow of Narrain Row, Ganga Bace, was pregnant. This determined their wavering refolutions. Frequent conſultations were held among the principal men then in the capital; and it was finally refolved to abjure the allegiance they had fworn to Rogobah, and declare the child, yet unborn, to be the legal fucceffor of the late Paifhwa.

A council of regency was immediately appointed to govern the country until the child fhould become of age; and it was agreed to reſerve their deliberations, in cafe it fhould prove a female or die, till the event fhould render them neceffary. They who principally conducted thefe meafures, and whofe names will on that account be remembered, were Sackharam Babou and Balajee Pundit, called alfo Nanah Pher Nevees from his having been long the principal fecretary of the Marhatta ftate. Nine other Marhatta leaders approved of thefe meafures, and fwore to maintain them.

As the firft ftep towards the execution of their plan, the widow of Narrain Row was conveyed to Poorendher, a fort of great ftrength, fituated on a high mountain, about 25 miles from Poonah. As foon as Rogobah received intimation of this revolution, he marched back towards the capital. But difcontent had already infected his troops; fome of the chiefs retired to their eftates, and others joined the ftandard of the regents. He however rifked a battle with an army of the revolters commanded by Trimbec Row, in which the latter was ſlain; but though he obtained a victory, the ftrength of the confederates daily increafed, while his own troops were diminifhed by continual defertions. He therefore found it neceffary to retire to Ugein, and to folicit the aſſiſtance of the Marhatta chiefs Sindia and Holkar; but meeting with a refufal, he went to Surat, and applied for fuccour to the Engliſh.

Rogobah's fucceſs in this application was the cauſe of two wars with the Marhatta ſtate; which, after much waſte of blood and treaſure, we were obliged to conclude by relinquiſhing his claim, and acknowledging as legal Paifhwa the ſon of Narrain Row, who was born about ſeven months after the death of his father.

The Marhatta dominions, as already obſerved, are governed by a number of ſeparate chiefs, all of whom acknowledge the Ram Rajah as their ſovereign; and all, except Moodajee Boonſalah, own the Paifhwa as his vicegerent. The country immediately ſubject to the Paifhwa, including all the hereditary territories that were left by the Rajah Sahou to the Ram Rajah, and thoſe that have been acquired and added to them ſince in his name, extends along the coaſt nearly from Goa to Cambay; on the ſouth it borders on the poſſeſſions of Tippoo Saib, eaſtward on thoſe of the Nizam and of the Marhatta Rajah of Berar, and towards the north on thoſe of the Marhatta chiefs Sindia and Holkar.

Moodajee Boonſalah, Rajah of Berar, poſſeſſes, beſides Berar, the greateſt part of Orixa (ſee HINDOSTAN). This prince being deſcended from the line of the Ram Rajah, eyes the power of the Paifhwa, by whom a branch of his family is kept in ignominious confinement, with ill-will; has often refuſed to ſupport his meaſures; and, on ſome occaſions, has even ſeemed inclined to act againſt him.

Next to Moodajee, in point of importance, muſt be ranked Madajee Sindia, a bold and aſpiring chief, who poſſeſſes the greateſt part of the extenſive ſoubadary or government of Malva, together with part of the province of Candeiſh. The remainder is under the dominion of Holkar. Both he and Sindia pretend to be deſcended from the ancient kings of Malva. Sindia reſides chiefly at Ugein, near the city of Mundu, once the capital of theſe kings; and Holkar at Indoor, a town little more than 30 miles weſt of it. The dominions of theſe, and of ſome chiefs of leſs conſequence, extend as far as the river Jumna.

The meaſures purſued by the Marhattas for ſome years left little room to doubt that they aſpired at the ſovereignty of all Hindoſtan, or at leaſt at the expulſion of the Mahomedan princes: and in this laſt deſign they appear to have ſucceeded, and to have gained a great acceſſion of territory, through the arms of Sindia, both by the capture of the cities of Agra and Delhi, with their territorial dependencies, and the conſequent captivity of the unfortunate monarch who ruled there as the laſt imperial repreſentative of the great Moghul race of Timur. "The whole of the dominion thus newly eſtabliſhed is of vaſt extent, ſtretching near 1200 miles along the frontiers of Tippoo and the Nizam in a north-eaſt direction, from Goa on the Malabar coaſt to Balaſore in Oriſſa adjoining to Bengal; and from thence north-weſterly 1000 miles more, touching the confines of the Britiſh and allied ſtates, on the borders of the Ganges and Jumna, to the territory of the Sieks at Paniput, rendered famous in 1761 for the laſt memorable defeat ſuſtained by the Marhattas in their ambitious conteſt for empire with the united declining power of the Mahomedans. From this place, in a ſoutherly courſe, with great encroachment on the old eaſtern boundary of the Rajepoot country of Ajmere, it runs about 260 miles to the little Hindoo principality of Kotta, and thence ſouth-weſterly 540 miles further to the extreme point of the ſoubah of Gujerat at Duarka, including the whole of that fertile province; from whence, along the ſea-coaſts of Cambay and Malabar to Goa, the diſtance may be reckoned 800 miles. Thus the overgrown empire of the Marhattas may be ſaid to extend eaſt 19 degrees of longitude, near the parallel of 22 degrees north latitude, from the mouths of the Indus to thoſe of the Ganges, and about 13 degrees of latitude north, from the Kiſtnah to Paniput; comprehending at leaſt an area of 400,000 ſquare geographic miles, being conſiderably more than a third part of Hindoſtan, including the Decan, and equal perhaps in dimenſions to all the Britiſh and allied ſtates in India, with thoſe of Golconda and Myſore, taken together."

MARIA, or SANCTA MARIA, an iſland of the Indian Ocean, lying about five miles eaſt from Madagaſcar. It is about 27

miles long and five broad; well watered, and ſurrounded by rocks. The air is extremely moiſt, for it rains almoſt every day. It is inhabited by 500 or 600 negroes, but ſeldom viſited by ſhips.

MARIA (St), a conſiderable town of South America, in the audience of Panama, built by the Spaniards after they had diſcovered the gold mines near it, and ſoon after taken by the Engliſh. It is ſeated at the bottom of the Gulph of St. Michael, at the mouth of a river of the ſame name; which is navigable, and the largeſt that falls into the gulf. The Spaniards come here every year in the dry ſeaſon, which continues three months, to gather the gold-duſt out of the ſands of the neighbouring ſtreams; and carry away great quantities. W. lon. 148. 30. N. lat. 7. 0.

MARIA (St), a handſome and conſiderable town of Spain, in Andaluſia, with a ſmall caſtle. It was taken by the Engliſh and Dutch in 1702, for the archduke of Auſtria. It is ſeated on the Guadaleta, at the mouth of which is a tower and a cloſe battery. W. lon. 5. 33. N. lat. 36. 35.

MARIAN ISLANDS. See LADRONE *Iſlands*.

MARIANA (JOHN), a learned Spaniſh hiſtorian, born at Talavera, in the dioceſe of Toledo. He entered among the Jeſuits in 1554, at 17 years of age; and became one of the moſt learned men of his time. He was a great divine, a good humaniſt, and profoundly verſed in eccleſiaſtical as well as profane hiſtory. He taught at Rome, in Sicily, at Paris, and in Spain; and died at Toledo in 1624. His principal works are, 1. An excellent hiſtory of Spain in 30 books; which he himſelf tranſlated from the Latin into Spaniſh, without ſervilely following his own Latin edition. 2. *Scholia*, or ſhort notes on the Bible. 3. A treatiſe on the changes the ſpecie has undergone in Spain; for which he was thrown into priſon by the duke of Lerma, the Spaniſh miniſter. 4. A famous treatiſe *De rege et regis inſtitutione*, which made much noiſe, and was condemned by the parliament of Paris to be burnt by the hands of the common hangman, for his aſſerting in that work, that it is lawful to murder tyrants. 5. A work on the faults of the government of the ſociety of Jeſuits; which has been tranſlated into Spaniſh, Latin, Italian, French, &c.

MARIANUS SCOTUS, an Iriſh monk, was related to the venerable Bede, and wrote a chronicle which is eſteemed. He died in the abbey of Fuld in 1086, aged 58.

MARIBONE, or ST. MARY LE BONE, or rather *Borne*, from the neighbouring brook, a pariſh of Middleſex, on the north-weſt ſide of London. The manor appears to have belonged anciently to the biſhop of London. The houſes in this pariſh are very numerous, compriſing ſeveral extenſive ſtreets and ſquares, which are every year increaſing. The Paddington road from Iſlington paſſes through this pariſh, which gives it communication with the eaſtern part of London without paſſing through the ſtreets. Here were three conduits erected about the year 1238, for ſupplying the city of London with water; but, anno 1703, when it was plentifully ſerved by the New-River, the citizens let them out at 700l. a-year for 43 years. There were two for receiving its water at the north-eaſt corner of the bridge on the river Tyburn, and over them ſtood the lord-mayor's banqueting-houſe, to which (the uſe of coaches being not then known) his lordſhip and the aldermen uſed to ride on horſeback, as their ladies did in waggons. This banqueting-houſe, after being many years neglected, was taken down in 1737, and the ciſterns arched over. This village, if it may be called by that name, is joined by new buildings to London. The old church, which was a mean edifice, was pulled down, and a new one erected in 1741. Beſides which it has a great number of chapels of every ſect and perſuaſion, and an extenſive work-houſe for the poor.

MARIDUNUM (anc. geog.) a town of the Demetæ in Britain. Now *Caer Marden*, or *Caermarthen*, the capital of Caermarthen-ſhire.

MARIGALANTE, an iſland of North America, and one of the leaſt of the Caribbees, lies in N. lat. 16. 32. and W. lon. 61. 5. from London, at the diſtance of four leagues from Guadaloupe, to the ſouth. The ſoil, produce, and climate, are pretty much the ſame as the other Caribbees. Columbus diſcovered it on his ſecond American voyage in 1483, and called it by the name of his ſhip Maria Galanta, or Gallant Mary. It is about ſix leagues long, and between three and four broad. Viewed at a diſtance from on board a ſhip, it appears like a floating iſland, becauſe, as it is for the moſt part flat, the trees ſeem to ſwim; but a nearer proſpect ſhows it to be interſected by ſome riſing grounds, which give a fine variety to the landſcape. The French ſettled here in 1648; and it was taken by the Engliſh in 1691, but the French ſoon got poſſeſſion of it again. It was again taken by the Britiſh in 1759, but afterwards reſtored at the peace 1763.—This iſland was thought, on its firſt diſcovery, to want water; but a charming running ſtream has in time been diſcovered, no leſs convenient than refreſhing and wholeſome, on the banks of which are ſome wealthy planters, and excellent plantations of ſugar. A little village in a ſmall bay is the capital of the iſland, and here the commandant reſides. The whole iſland is very capable of improvement; the ſoil being almoſt equally good, and the land riſing no where too high. The coaſt affords many little bays, and ſafe anchorage and ſhelter to ſhips.

MARINE, a general name for the navy of a kingdom or ſtate; as alſo the whole œconomy of naval affairs; or whatever reſpects the building, rigging, arming, equipping, navigating, and fighting ſhips. It comprehends alſo the government of naval armaments, and the ſtate of all the perſons employed therein, whether civil or military. The hiſtory of the marine affairs of any one ſtate is a very comprehenſive ſubject, much more that of all nations. Thoſe who would be informed of the maritime affairs of Great Britain, and the figure it has made at ſea in all ages, may find abundance of curious matter in Selden's *Mare Clauſum*; and from his time to ours we may trace a ſeries of facts in Lediard's and Burchet's Naval Hiſtory, but above all in the Lives of the Admirals, by the accurate and judicious Dr. Campbell.

MARINES, or *Marine Forces*, a body of ſoldiers raiſed for the ſea-ſervice, and trained to fight either in a naval engagement or in an action aſhore. The great ſervice of this uſeful corps was manifeſted frequently in the courſe of the war before laſt, particularly at the ſiege of Belleiſle, where they acquired a great character, although lately raiſed, and hardly exerciſed in military diſcipline. At ſea they are incorporated with the ſhip's crew, of which they make a part; and many of them learn in a ſhort time to be excellent ſeamen, to which their officers are ordered by the admiralty to encourage them, although no ſea-officer is to order them to go aloft againſt their inclination. In a ſea-fight their ſmall arms are of very great advantage in ſcouring the decks of the enemy; and when they have been long enough at ſea to ſtand firm when the ſhip rocks, they muſt be infinitely preferable to ſeamen if the enemy attempts to board, by raiſing a battalion with their fixed bayonets to oppoſe him.

The ſole direction of the corps of marines is veſted in the lords commiſſioners of the admiralty; and in the admiralty is a diſtinct apartment for this purpoſe. The ſecretary to the admiralty is likewiſe ſecretary to the marines, for which he has a ſalary of 300 l. a-year; and he has under him ſeveral clerks for the management of this department.

The marine forces of Great Britain, in the time of peace, are ſtationed in three diviſions; one of which is quartered at Chatham, one at Portſmouth, and another at Plymouth. By

a late regulation, they are ordered to do duty at the ſeveral dock-yards of thoſe ports, to prevent the embezzlement of the king's ſtores, for which a captain's guard mounts every day; which certainly requires great vigilance, as ſo many abuſes of this kind have been committed, that many of the inhabitants, who have been long uſed to an infamous traffic of this kind, expect theſe conveyances at certain periods as their due, and of courſe reſent this regulation in the higheſt degree as an infringement of their liberties as Britiſh ſubjects.

The marine corps are under the command of their own field-officers, who diſcipline them, and regulate their different duties. —His late majeſty in 1760 formed a new eſtabliſhment of marine officers, entitled, the *general*, *lieutenant-general*, and *three colonels* of marines (one for each diviſion), to be taken from officers in the royal navy. The two firſt are always enjoyed by flag-officers, the laſt by poſt-captains only. This eſtabliſhment was formed to reward ſuch officers who diſtinguiſhed themſelves in the ſervice of their country.

MARINE-*Diſcipline*, is the training up ſoldiers for ſea-ſervice, in ſuch exerciſes as the various poſitions of the firelock and body, and teaching them every manœuvre that can be performed on board ſhips of war at ſea. See EXERCISE.

MARINE-*Chair*, a machine invented by Mr. Irwin for viewing the ſatellites of Jupiter at ſea, and of courſe determining the longitude by their eclipſes. An account of it is given in the *Journal Eſtranger* for March 1760. An account of its accuracy was publiſhed the year following by M. de l'Iſle, aſtronomer in the imperial academy of Peterſburg: but notwithſtanding the encomiums beſtowed upon it by this gentleman, it has never come into general uſe; and therefore we may conclude, that it is much inferior to the inventions of Mr. Harriſon for the ſame purpoſe. See HARRISON and LONGITUDE.

MARINE-*Surveyor*, is the name of a machine contrived by Mr. H. de Saumarez for meaſuring the way of a ſhip in the ſea. This machine is in the form of the letter Y, and is made of iron or any other metal. At each end of the lines which conſtitute the angle or upper part of that letter, are two pallets, not much unlike the figure of the log; one of which falls in the ſame proportion as the other riſes. The falling or pendent pallet meeting a reſiſtance from the water, as the ſhip moves, has by that means a circular motion under water, which is faſter or ſlower according as the veſſel moves. This motion is communicated to a dial within the ſhip, by means of a rope faſtened to the tail of the Y, and carried to the dial. The motion being thus communicated to the dial, which has a bell in it, it ſtrikes exactly the number of geometrical paces, miles, or leagues which the ſhip has run. Thus the ſhip's diſtance is attained, and the forces of tides and currents may alſo be diſcovered by this inſtrument: which, however, has been very little uſed.

MARINE-*Acid*, a name given to one of the component parts of ſea-ſalt. An account of various methods of procuring this acid from common ſalt, of moſt of its chemical properties, and of ſeveral uſes it may be put to in the arts, is given under the articles, CHEMISTRY, COLOUR-*Making*, BLEACHING, &c. M. Chaptal obſerves, that the marine acid cannot be obtained by diſtilling ſalt with powdered flints. He made the experiment by mixing ten pounds of flints with two pounds of ſea-ſalt, but obtained only a maſs of the colour of litharge, and the fumes were not perceptibly acid. Clay will decompoſe this ſalt for once, but not in the ſmalleſt degree if uſed a ſecond time; which ſhows that in all probability the decompoſition is owing to a portion of vitriolic acid contained in the clay. In France there is a very impure kind of ſoda named *Blanquette*, which, according to M. Chaptal's analyſis, contains 21 pounds of ſea-ſalt out of 25; and yet, when treated with vitriolic acid, affords little or no ſpirit of ſalt, but abundance of volatile ſpirit of ſulphur. Our author aſcribes this to the quantity of charcoal contained in the blanquette, which unites with the vitriolic acid and volatilizes it: and his conjectures appeared to be right; becauſe, if the coal is deſtroyed by calcination, the blanquette yields marine acid in proportion to the quantity of common ſalt it contains.

Under the article BLEACHING we have taken notice of the properties of the dephlogiſticated acid of ſea ſalt in whitening cloth: but though this has been often attempted, it does not appear likely to come into practice; nor does even the offer of a premium ſeem to encourage the bleachers of this country to make any ſerious endeavour to introduce it. This we can only account for in two ways: 1. From the very noxious and ſuffocating ſmell attending the operation, by which the health, and even the life of thoſe who prepare this acid in an unſkilful manner, as well as of the bleachers who make uſe of it, are greatly endangered. 2. From the exceſſive waſte of vapour in the ordinary mode of preparation, which renders the liquid too dear for ordinary uſe.

To avoid theſe inconveniences, it has been recommended by chemiſts to force the vapour violently into larger quantities of water, and, by compreſſing the fumes to a great degree, to render the liquid extremely ſtrong, and then dilute it when it is to be uſed. By this means, however, the vapour forces out at the joinings of the diſtilling veſſel in ſuch a manner that no lute can keep it in; at the ſame time that the liquor being impregnated with an over-proportion of gas, lets go the ſuperfluous quantity as ſoon as the preſſure is taken off, thereby loſing its power, and annoying with its noxious and indeed poiſonous ſmell every one who comes near it. The trouble attending this preparation may be eaſily judged from the following deſcription of the proceſs given by M. Chaptal:

"To extract this acid (ſays he), I place a large glaſs alembic, of one ſingle piece, upon a ſand-bath. To the alembic I adopt a ſmall receiver; and to the receiver three or four ſmall bottles nearly filled with diſtilled water, and arranged according to the method of Mr. Woulfe. I diſpoſe the receiver and bottles in a ciſtern, the places of junction being luted with fat lute, and ſecured with rags ſoaked in the lute of lime and whites of eggs. Laſtly, I ſurround the bottles with pounded ice. When the apparatus is thus diſpoſed, I introduce into the alembic half a pound of manganeſe of Cevennes, and pour upon it, at ſeveral repetitions, three pounds of fuming muriatic acid. The quantity of acid which I pour at once is three ounces; and at each time of pouring, a conſiderable effervescence is raiſed. I do not pour a new quantity until nothing more comes over into the receivers. This method of proceeding is indiſpenſably neceſſary when the operator is deſirous of making his proceſs with a definite quantity of materials: for if too large a quantity of acid be poured on at once, it is impoſſible to reſtrain the vapours; and the effervescence will throw a quantity of manganeſe into the receiver. The vapours which are developed by the effuſion of muriatic acid are of a greeniſh-yellow colour, and they communicate this colour to the water when they combine with it. When this vapour is concentrated by means of the ice, and the water is ſaturated with it, it forms a ſcum on the ſurface, which is precipitated through the liquid, and reſembles a congealed oil. It is neceſſary to aſſiſt the action of the muriatic acid by means of a moderate heat applied to the ſand-bath. The ſecure luting of the veſſels is alſo an eſſential circumſtance; for the vapour which might eſcape is ſuffocating, and would not ſuffer the chemiſt to inſpect his operation cloſely It is eaſy to diſcover the place where it eſcapes through the

lutes by running a feather dipped in volatile alkali over them; the combination of theſe vapours inſtantly forms a white cloud, which renders the place viſible where the vapour eſcapes.

"The ſame oxygenated muriatic acid may be obtained, by diſtilling in a ſimilar apparatus ten pounds of marine ſalt, three or four pounds of manganeſe, and ten pounds of *ſulphuric* (vitriolic) acid.

"Mr. Reboul has obſerved, that the concrete ſtate of this acid is a cryſtallization of it, which takes place at three degrees of temperature below the freezing point of Reamur. The forms which have been obſerved are thoſe of a quadrangular priſm, truncated very obliquely, and terminated by a lozenge. He has likewiſe obſerved hollow hexahedral pyramids on the ſurface of the liquor.

"To make uſe of the oxygenated acid in the arts, and in order to concentrate a greater quantity in a given volume of water, the vapour is made to paſs through a ſolution of alkaline ſalt. A white precipitate is at firſt formed in the liquid; but a ſhort time afterwards the depoſition diminiſhes, and bubbles are diſengaged, which are nothing but the carbonic acid. In this caſe two ſalts are formed, the oxygenated muriate and the ordinary muriate. The mere impreſſion of light is ſufficient to decompoſe the former, and to convert it into common ſalt. This lixivium contains indeed the oxygenated acid in a ſtronger proportion. The execrable ſmell of the acid is much weakened. It may be employed for various uſes with the ſame ſucceſs, and with great facility; but the effect is very far from correſponding with the quantity of oxygenated acid which enters into this combination, becauſe the virtue of a great part is deſtroyed by its union with the alkaline baſis.—The oxygenated muriatic acid has an exceſſively ſtrong ſmell. It acts directly on the larynx, which it ſtimulates, excites coughing, and produces violent headaches."

The apparatus recommended by Mr. Berthollet is on the ſame plan with M. Chaptal's, though the ſcale is much larger. Both are evidently troubleſome; and cannot by any means be introduced into ordinary practice, where the *preparation*, as well as the method of uſing the liquor, muſt be left to workmen of little underſtanding and leſs attention. For theſe it is neceſſary to have an apparatus which may not readily be broken, which requires little trouble or dexterity in the uſing, and which may prepare great quantities at once. The principal difficulty is the condenſation of the fumes. To attempt violently to force ſteam of any kind into water is always improper, and ſeldom anſwers any purpoſe, unleſs when for chemical experiments the liquors are wanted of extraordinary ſtrength. Water naturally attracts a certain proportion of every kind of vapour; and when once this natural attraction is ſatisfied, it is vain to attempt to force more into it. In proportion to the quantity of ſurface expoſed to the ſteam, water will imbibe it in ſhorter or longer time; and therefore a broad ſhallow veſſel is always preferable to a round or narrow deep one, where diſtillations of this kind are to be performed.

It muſt alſo be obſerved, that the vapour with which the water is to be impregnated, ought not to ruſh out of the diſtilling veſſel with too great haſte; as in this caſe a great quantity will unavoidably be loſt, by reaſon of the water not having time to abſorb it all. To avoid this, matters ſhould be managed in ſuch a manner, that, without ſenſibly interrupting the operation, the vapour may iſſue from the diſtilling veſſel gradually, and without ſudden exploſions; by which means the water will imbibe as faſt as the veſſel diſtils for a certain time; and in order to preſerve all the vapour, there ought to be ſeveral receivers, one above the other, communicating by pipes, that the vapour which does not condenſe in one may do ſo in the other.—The following apparatus may be uſed with ſucceſs:

1. For the *diſtilling veſſel*, a large bottle of common brown earthen-ware, ſuch as is repreſented in plate 15 is undoubtedly the cheapeſt and moſt eligible that can be made uſe of; as it is not liable to break, and may be uſed for a long time without being corroded. It may be placed in a ſand-bath; or in caſe it is luted, it may be put on an open fire, which, however, ought not to be raiſed to any great height.

2. The receivers ought to be large ſquare ciſterns of wood, covered over on the inſide with white wax, on which the acid has no effect; and they may be placed, for the greater convenience, one above the other, with cocks ſo ſituated, that the water of the upper ciſterns may be diſcharged into the lower ones as occaſion requires. The lowermoſt ciſtern muſt alſo be furniſhed with a cock, for running off the liquor into the veſſels in which the cloth is to be ſteeped.

3. The bottle muſt be furniſhed with a glaſs tube to convey the ſteam from it into the receiver; but to prevent any of the acid from getting in amongſt the liquor deſigned for bleaching, it will be neceſſary to have a ſmall caſk interpoſed betwixt it and the receivers; which will alſo prevent the liquor from being dirtied by any ſudden ſwell of the mixture in the bottle.

4. It will be convenient, and which may be eaſily accompliſhed in moſt bleaching-houſes, to have a ſmall ſtream of clear water running into it, higher than the level of the uppermoſt reſervoir; by which means they can all be filled to a ſufficient depth with very little trouble. The apparatus then will be as repreſented in the plate, where A is the bottle containing the mixture; B the ſand-pot, furnace, door, and aſh-hole; C the glaſs tube to convey the ſteam into the caſk D, placed there on purpoſe to catch any acid which may diſtil, or ſmall quantity of the mixture which may boil over. E is another glaſs-tube communicating with the lowermoſt reſervoir *d*, into which it conveys the ſteam to be abſorbed by the water lying in its bottom. The three ciſterns communicate on their upper parts by means of the pipes *m* and *n*, by which the ſteam which does not condenſe in the lower reſervoir is conveyed to the middle one *e*, and that which does not condenſe in the middle one is conveyed to the upper one *f*; in which a vent is finally given to it at *g*; or if it is found that three reſervoirs are not ſufficient, there may be one or more placed on the top of theſe, in a manner ſimilar to what we have already deſcribed.

The operation is to be begun by putting into the bottle A, a quantity of ſtrong ſpirit of ſalt diluted with at leaſt four times its quantity of water, ſufficient to fill ſomewhat more than one half of it. The manganeſe, reduced to as fine a powder as poſſible, is to be made up into ſmall pellets or balls, with water, and thrown in at the lateral neck of the bottle. A few only are to be thrown in at once, and the mouth inſtantly ſtopped with a cork; a briſk effervеſcence will immediately enſue, and a conſiderable quantity of vapours will come over without heat, paſſing through the pipes C and E into the reſervoir *d*; from thence through *m* into the reſervoir *e*, and from *e* into *f*; the ſmall quantity which ſtill remains uncondenſed paſſing out at the vent *g*, which ought to be under a chimney, or to be fitted with an upright pipe going through the roof of the houſe.

A fire being applied, the vapour will begin to iſſue out through the pipes in greater quantities, but by the time the liquor has begun to boil, the deplogiſticated vapour will have entirely paſſed over. This may be eaſily known to be the caſe by the heat of the glaſs tubes. On this the cork is to be pulled out, and two or three more pellets of manganeſe are to be thrown in, and the mouth ſtopped up as quickly as poſſible. The vapour from theſe will be quickly diſſipated, and the ope-

ration muſt be repeated until no more efferveſcence ariſes upon throwing in the manganeſe. When this is the caſe, a freſh quantity of ſpirit of ſalt diluted, but not ſo much as the preceding, is to be added, and this again treated with more manganeſe as before; continuing the operation till the bottle be ſuppoſed as full as is convenient for the operation. The whole muſt now be allowed to cool: and it would be proper to have another furnace, ſand-pot, and bottle, to join immediately to the reſervoirs, that the operation may not be interrupted.—The water in the lowermoſt reſervoir will always be moſt ſtrongly impregnated, and may be known to be of ſufficient ſtrength when a few threads of flax put into it are viſibly whitened in two or three minutes. It is then to be let off into the large reſervoir for ſteeping the cloth; the water in the middle receiver, which is alſo partly impregnated with dephlogiſticated gas, muſt be let down into the lowermoſt one by turning the cock of the pipe *i*, which runs off the water to the bottom. In like manner, the water in the upper ciſtern *f* is let down into the middle ciſtern *e*, by turning the cock belonging to the pipe *h*, while that in *f* is to be replaced by freſh water from the ſtream which runs into the houſe.—The reſiduum of the diſtillation is a ſolution of manganeſe in common ſpirit of ſalt, from which the metal may be precipitated by cauſtic volatile alkali, and the liquid will afford ſal ammoniac: the precipitate, by being calcined again till it grows black, may be uſed as freſh manganeſe; but conſidering the low price of this mineral, we can ſcarce recommend this proceſs as worth the trouble. It is certain, however, that a great part of the marine acid will remain undecompoſed, even after we have added as much manganeſe as will excite any efferveſcence. This may be extemporaneouſly recovered by pouring into the diſtilling veſſel a ſmall quantity of oil of vitriol. This expels the marine acid from the manganeſe with which it is united, and renders it again capable of acting upon more; but when the addition of a ſmall quantity of this acid has no effect in producing the proper gas, we may then be ſure that the operation is totally finiſhed. The reſiduum is now a combination of manganeſe with vitriolic acid, and may be decompoſed by volatile alkali, ſo that it can ſtill be of uſe to the makers of ſpirit of hart's horn and ſal-ammoniac.

Thus we ſee, that by a very eaſy proceſs, without the ſmalleſt danger to the health of the workman, an unlimited quantity of dephlogiſticated ſpirit of ſalt may be prepared of a ſufficient ſtrength to anſwer every uſeful purpoſe; and it is evident from the foregoing deſcription of the proceſs, that the moſt is made of the materials, ſo that we can ſcarce expect a cheaper method. The practice of mixing together the ſalt, oil of vitriol, and manganeſe, all together in the diſtilling veſſel, is by no means to be commended; for thus the matter always runs into an hard lump,, which cannot be got out without breaking the veſſel; and the vapour is, beſides, forced out with ſuch rapidity, that great part of it is unavoidably loſt.

The next and moſt important conſideration is the method of uſing the liquor after it is diſtilled. And here, as the volatility of the gas is the principal obſtacle to the preſervation of its ſtrength, it is indiſpenſibly neceſſary to have it run from a covered ſpout into a covered veſſel where the cloth is placed. It is likewiſe a matter of importance to have the cloth ſpread among the liquid in ſuch a manner that the power of the gas may be equally diffuſed over its whole ſurface; for if it lies in folds upon one another, it will undoubtedly be ſpotted, let us do as we will. To prevent this in the moſt effectual manner, it is neceſſary to roll the cloth as is done by dyers to make their colours ſtrike equally; for this operation we may account a kind of dyeing *white*; and the ſame precautions are undoubtedly neceſſary to make this colour equal as any other. It is probable, that veſſels and rollers might be ſo conſtructed, that a number of pieces of cloth might be whitened all at once; and the operation of driving the rollers might be performed by a machine driven by water.

With regard to the uſe of this liquid itſelf, it muſt be obſerved, that though very cheap when made as above directed, yet water itſelf is ſtill cheaper; and whatever can be done by mere water, ought to be previouſly done to the cloth before it is immerſed in the dephlogiſticated liquor. With this view it ought to undergo a long continued but gentle fulling, a ſtream of warm water conſtantly running upon it all the while. Thus an incredible quantity of filth will be ſeparated; and it will be matter of ſurpriſe to thoſe who have not made the experiment, to be told, that they could not, in 24 hours, waſh a piece of cloth as it comes from the weaver ſo clean in repeated quantities of water but that it would ſtill render the laſt quantity dirty. Cloth, when treated in this manner for a conſiderable time, will be very nearly as well whitened as that which has been boiled in alkali. Boiling in water has not an effect nearly equal to that of gentle beating while the cloth is immerſed in water, neither are violent ſtrokes ſo uſeful as thoſe which are gentle; and it might undoubtedly be worth while to contrive a machine for the purpoſe of giving this gentle fulling, which, without injuring the texture of the cloth, might be continued for a long time, and would be advantageous either on the old or new plan of bleaching.

If this method of fulling ſhould not be adopted, that of *ſtreaming* the cloth, or immerſing it for ſome time in a ſtream of running water, would be of very conſiderable uſe as a preparation: but boiling with alkaline ſalt ſeems more advantageouſly to be omitted till after the cloth has undergone two or three operations in the dephlogiſticated liquor; becauſe this liquid, even when very weak, will cleanſe conſiderably, and extract a great quantity of ſordes, which would load the alkali and deſtroy its force.

Having prepared the cloth in ſome of the methods above mentioned, it is to be put into the veſſel deſigned for whitening, put over the roller, and a quantity of the liquid let into it. As the cloth whitens, the liquor gradually loſes its ſmell, and ſoon becomes incapable of giving any additional whiteneſs. This may be perceived by having a ſmall door in the ſide of the veſſel, which may be opened occaſionally, and a bit of the cloth pulled out through it and looked at. When the firſt quantity of liquid, therefore, appears to have no more effect, it muſt be allowed to run off into another veſſel; but is not yet to be thrown away, becauſe it is ſtill much more powerful than water, and will have a conſiderable effect upon cloths which have undergone the aqueous preparation.

After the firſt quantity of liquid is run off, another muſt be admitted from the lowermoſt reſervoir, and is to be uſed in the ſame manner with the former; only it will now be ſomewhat longer before its ſtrength is exhauſted. When this is the caſe, a third quantity is to be employed, and ſo on till we find that the effect of the liquid is beginning to diminiſh. The cloth muſt then be taken out, fulled, and thoroughly cleaned of the acid by water, before the next operation, which is boiling with alkali. The lixivium ought to be of conſiderable ſtrength, that the liquor may eaſily be evaporated, and part of the alkali recovered. (See POTASHES); but as the cloth will neceſſarily retain a conſiderable quantity of this ſtrong lixivium, it muſt be wrung out by a proper inſtrument for that purpoſe, and the liquid which falls from it ſaved and returned again into the kettle. The cloth, ſtill retaining a quantity of alkali which could not be wrung out, muſt be thrown into a cauldron of boiling water, and allowed to remain there for a quarter of an hour; after which it is to be taken out and wrung as before. The water of the ſecond cauldron will be ſlightly alkaline, and may be uſed as a prepara-

tion for cloth, or for filling up the veſſel containing the ſtrong alkali as it evaporates.

Before the cloth is returned into the dephlogiſticated liquor, it is abſolutely neceſſary that the alkaline ſalt be entirely taken out of it, which can only be ſpeedily done by fulling, ſtreaming, or at leaſt ſteeping in repeated quantities of water. When all this is done, it will moſt probably be of a darker colour than before; but this will go off in a few minutes, and the cloth will become much whiter than ever. The remainder of the operation is only a repetition of the proceſſes already deſcribed, and for which no other directions are requiſite than that both alkali and acid, the latter eſpecially, always looſen a quantity of ſordes, which, unleſs waſhed off, ſoon prevents their own operation. As ſoon, therefore, as the cloth is taken out of either the alkaline or acid liquor, there is a neceſſity for uſing every method conſiſtent with the ſafety of its texture to clear it of this looſe matter, which will allow the liquor into which it is next plunged to have the greater effect. It muſt be remembered, however, that the nearer the cloth approaches to perfect whiteneſs, the leſs effect has either of the liquids upon it; and therefore there is a neceſſity either for increaſing the ſtrength of the dephlogiſticated acid, or allowing it a longer time; but the latter is by much the preferable method: and, after all, it would be far from being improper to expoſe the cloth for a few days to the air, which will effectually prevent any change of colour afterwards, as frequently happens to cloths bleached after this manner.

Could a ready method be fallen upon to bleach flax by itſelf, it would be greatly in favour of the linen manufacture; as the ſtrength of the threads is vaſtly increaſed by this method. The great difficulty in this operation ariſes from the filamentous nature of the flax; by which, when put into any liquid, it becomes matted together in ſuch a manner as not to be ſeparated afterwards by any means whatever ſo as to be ſpun with the ſame eaſe as before. The fairer and better dreſſed the lint is, the greater is this difficulty; and to obviate it, there ſeems to be no other poſſible method but that of uſing flax juſt as it comes from the mill, without any other dreſſing. Thus, indeed, the tow muſt be bleached as well as the flax; but when we conſider, that thus it may be ſpun into much finer and ſtronger yarn than otherwiſe could be done, we cannot ſuppoſe this to be any diſadvantage.

Another obſtacle is the difficulty the liquid has in getting into the heart of the flax; ſo that the outſide will be well whitened, when the inſide is ſcarce altered. For this no other remedy ſeems adequate, beſides the dividing it into many ſmall parcels, tying them together in pairs, putting them over rods as candle-makers do their candles, and thus ſuſpending them for a time in the liquid. They muſt be dipped in an hot ſolution of alkali in the ſame manner, afterwards for a conſiderable time in freſh water, to take out all the alkali; after which, they are to be again put into the acid liquor, and treated exactly as directed for the cloth. Thus, in two or three days, the flax will attain a ſurpriſing whiteneſs. It is then to be dreſſed and treated exactly as other flax, but muſt be dried without any kind of wringing or preſſure.—This method would appear to be uſeful, even though the utmoſt degree of whiteneſs ſhould not be given, as the texture of the threads will be much leſs injured by the ſubſequent bleaching than if the flax had been ſpun in its natural ſtate.

M. Chaptal obſerves, that this acid may be applied tothe whitening of paper and old prints; and by its means (he ſays) they obtain a whiteneſs which they never had before. Common ink diſappears by its action, but it has no effect upon printer's ink.—It thickens oils, and calcines metals to ſuch a degree, that the proceſs may be much expedited by its means. It diſſolves metals without effervescence, and precipitates mercury from its ſolutions, converting it into corroſive ſublimate.—It acts, likewiſe, very vigorouſly upon metallic calces, forming with them ſalts more readily than other acids.

M. Chaptal obſerves, that the combination of the marine acid with vegetable alkali, named *febrifuge ſalt of Sylvius*, is found, though in ſmall quantities, in ſea-water, plaſter, and the aſhes of tobacco. "The exiſtence of this ſalt (ſays he) in the aſhes of tobacco might with juſtice have ſurpriſed me, as I had reaſon to expect the muriate of ſoda, which is employed in the operation called *watering*. Was the ſoda metamorphoſed into pot-aſh by the vegetable fermentation? This may be determined by direct experiments."

MARINER, the ſame with a SAILOR or SEAMAN. See theſe articles.

Method of preſerving the health of MARINERS. See SEAMEN.

MARINER'S *Compaſs*. See COMPASS.

ST. MARINO, a ſmall town and republic of Italy, ſituated in E. lon. 13. 44. N. lat. 44. 21. This ſmall republic conſiſts only of a mountain, and a few hillocks, that lie ſcattered about the bottom of it. The number of the inhabitants is about 5000. The mountain yields good wine, but they have no other than rain or ſnow water. The founder of the republic was a Dalmatian, and a maſon, who upwards of 1300 years ago turned hermit, and retired to this mountain. Here his devotion and auſterity, and, in conſequence of that, his reputation for ſanctity, were ſuch, that the princes of the country made him a preſent of the mountain; on which many, out of veneration for the ſaint, ſoon after took up their abode. Thus was the foundation laid of the town and republic, which ſtill bears the name of the ſaint. The town ſtands on the top of the mountain, and there is only one way by which it can be come at. In the whole territory are only three caſtles, three convents, and five churches. The largeſt of the churches is dedicated to the ſaint, and contains his aſhes and his ſtatue. He is looked upon as the greateſt ſaint, next to the bleſſed Virgin; and to ſpeak diſreſpectfully of him is accounted blaſphemy, and puniſhed as ſuch. The republic is under the protection of the pope. All that are capable of bearing arms are exerciſed, and ready at a minute's call. In the ordinary courſe of government, the adminiſtration is in the hands of the council of 60, which, notwithſtanding its name, conſiſts only of 40; one half of the members of which are of the noble families, and the other of the plebeian: on extraordinary occaſions, however, the arengo, in which every houſe has its repreſentative, is called together. The two principal officers are the capitaneos, who are choſen every half year; and next to them is the commiſſary, who judges in civil and criminal matters, and is joined in commiſſion with the capitaneos; both he and the phyſician muſt be foreigners, and both have their ſalaries out of the public ſtock. When any perſon, after due ſummons, neglects to aſſiſt at the council according to their ſtatute-book, he is to be fined in about a penny Engliſh; and when an ambaſſador is to be ſent to any foreign ſtate, he is to be allowed about 1s. a-day.

MARINO (JOHN BAPTIST), a celebrated Italian poet, born at Naples in 1569. His father, who was an an able civilian, obliged him to ſtudy the law; at which being diſguſted, he left his parents, and retired to the houſe of the Sieur Manzi, who was a friend to all perſons of wit. He at length became ſecretary to Matthew of Capua, great admiral of the kingdom of Naples, and contracted a friendſhip with Taſſo. A ſhort time after, he went to Rome, and entered into the ſervice of cardinal Aldobrandini, nephew to pope Clement VIII. who took him with him to Savoy. Marino was in great favour with the court of Turin; but afterwards created himſelf many enemies there, the moſt furious of whom was the poet Gaſpard

Murtola, who, attempting to ſhoot him with a piſtol, wounded one of the duke of Savoy's favourites. Marino being obliged to leave Turin, went to Paris at the deſire of queen Mary de Medicis, and publiſhed there his poem on Adonis. He afterwards went to Rome, where he was made prince of the academy of the humoriſti; from thence to Naples, where he died while he was preparing to return home. He had a very lively imagination, but little judgment; and, giving way to the points and conceits then in vogue, his authority, far from correcting the falſe taſte of the Italians, ſerved rather to keep it farther from reformation. His works, which are numerous, have been often printed.

MARINUS, an engraver who flouriſhed about the year 1630, and reſided principally at Antwerp. His plates, Mr. Strutt obſerves, are executed in a very ſingular ſtyle, with the graver only: the ſtrokes are very fine and delicate, and croſſed over each other in a lozenge-like form, which he filled up with thin long dots. His prints, though generally very neat, want the ſtyle of the maſter in the determination of the folds of the draperies and the outline of the human figure; the extremities of which are heavy, and not marked with preciſion. Fine impreſſions from his beſt plates are, however, much ſought after by collectors; thoſe eſpecially after Rubens and Jordaens are held in very high eſtimation.

MARIONIS, (anc. geog.) a town of Germany: now Hamburg, a famous trading city on the Elbe, in Lower Saxony, in the duchy of Holſtein. Another Marionis (Ptolemy,) thought to be Wiſmar, a town of Lower Saxony, in the duchy of Mecklenburg.

MARIOTTE (Edme), an eminent phyſician and mathematician, was born in Burgundy, and was made a member of the academy of ſciences. He died in 1684. His works, which are much eſteemed, were printed at Leyden in 1717, 2 vols. 4to.

MARJORAM, in botany. See Origanum.

MARITAGIUM, in the feudal cuſtoms, *maritagium* (as contradiſtinguiſhed from *matrimonium*), ſignifies the power which the lord or guardian in chivalry had of diſpoſing of his infant ward in matrimony. For while the infant was in ward, the guardian had the power of tendering him or her a ſuitable match without diſparagement or inequality: which if the infants refuſed, they forfeited the value of their marriage, *valorem maritagii*, to their guardian; that is, ſo much as a jury would aſſeſs, or any one would *bona fide* give to the guardian for ſuch an alliance: and if the infants married themſelves without the guardian's conſent, they forfeited double the value, *duplicem valorem maritagii*.

MARITIME, ſomething relating to, or bounded by, the ſea. Thus a maritime province or country is one bounded by the ſea; and a maritime kingdom is one that makes a conſiderable figure, or that is very powerful at ſea. Hence, by *maritime* powers among the European ſtates, are underſtood Great Britain and Holland.

Maritime *State*, in Britiſh polity, one of the three general diviſions of the laity: (See Laity) This ſtate is nearly connected with the military; though much more agreeable to the principles of our free conſtitution. The royal navy of England hath ever been its greateſt defence and ornament; it is its ancient and natural ſtrength; the floating bulwark of the iſland; an army from which, however ſtrong and powerful, no danger can ever be apprehended to liberty: and accordingly it has been aſſiduouſly cultivated from the earlieſt ages. To ſo much perfection was our naval reputation arrived in the 12th century, that the code of maritime laws, which are called the *laws of Oleron*, and are received by all nations in Europe as the ground and ſubſtruction of all their marine conſtitutions, was confeſſedly compiled by our king Richard I. at the iſle of Oleron on the coaſt of France, then part of the poſſeſſions of the crown of England. And yet ſo vaſtly inferior were our anceſtors in this point to the preſent age, that even in the maritime reign of queen Elizabeth, Sir Edward Coke thinks it matter of boaſt, that the royal navy of England then conſiſted of *three-and-thirty* ſhips. The preſent condition of our marine is in great meaſure owing to the ſalutary proviſions of the ſtatutes called the *navigation acts*; whereby the conſtant increaſe of Engliſh ſhipping and ſeamen was not only encouraged, but rendered unavoidably neceſſary. By the ſtatute 5 Richard II. c. 3. in order to augment the navy of England, then greatly diminiſhed, it was ordained, that none of the king's liege people ſhould ſhip any merchandize out of or into the realm, but only in ſhips of the king's ligeance, on pain of forfeiture. In the next year, by ſtatute 6 Ric. II. c. 8. this wiſe proviſion was enervated, by only obliging the merchants to give Engliſh ſhips (if able and ſufficient) the preference. But the moſt beneficial ſtatute for the trade and commerce of theſe kingdoms is that navigation-act, the rudiments of which were firſt framed in 1650, with a narrow partial view; being intended to mortify our own ſugar iſlands, which were diſaffected to the parliament, and ſtill held out for Charles II. by ſtopping the gainful trade which they then carried on with the Dutch, and at the ſame time to clip the wings of thoſe our opulent and aſpiring neighbours. This prohibited all ſhips of foreign nations from trading with any Engliſh plantations, without licence from the council of ſtate. In 1651, the prohibition was extended alſo to the mother-country: and no goods were ſuffered to be imported into England, or any of its dependencies, in any other than Engliſh bottoms; or in the ſhips of that European nation of which the merchandize imported was the genuine growth or manufacture. At the Reſtoration, the former proviſions were continued, by ſtat. 12 Car. II. c. 18. with this very material improvement, that the maſter and three-fourths of the mariners ſhall alſo be Engliſh ſubjects.

Many laws have been made for the ſupply of the royal navy with ſeamen; for their regulation when on board; and to confer privileges and rewards on them during and after their ſervice.

1. For their ſupply. The principal, but the moſt odious, though often neceſſary method for this purpoſe, is by impreſſing; ſee Impressing. But there are other ways that tend to the increaſe of ſeamen, and manning the royal navy. Pariſhes may bind out poor boys apprentices to the maſters of merchantmen, who ſhall be protected from impreſſing for the firſt three years; and if they are impreſſed afterwards, the maſters ſhall be allowed their wages: great advantages in point of wages are given to volunteer ſeamen, in order to induce them to enter into his majeſty's ſervice: and every foreign ſeaman, who, during a war, ſhall ſerve two years in any man of war, merchantman, or privateer, is naturalized *ipſo facto*. About the middle of king William's reign, a ſcheme was ſet on foot for a regiſter of ſeamen to the number of 30,000, for a conſtant and regular ſupply of the king's fleet; with great privileges to the regiſtered men; and, on the other hand, heavy penalties in caſe of their non-appearance when called for: but this regiſtry, being judged to be rather a badge of ſlavery, was aboliſhed by ſtat. 9 Ann. c. 21.

2. The method of ordering ſeamen in the royal fleet, and keeping up a regular diſcipline there, is directed by certain expreſs rules, articles, and orders, firſt enacted by the authority of parliament ſoon after the Reſtoration; but ſince new-modelled and altered, after the peace of Aix-la Chapelle, to remedy ſome defects which were of fatal conſequence in conducting the preceding war. In theſe articles of the navy almoſt every poſſible offence is ſet down, and the puniſhment thereof annexed: in which reſpect the ſeamen have much the advantage over their brethren in the land-ſervice; whoſe articles of war are not enacted by parliament, but framed from time to

time at the pleaſure of the crown. Yet from whence this diſtinction aroſe, and why the executive power, which is limited ſo properly with regard to the navy, ſhould be ſo extenſive with regard to the army, it is hard to aſſign a reaſon; unleſs it proceeded from the perpetual eſtabliſhment of the navy, which rendered a permanent law for their regulation expedient, and the temporary duration of the army, which ſubſiſted only from year to year, and might therefore with leſs danger be ſubjected to diſcretionary government. But, whatever was apprehended at the firſt formation of the mutiny-act, the regular renewal of our ſtanding force at the entrance of every year has made this diſtinction idle. For, if from experience paſt we may judge of future events, the army is now laſtingly ingrafted into the Britiſh conſtitution; with this ſingularly fortunate circumſtance, that any branch of the legiſlature may annually put an end to its legal exiſtence, by refuſing to concur in its continuance.

3. With regard to the privileges conferred on ſailors, they are pretty much the ſame with thoſe conferred on ſoldiers, with regard to relief, when maimed, or wounded, or ſuperannuated, either by county-rates, or the royal hoſpital at Greenwich; with regard alſo to the exerciſe of trades, and the power of making nuncupative teſtaments: and, farther, no ſeaman aboard his majeſty's ſhips can be arreſted for any debt, unleſs the ſame be ſworn to amount to at leaſt twenty pounds; though, by the annual mutiny acts, a ſoldier may be arreſted for a debt which extends to half that value, but not to a leſs amount.

MARIUS, the famous Roman general, and ſeven times conſul, who ſullied his great military reputation by ſavage barbarities. He was born at Arpinum, of obſcure and illiterate parents. He forſook the meaner occupations of the country for the camp; and ſignalized himſelf under Scipio, at the ſiege of Numantia. The Roman general ſaw the courage and intrepidity of young Marius, and foretold the æra of his future greatneſs. By his ſeditions and intrigues at Rome, while he exerciſed the inferior offices of the ſtate, he rendered himſelf known; and his marriage with Julia, who was of the family of the Cæſars, contributed in ſome manner to raiſe him to conſequence. He paſſed into Africa as lieutenant to the conſul Metellus againſt Jugurtha; and after he had there ingratiated himſelf with the ſoldiers, and raiſed enemies to his friend and benefactor, he returned to Rome and canvaſſed for the conſulſhip. The extravagant promiſes he made to the people, and his malevolent inſinuations about the conduct of Metellus, proved ſucceſsful. He was elected, and appointed to finiſh the war againſt Jugurtha. He ſhowed himſelf capable in every degree to ſucceed to Metellus. Jugurtha was defeated, and afterwards betrayed into the hands of the Romans by the perfidy of Bocchus. No ſooner was Jugurtha conquered, than new honours and freſh trophies awaited Marius. The provinces of Rome were ſuddenly invaded by an army of 300,000 barbarians, and Marius was the only man whoſe activity and boldneſs could reſiſt ſo powerful an enemy. He was elected conſul, and ſent againſt the Teutones. The war was prolonged, and Marius was a third and fourth time inveſted with the conſulſhip. At laſt two engagements were fought, and not leſs than 200,000 of the barbarian forces of the Ambrones and Teutones were ſlain in the field of battle, and 90,000 made priſoners. The following year, A. U. C. 651, was alſo marked by a total overthrow of the Cimbri, another horde of barbarians; in which 140,060 were ſlaughtered by the Romans, and 60,000 taken priſoners. After ſuch honourable victories, Marius with his colleague Catullus entered Rome in triumph; and for his eminent ſervices he received the appellation of the *third founder of Rome*. He was elected conſul a ſixth time; and as his intrepidity had delivered his country from its foreign enemies, he ſought employment at home, and his reſtleſs ambition began to raiſe ſeditions, and to oppoſe the power of Sylla. This was the foundation of a civil war. Sylla refuſed to deliver up the command of his forces, with which he was empowered to proſecute the Mithridatic war; and he reſolved to oppoſe in perſon the authors of a demand which he conſidered as arbitrary and improper. He advanced to Rome, and Marius was obliged to ſave his life by flight. The unfavourable winds prevented him from ſeeking a ſafer retreat in Africa, and he was left on the coaſt of Campania, where the emiſſaries of his enemy ſoon diſcovered him in a marſh, where he had plunged himſelf in the mud, and left only his mouth above the ſurface for reſpiration. He was violently dragged to the neighbouring town of Minturnæ; and the magiſtrates, all devoted to the intereſt of Sylla, paſſed ſentence of immediate death on their magnanimous priſoner. A Gaul was commanded to cut off his head in the dungeon; but the ſtern countenance of Marius diſarmed the courage of the executioner: and when he heard the exclamation of *Tune, homo, audes occidere Cajum Marium?* the dagger dropped from his hand. Such an uncommon adventure moved the compaſſion of the inhabitants of Minturnæ. They releaſed Marius from priſon; and favoured his eſcape to Africa, where he joined his ſon Marius, who had been arming the princes of that country in his cauſe. Marius landed near the walls of Carthage, and he received no ſmall conſolation at the ſight of the venerable ruins of a once powerful city, which like himſelf had been expoſed to calamity, and felt the cruel viciſſitude of fortune. This place of his retreat was ſoon known; and the governor of Africa, to conciliate the favour of Sylla, compelled Marius to fly to a neighbouring iſland. He ſoon after learned that Cinna had embraced his cauſe at Rome, when the Roman ſenate had ſtripped him of his conſular dignity, and beſtowed it upon one of his enemies. This intelligence animated Marius; he ſet ſail to aſſiſt his friend only at the head of 1000 men. His army, however, was ſoon increaſed, and he entered Rome like a conqueror. His enemies were inhumanly ſacrificed to his fury; Rome was filled with blood; and he, who once had been called the father of his country, marched through the ſtreets of the city, attended by a number of aſſaſſins, who immediately ſlaughtered all thoſe whoſe ſalutations were not anſwered by their leader. Such were the ſignals for bloodſhed. When Marius and Cinna had ſufficiently gratified their reſentment, they made themſelves conſuls; but Marius, already worn out with old age and infirmities, died ſixteen days after he had been honoured with the conſular dignity for the ſeventh time, A. U. C. 666. Such was the end of Marius, who rendered himſelf conſpicuous by his victories and by his cruelty. As he was brought up in poverty and among peaſants, it will not appear wonderful that he always betrayed ruſticity in his behaviour, and deſpiſed in others thoſe poliſhed manners and that ſtudied addreſs which education had denied him. He hated the converſation of the learned only becauſe he was illiterate; and if he appeared an example of ſobriety and temperance, he owed theſe advantages to the years of obſcurity which he paſſed at Arpinum. His countenance was ſtern, his voice firm and imperious, and his diſpoſition untractable. He was in the 70th year of his age when he died; and Rome ſeemed to rejoice at the fall of a man whoſe ambition had proved ſo fatal to many of her citizens. His only qualifications were thoſe of a great general; and with theſe he rendered himſelf the moſt illuſtrious and powerful of the Romans, becauſe he was the only one whoſe ferocity ſeemed capable to oppoſe the barbarians of the north.

C. Marius, the ſon of the great Marius, was as cruel as his father, and ſhared his good and his adverſe fortune. He made himſelf conſul in the 25th year of his age, and murdered all the ſenators who oppoſed his ambitious views. He was defeated by Sylla, and fled to Prænesſte, where he killed himſelf.

MARIUS (M. Aurelius), a native of Gaul; who, from the mean employment of a blackſmith, became one of the generals of Gallienus, and at laſt cauſed himſelf to be ſaluted emperor. Three days after this elevation, a man who had ſhared his poverty without partaking of his more proſperous fortune, publicly aſſaſſinated him, and he was killed by a ſword which he himſelf had made in the time of his obſcurity. Marius has been often celebrated for his great ſtrength; and it is confidently reported, that he could ſtop, with one of his fingers only, the wheel of a chariot in its moſt rapid courſe.

MARIUS (Maximus), a Latin writer, who publiſhed an account of the Roman emperors from Trajan to Alexander, now loſt. His compoſitions were entertaining, and executed with great exactneſs and fidelity. Some have accuſed him of inattention, and complain that his writings abounded with many fabulous and inſignificant ſtories.

MARIVAUX (PETER CARLET DE), a French writer in the dramatic way and in romance, was born of a good family at Paris in 1688. A fine underſtanding, well improved by education, diſtinguiſhed him early. His firſt object was the theatre, where he met with the higheſt ſucceſs in comic productions; and theſe, with the merit of his other works, procured him a place in the French academy. The great characteriſtic of both his comedies and romance was, to convey an uſeful moral under the veil of wit and ſentiment: "My only object (ſays he) is to make men more juſt and more humane;" and he was as amiable in his life and converſation as he was in his writings. He died at Paris in 1763, aged 75. His works conſiſt of, 1. *Pieces de Theatre*, 4 vols. 12mo. 2. *Homere traveſti*, 12mo; which is not ſuppoſed to have done much honour to his taſte. 3. *Le Spectateur François*, 2 vols. 12mo. 4. *Le Philoſophe Indigent*, 12mo. 5. *Vie de Marianne*, 2 vols. 12mo; one of the beſt romances in the French language. 6. *Le Payſan Parvenu*, 12mo. 7. *Pharſamon*; inferior to the former.

MARK (ST.) was by birth a Jew, and deſcended of the tribe of Levi. He was converted by ſome of the apoſtles, probably by St. Peter; to whom he was a conſtant companion in all his travels, ſupplying the place of an amanuenſis and interpreter. He was by St. Peter ſent into Egypt, fixing his chief reſidence at Alexandria, and the places thereabout: where he was ſo ſucceſsful in his miniſtry, that he converted multitudes both of men and women. He afterwards removed weſtward, towards the parts of Libya, going through the countries of Marmorica, Pentapolis, and others thereabouts; where, notwithſtanding the barbarity and idolatry of the inhabitants, he planted the goſpel. Upon his return to Alexandria, he ordered the affairs of that church, and there ſuffered martyrdom in the following manner: About Eaſter, at the time the ſolemnities of Serapis were celebrated, the idolatrous people, being excited to vindicate the honour of their deity, broke in upon St. Mark, while he was performing divine ſervice, and, binding him with cords, dragged him through the ſtreets, and thruſt him into priſon, where in the night he had the comfort of a divine viſion. Next day the enraged multitude uſed him in the ſame manner, till, his ſpirits failing, he expired under their hand. Some add, that they burnt his body, and that the Chriſtians decently interred his bones and aſhes near the place where he uſed to preach. This happened in the year of Chriſt 68. Some writers aſſert, that the remains of St. Mark were afterwards, with great pomp, tranſlated from Alexandria to Venice. However, he is the tutelar ſaint and patron of that republic, and has a very rich and ſtately church erected to his memory. This apoſtle is author of one of the four goſpels inſcribed with his name. See the following article.

ST. MARK'S *Goſpel*, a canonical book of the New Teſtament, being one of the four goſpels. St. Mark wrote his goſpel at Rome, where he accompanied St. Peter in the year of Chriſt 44. Tertullian and others pretend, that St. Mark was no more than an amanuenſis to St. Peter, who dictated this goſpel to him; others affirm, that he wrote it after St. Peter's death. Nor are the learned leſs divided as to the language it was wrote in; ſome affirming that it was compoſed in Greek, others in Latin. Several of the ancient heretics received only the goſpel of St. Mark: others, among the Catholics, rejected the 12 laſt verſes of this goſpel. The goſpel of St. Mark is properly an abridgement of that of St. Matthew.

St. MARK *the Evangeliſt's Day*, a feſtival of the Chriſtian church, obſerved April 25.

Canons of St. MARK, a congregation of regular canons founded at Mantua, by Albert Spinola a prieſt, towards the end of the 12th century. Spinola made a rule for them, which was approved, corrected, and confirmed by ſeveral ſucceeding popes. About the year 1450 they were reformed, and followed only the rule of St. Auguſtine. This congregation having flouriſhed by the ſpace of 400 years, declined by little and little, and is now become extinct.

Knights of St. MARK, an order of knighthood in the republic of Venice, under the protection of St. Mark the evangeliſt. The arms of the order are, gules, a lion winged or; with this device, PAX TIBI, MARCE EVANGELISTA. This order is never conferred but on thoſe who have done ſignal ſervice to the commonwealth.

MARK, or *Marc*, in commerce, denotes a weight uſed in ſeveral ſtates of Europe, and for ſeveral commodities, eſpecially gold and ſilver. In France, the mark is divided into eight ounces, 64 drachms, 192 deniers or penny-weights, 160 eſterlines, 300 maills, 640 ſelins, or 4608 grains. In Holland, the mark weight is alſo called *Troy-weight*, and is equal to that of France. When gold and ſilver are ſold by the mark, it is divided into 25 carats.

MARK is alſo uſed among us for a money of account, and in ſome other countries for a coin. See MONEY. The Engliſh mark is two thirds of a pound ſterling, or 13s. 4d. and the Scotch mark is of equal value in Scots money of account, viz. 13⅓d.

MARKET, a public place in a city or town, in which live-cattle, proviſions, or other goods, are ſet to ſale; and alſo a privilege, either by grant or preſcription, by which a town is enabled to keep a market.

Court of the Clerk of the MARKET, is incident to every fair and market in the kingdom, to puniſh miſdemeanors therein; and a court of *pie poudre* is to determine all diſputes relating to private or civil property. The object of this juriſdiction (ſee ſtat. 17 Car. II. cap. 19. 22 Car. II. cap. 8. 23 Car. II. cap. 12.) is principally the cognizance of weights and meaſures; to try whether they be according to the true ſtandard thereof or no: which ſtandard was anciently committed to the cuſtody of the biſhop, who appointed ſome clerk under him to inſpect the abuſe of them more narrowly; and hence this officer, though now uſually a layman, is called the clerk of the market. If they be not according to the ſtandard, then, beſide the puniſhment of the party by fine, the weights and meaſures themſelves ought to be burnt. This is the loweſt court of criminal juriſdiction in the kingdom.

MARKHAM (GERVASE), an Engliſh author, was the ſon of Robert Markham of Gotham, Eſq. in Nottinghamſhire, and bore a captain's commiſſion under Charles I. in the civil wars. He was eſteemed both a good ſoldier and a good ſcholar. He was particularly maſter of the French, Italian, and Spaniſh. He wrote, 1. The tragedy of Herod and Antipater, which was printed in 1622. 2. Many volumes upon huſbandry and horſemanſhip. 3. A piece on the art of fowling. 4. The ſoldier's accidence and grammar.

MARKLAND (Jeremiah), one of the moſt learned ſcholars and penetrating critics of the age, was born in 1692, and received his education in Chriſt's hoſpital. He became firſt publicly known by his *Epiſtola Critica*, addreſſed to biſhop Hare. In this he gave many proofs of extenſive erudition and critical ſagacity. He afterwards publiſhed an edition of Statius, and ſome plays of Euripides; and aſſiſted Dr. Taylor in his editions of Lyſias and Demoſthenes, by the notes which he communicated to him. He has alſo very happily elucidated ſome paſſages in the New Teſtament, which may be found in Mr. Bowyer's edition of it; and was author of a very valuable volume of remarks on the epiſtles of Cicero to Brutus, and of an excellent little treatiſe under the title of *Quæſtio Grammatica*. He died in 1775, at Milton, near Dorking in Surry; and was a man not more valued for his univerſal reading than beloved for the excellency of his heart and primitive ſimplicity of manners.

MARLBOROUGH, a town of Wiltſhire in England, ſituated near the ſource of the Kennet, at the foot of a chalky hill, 75 miles from London. It has its name from its chalky ſoil, which was formerly called *marle*. It was a Roman ſtation. In the year 1627, a parliament was held in the caſtle here, which made thoſe laws called *Marlborough ſtatutes*. There are ſtill ſome ſmall remains of its walls and ditch. The town, which is an ancient borough by preſcription, ſends two members to parliament. It is governed by a mayor, 7 juſtices, 12 aldermen, 24 burgeſſes, a town-clerk, 2 bailiffs, 10 ſerjeants at mace, &c. It conſiſts chiefly of one broad ſtreet, with piazzas all along one ſide of it, two pariſh churches, and ſeveral commodious inns, it being the grand thoroughfare from London to Bath and Briſtol. To the ſouth are ſome relics of a priory, particularly the Gate-houſe, and the ſite of a Roman Caſtrum, the foundations of which have been diſcovered there, with Roman coins. The ditch is ſtill in ſome parts 20 feet wide; and towards the river, without the garden walls, one angle of the Caſtrum is very viſible, with the rampart and ditch entire. The mount at the weſt end of the town, which was the keep or main-guard of the caſtle, is converted into a pretty ſpiral walk; at the top of which is an octagon ſummer-houſe. This town has often ſuffered by fire, particularly in 1690, whereupon the parliament paſſed an act to prevent its houſes from being thatched. The markets here are Wedneſdays and Saturdays; and it has five fairs. Here is a charity-ſchool, which was erected in 1712, for 44 children.

Marlborough (duke of). See Churchill.

Marlborough-*Fort*, an Engliſh factory on the weſt coaſt of the iſland of Sumatra in Aſia; ſeated three miles weſt of the town of Bencoolen. E. lon. 101. 12. S. lat. 4. 21.

MARLE, a kind of calcareous earth, very much uſed in agriculture as a manure. See Husbandry. Marle is dug in many places of Great Britain and Ireland. In digging for it in Ireland, they meet with horns and other curious foſſils. The marle always lies in the bottoms of low bogs, and is found by boring with augurs made for that purpoſe. It uſually lies at five, ſeven, or nine feet depth. The obtaining it in many places is attended with very conſiderable expence in draining off the water. The manner of digging it is this: They employ ſix able labourers and a ſupernumerary; and theſe cut up a hole of 12 feet ſquare, which is ſuppoſed a pit that this number of men can manage in one day. Two men dig, two throw it up, and two throw it by, and the ſupernumerary man ſupplies defects on all occaſions. For the firſt three feet they dig through a fuzzy earth, fit for making turf or fuel. Under this lies a ſtratum of gravel, of about half a foot; under this often, for three feet more, there is a more kindly moſs, which would make better fuel. This lower ſtratum is always full of foſſil wood, which is uſually ſo ſoft that the ſpade cuts as eaſily through it as through the earth it lies in. Under this, for the thickneſs of about three inches, is found a ſeries of leaves, principally of the oak. Theſe appear very fair to the eye, but fall to pieces on being touched; and this ſtratum is ſometimes interrupted by vaſt heaps of ſeed, which ſeem to be broom or furze ſeed. In ſome places there appear berries of different kinds, and in others ſeveral ſpecies of ſea-plants; all lying in the ſame confuſed manner as the oak leaves. Under this vegetable ſtratum there lies one of blue clay, half a foot thick, and uſually full of ſea-ſhells. This blue clay is not ſo tough as common clay; but is thrown carefully up, and uſed as marle in ſome places. Under this always appears the true marle; the ſtratum of which is uſually from two to four feet thick, and ſometimes much more.—This marle looks like buried lime, and is full of ſhells, which are uſually of a ſmall ſize, and of the periwinkle kind; but there are ſeveral other ſorts at times found among them. Among this marle, and often at the very bottom of it, are found great numbers of very large horns of the deer kind, which are vulgarly called *elk's horns*. Theſe, where they join to the head, are thick and round; and at that joining there grows out a branch, which is about a foot long, and ſeems to have hung juſt over the creature's eyes: it grows ſtill round for about a foot above this; and then ſpreads out broad, and terminates in branches long and round, terminating with a ſmall bend. The labourers are obliged to work in a hurry in all theſe pits, ſo that they ſeldom bring out the horns whole. There are alſo, at times, found the leg-bones and other parts of the ſkeletons of the ſame beaſts; but this more rarely, only a few together, and but in few places.

Dr. Black is of opinion, that all kinds of marle derive their origin from the calcareous matter of ſhells and lythophyta.

Shell-marle, ſays he, is compoſed of the ſhells of aquatic animals, which are ſometimes very entire, and often decayed or mixed down with other earthy ſubſtances. Examining this matter as occurring in different places, it may be diſtinguiſhed into freſh water marle, and the marle of ſea-ſhells. Of the firſt an example exiſts in the Meadow at Edinburgh. Wherever the ſoil is turned up to the depth of ſix inches, a quantity appears. It is compoſed of the ſhells of a ſmall freſh-water ſnail or welk. This animal, when alive, is not eaſily diſcernible, the ſhell being much of the ſame obſcure colour as the ſtones covered with the water. But we can obſerve a great number of them in all running brooks and other collections of freſh water; and as the animal dies, the ſhells are depoſited where the water ſtagnates in very great quantity. That compoſed of ſea ſhells conſtitutes greater collections, that are found in innumerable places now far removed from the ſea. That moſt particularly deſcribed by Reaumur is a collection of this kind in a province of France, and at Turin. That part of the country where it is found is computed to contain 80 ſquare miles of ſurface; and wherever they dig to a certain depth, they find this collection of ſhells: the country at preſent is 108 miles from the ſea. They find the marle eight or nine feet below the ſurface, and they dig it to the depth of 20 feet. It is ſtill deeper, but they find it too expenſive to ſearch for it. He ſuppoſes it to be only 18 feet deep; and even at this depth the quantity will appear enormous. It will amount to 140 millions of cubic fathoms of ſhells that are moſtly decayed and broken into fragments, and mixed with other marine productions, as millipores, madripores, and other coralline bodies, which are all productions of the ſea.

MARLI, a village of France, between Verſailles and St. Germain, near a foreſt of the ſame name. Here was a royal palace, noted for its fine gardens and water-works, there being a curious machine on the Seine, which not only ſupplied them with water, but alſo thoſe of Verſailles. It is ten miles north-weſt of Paris.

MARLINE, in ſea affairs, are tarred white ſkains, or long

wreaths or lines of untwiſted hemp, dipped in pitch or tar, with which cables or other ropes are wrapped round, to prevent their fretting or rubbing in the blocks or pulleys through which they paſs. The ſame ſerves in artillery upon ropes uſed for rigging gins, uſually put up in ſmall parcels called *ſkains*.

MARLOE (Christopher), an Engliſh dramatic author, was a ſtudent in the univerſity of Cambridge; but afterwards turning player, he trode the ſame ſtage with the inimitable Shakeſpeare. He was accounted an excellent poet even by Ben Jonſon himſelf. He wrote ſix tragedies, one of which called *Luſt's Dominion*, or the *Laſcivious Queen*, has been altered by Mrs Behn and acted under the title of *Abdelazar*, or the *Moor's Revenge*. Some time before his death, he had made a conſiderable progreſs in an excellent poem entitled *Hero* and *Leander*; which was afterwards finiſhed by George Chapman, who is ſaid to have fallen ſhort of the ſpirit and invention diſcovered by Marloe. Mr. Anthony Wood repreſents him as a free-thinker, in the worſt ſenſe of the word; and gives the following account of his death: Falling deeply in love with a low girl, and having for his rival a fellow in livery, Marloe, imagining that his miſtreſs granted him favours, was fired with jealouſy, and ruſhed upon him in order to ſtab him with his dagger; but the footman avoided the ſtroke, and, ſeizing his wriſt, ſtabbed him with his own weapon; of which wound he died, in the year 1593.

MARLOW, a town in the county of Buckingham, 31 miles from London, lies under the Chiltern Hills, in a marley ſoil. It is a pretty large borough, though not incorporated, with a bridge over the Thames, not far from its conflux with Wycomb, and has a handſome church and town-hall, with a charity-ſchool for 20 boys, who are taught and clothed. It firſt ſent members to parliament in the reign of Edward II. Bone lace is its chief manufacture. The Thames brings goods hither from the neighbouring towns, eſpecially great quantities of meal and malt from High-Wycomb, and beech from ſeveral parts of the county, which abounds with this wood more than any in England. In the neighbourhood are frequent horſe-races; and here are ſeveral corn and paper-mills, particularly on the river Loddon, between this town and High-Wycomb. There are, beſides, the Temple-mills, for making thimbles, and another for preſſing oil from rape and flax ſeeds. Its market is on Saturday, and fair October 29.

MARMANDE, a town of France, in the department of Lot and Garonne, and late province of Guienne. It carries on a great trade in corn, wine, and brandy. It is ſeated on the Garonne, 40 miles ſouth-eaſt of Bourdeaux, and 300 S. by W. of Paris. E. lon. 0. 15. N. lat. 44. 20.

MARMALADE, a confection of plums, apricots, quinces, &c. boiled up to a conſiſtence with ſugar. In Scotland, it is made of Seville oranges and ſugar only.

MARMOR. See Marble.

MARMORA, the name of four iſlands of Aſia, in the ſea of the ſame name. The largeſt is about 30 miles in circumference; and the ſoil of them all produces corn, wine, and fruits. The ſea of Marmora is a large gulph, which communicates both with the Archipelago and the Black Sea by that of Conſtantinople, being 120 miles in length and 50 in breadth; and all ſhips muſt paſs through it that ſail to Conſtantinople from the Mediterranean. It was anciently the *Propontis*.

MARMORICA, a country of Africa anciently inhabited by the Libyans. It was bounded on the eaſt by Egypt, on the weſt by Cyrenaica, on the ſouth by Sahara, or the deſert of Libya Interior, and on the north by the Mediterranean; and was reckoned a part of Egypt. There is no diſtinct hiſtory of the country.

MAROBUDUM (anc. geog.), the royal reſidence of Marobuduus, king of the Marcomanni; and hence the appellation. Now thought to be *Prague*, the capital of Bohemia.

MAROLLES (Michel de), born in 1600, was the ſon of Claude de Marolles, whom French memoirs make a military hero. Michel, however, was of a different compoſition. He entered early into the eccleſiaſtical ſtate, and by the intereſt of his father obtained two abbeys. He was formed with an extreme ardour for ſtudy, which never abated all his life long: for, from 1619 when he publiſhed a tranſlation of Lucan, to 1681 the year of his death, he was conſtantly employed in writing and printing. He attached himſelf unfortunately to the tranſlating of ancient Latin writers: but, being devoid of all claſſical taſte and ſpirit, they ſunk miſerably under his hands, the poets eſpecially. He was certainly, however, a man of great learning, and diſcovered all his life a love for the arts. He was one of the firſt who paid any attention to prints; and collected about 100,000, which make at this day one of the ornaments of the late French king's cabinet. He compoſed memoirs of his own life, which were publiſhed by the Abbé Goujet, 1755, in 3 vols. They contain, like ſuch ſort of things, ſome intereſting facts, but an infinity of minute and inſipid nothings.

MARONITES, in eccleſiaſtical hiſtory, a ſect of eaſtern Chriſtians, who follow the Syrian rite, and are ſubject to the Pope; their principal habitation being on mount Libanus. Moſheim informs us, that the doctrine of the Monothelites, condemned and exploded by the council of Conſtantinople, found a place of refuge among the Mardaites, a people who inhabited the mounts Libanus and Antilibanus, and who, about the concluſion of the ſeventh century, were called *Maronites*, after *Maro* their firſt biſhop; a name which they ſtill retain. None (he ſays) of the ancient writers give any certain account of the firſt perſon who inſtructed theſe mountaineers in the doctrine of the Monothelites: it is probable, however, from ſeveral circumſtances, that it was John Maro, whoſe name they had adopted; and that this eccleſiaſtic received the name of Maro from his having lived in the character of a monk in the famous convent of St. Maro, upon the borders of the Orontes, before his ſettlement among the Mardaites of mount Libanus. One thing is certain, from the teſtimony of Tyrius and other unexceptionable witneſſes, as alſo from the moſt authentic records, viz. that the Maronites retained the opinions of the Monothelites until the 12th century, when, abandoning and renouncing the doctrine of one will in Chriſt, they were readmitted in the year 1182 to the communion of the Roman church. The moſt learned of the modern Maronites have left no method unemployed to defend their church againſt this accuſation; they have laboured to prove, by a variety of teſtimonies, that their anceſtors always perſevered in the Catholic faith, in their attachment to the Roman pontiff, without ever adopting the doctrine of the Monophyſites, or Monothelites. But all their efforts are inſufficient to prove the truth of theſe aſſertions to ſuch as have any acquaintance with the hiſtory of the church and the records of ancient times; for to all ſuch the teſtimonies they allege will appear abſolutely fictitious and deſtitute of authority.

Fauſtus Nairon, a Maronite ſettled at Rome, has publiſhed an apology for Maron and the reſt of his nation. His tenet is, that they really took their name from the Maron who lived about the year 400, and of whom mention is made in Chryſoſtom, Theodoret, and the Menologium of the Greeks. He adds, that the diſciples of this Maron ſpread themſelves throughout all Syria; that they built ſeveral monaſteries, and, among others, one that bore the name of their leader; that all the Syrians who were not tainted with hereſy took refuge among them; and that for this reaſon the heretics of thoſe times called them Maronites.

Moſheim obſerves, that the ſubjection of the Maronites to the ſpiritual juriſdiction of the Roman pontiff was agreed to, with this expreſs condition, that neither the popes nor their emiſſaries ſhould pretend to change or aboliſh any thing that related to the ancient rites, moral precepts, or religious opinions, of this people: ſo that in reality there is nothing to be found among the Maronites that ſavours of popery, if we except their attachment to the Roman pontiff, who is obliged to pay very dear for their friendſhip. For, as the Maronites live in the utmoſt diſtreſs of poverty, under the tyrannical yoke of the Mahometans, the biſhop of Rome is under the neceſſity of furniſhing them with ſuch ſubſidies as may appeaſe their oppreſſors, procure a ſubſiſtence for their biſhop and clergy, provide all things requiſite for the ſupport of their churches and the uninterrupted exerciſe of public worſhip, and contribute in general to leſſen their miſery. It is certain that there are Maronites in Syria, who ſtill behold the church of Rome with the greateſt averſion and abhorrence; nay, what is ſtill more remarkable, great numbers of that nation reſiding in Italy, even under the eye of the pontiff, oppoſed his authority during the laſt century, and threw the court of Rome into great perplexity. One body of theſe non-conforming Maronites retired into the valleys of Piedmont, where they joined the Waldenſes; another, above 600 in number, with a biſhop and ſeveral eccleſiaſtics at their head, fled into Corſica, and implored the protection of the republic of Genoa againſt the violence of the inquiſitors.

The Maronites have a patriarch, who reſides in the monaſtery of Cannubin, on mount Libanus, and aſſumes the title of patriarch of Antioch, and the name of Peter, as if he ſeemed deſirous of being conſidered as the ſucceſſor of that apoſtle. He is elected by the clergy and the people, according to the ancient cuſtom; but, ſince their re-union with the church of Rome, he is obliged to have a bull of confirmation from the pope. He keeps a perpetual celibacy, as well as the reſt of the biſhops his ſuffragans: as to the reſt of the eccleſiaſtics, they are allowed to marry before ordination; and yet the monaſtic life is in great eſteem among them. Their monks are of the order of St. Antony, and live in the moſt obſcure places in the mountains, far from the commerce of the world.

As to their faith, they agree in the main with the reſt of the eaſtern church. Their prieſts do not ſay maſs ſingly, but all ſay it together, ſtanding round the altar. They communicate in unleavened bread; and the laity have hitherto partaken in both kinds, though the practice of communicating in one has of late been getting footing, having been introduced by little and little. In Lent they eat nothing, unleſs it be two or three hours before ſun-riſing: their other faſtings are very numerous.

To MAROON, to put one or more ſailors aſhore upon a deſolate iſland, under pretence of their having committed ſome great crime. This deteſtable expedient has been repeatedly practiſed by ſome inhuman commanders of merchant-ſhips, particularly in the Weſt Indies.

MAROT (Clement), the beſt French poet of his time, was born at Cahors in 1495, and was the ſon of John Marot, valet de chambre to Francis I. and poet to queen Anne of Brittany. He enjoyed his father's place of valet de chambre to Francis I. and was page to Margaret of France, wife to the duke of Alençon. In 1521 he followed that prince into Italy, and was wounded and taken priſoner at the battle of Pavia; but at his return to Paris was accuſed of hereſy, and thrown into priſon, from whence he was delivered by the protection of king Francis I. He at length retired to the queen of Navarre, then to the ducheſs of Ferrara, and in 1536 returned to Paris: but declaring openly for the Calviniſts, he was obliged to fly to Geneva; which he at length left, and, retiring to Piedmont, died at Turin in 1544, aged 50. His verſes are agreeably filled with natural beauties. La Fontaine acknowledged himſelf his diſciple, and contributed greatly to reſtore to vogue the works of this ancient poet. Marot, beſides his other works, has tranſlated part of the Pſalms into verſe, which was continued by Beza, and are ſtill ſung in the Proteſtant churches abroad. *Michael Marot*, his ſon, was alſo the author of ſome verſes; but they are not comparable to thoſe of *John*, and much leſs to thoſe of *Clement Marot*.—The works of the three *Marots* were collected and printed together at the Hague in 1731, in 3 vols. 4to. and in 6 vols. 12mo.

MARPURG, a ſtrong and conſiderable town of Germany, in the Upper Rhine, and in the landgravate of Heſſe-Caſſel, with an univerſity, a caſtle, a palace, a handſome ſquare, and a magnificent town-houſe. It is ſeated on the river Lohn, in a pleaſant country, 15 miles ſouth of Waldeck, and 47 ſouth-weſt of Caſſel. E. lon. 8. 53. N. lat. 50. 42.

Marpurg, a handſome town of Germany, in Lower Styria, ſeated on the river Drave, 25 miles ſouth-weſt of Gratz, and 60 north-eaſt of Laubach. E. lon. 16. 10. N. lat. 46. 42.

MARQUARD (Freher), an eminent German civilian, born at Augſburg in 1565. He ſtudied at Bourges under the learned Cujas, and acquired great ſkill in polite literature, and in the laws. At his return to Germany, he became counſellor to the elector Palatine, and profeſſor of law at Heidelberg; and was afterwards ſent by the elector Frederick IV. as his miniſter, into Poland, to Mentz, and ſeveral other courts. He died at Heidelberg in 1614. He wrote many works which are eſteemed; the principal of which are, 1. *De re monetaria veterum Romanorum, et hodierni apud Germanos imperii.* 2. *Rerum Bohemicarum ſcriptores.* 3. *Rerum Germanicarum ſcriptores.* 4. *Corpus hiſtoriæ Franciæ*, &c.

MARQUE, or *Letters of* Marque, in military affairs, are letters of repriſal, granting the ſubjects of one prince or ſtate liberty to make reprifals on thoſe of another.—They are ſo called from the German *marcke*, "limit, frontier;" as being *jus conceſſum in alterius principis marckas ſeu limites tranſeundi, ſibique jus faciendi*; as being a right of paſſing the limits or frontiers of another prince, and doing one's ſelf juſtice.

Letters of marque, among us, are extraordinary commiſſions granted by authority for reparation to merchants taken and deſpoiled by ſtrangers at ſea; and repriſals is only the retaking, or taking of one thing for another. The form in theſe caſes is, the ſufferer muſt firſt apply to the lord privy-ſeal, and he ſhall make out letters of requeſt under the privy-ſeal; and if, after ſuch requeſt of ſatisfaction made, the party required do not, within convenient time, make due ſatisfaction or reſtitution to the party grieved, the lord-chancellor ſhall make him out letters of marque under the great ſeal; and by virtue of theſe he may attack and ſeize the property of the aggreſſor nation, without hazard of being condemned as a robber or pirate.

MARQUESAS Islands, the name of certain iſlands in the South Sea, lying between 8 and 10 degrees of ſouth latitude, and between 139 and 140 degrees of weſt longitude. They are five in number, viz. La Magdalena, St. Pedro, La Dominica, Santa Chriſtina, and Hood Iſland. All the natives of theſe iſlands may be ſuppoſed to be of the ſame tribe. Thoſe ſpots that are fit for culture are very populous; but as every iſland is very mountainous, and has many inacceſſible and barren rocks, it is to be doubted whether the whole population of this groupe amounts to 50,000 perſons. The Spaniards, who firſt viſited here, found the manners of theſe people gentle and inoffenſive; but theſe qualities did not prevent thoſe who landed from wantonly butchering ſeveral of the natives at Magdalena.

The inhabitants of theſe iſlands collectively, ſays captain Cook, are, without exception, the fineſt race of people in the South Sea. For ſymmetry of ſhape, and regular features, they perhaps ſurpaſs all other nations. Not a ſingle deformed or ill-proportioned perſon was ſeen on the iſland; all were ſtrong, tall, well-limbed, and remarkably active. The men are about five feet ſix or ten inches high; their teeth are not ſo good, nor are their eyes ſo full and lively, as thoſe of many other nations: their hair is of many colours, but none red; ſome have it long; but the moſt general cuſtom is to wear it ſhort, except a bunch on each ſide the crown, which they tie in a knot: their countenances are pleaſing, open, and full of vivacity: they are of a tawny complexion, which is rendered almoſt black by punctures over the whole body. They were entirely naked, except a ſmall piece of cloth round their waiſt and loins. The punctures were diſpoſed with the utmoſt regularity, ſo that the marks on each leg, arm, and cheek, were exactly ſimilar. The women, in two days time, began to appear in conſiderable numbers, and the ſailors found them not leſs kind than thoſe of the other iſlands which they had viſited: they were inferior to the men in ſtature, but well proportioned; their general colour was brown; no punctures were obſerved upon them; they wore a ſingle piece of cloth made of the mulberry bark, which covered them from the ſhoulders to the knees.

The principal head-dreſs uſed in the iſlands, and what appears to be their chief ornament, is a ſort of broad fillet, curiouſly made of the fibres of the huſks of cocoa-nuts; in the front is fixed a mother-of-pearl ſhell, wrought round to the ſize of a tea-ſaucer; before that another ſmaller, of very fine tortoiſe-ſhell, perforated into curious figures; alſo before, and in the centre of that, is another round piece of mother-of-pearl, about the ſize of half a crown; and before this another piece of perforated tortoiſe-ſhell, the ſize of a ſhilling. Beſides this decoration in front, ſome have it alſo on each ſide, but in ſmall pieces; and all have fixed to them the tail feathers of cocks, or tropic birds, which when the fillet is tied on ſtand upright, ſo that the whole together makes a very ſprightly ornament. They wear round the neck a kind of ruff or necklace made of light wood, the outward and upper ſides covered with ſmall peaſe, which are fixed on with gum; they alſo wear ſome bunches of human hair faſtened to a ſtring, and tied round the legs and arms. But all the above ornaments are ſeldom ſeen on the ſame perſon. All theſe ornaments, except the laſt, they freely parted with for a trifling conſideration; but the human hair they valued very highly, though theſe bunches were the uſual reſidence of many vermin. It is probable that theſe were worn in remembrance of their deceaſed relations, and therefore were looked upon with ſome veneration; or they may be the ſpoils of their enemies, worn as the honourable teſtimonies of victory. However, a large nail, or ſomething which ſtruck their eyes, commonly got the better of their ſcruples. The king, or chief of the iſland, came to viſit captain Cook; he was the only one ſeen completely dreſſed in this manner. Their ordinary ornaments are necklaces, and amulets made of ſhells, &c. All of them had their ears pierced, though none were ſeen with ear-rings. The king had not much reſpect paid him by his attendants: he preſented captain Cook with ſome fruit and hogs; and acquainted him that his name was *Honoo*, and that he was *he-ka-ai*, which title ſeems to correſpond with the *arce* of Otaheitee, and *arekee* of the Friendly Iſles. Their dwellings are in the valleys, and on the ſides of the hills near their plantations. They are built in the ſame manner as thoſe at Otaheitee, which will be particularly deſcribed when we ſpeak of that iſland; but they are much meaner, and are only covered with the leaves of the bread-fruit tree: in general, they are built on a ſquare or oblong pavement of ſtone, raiſed ſome height above the level of the ground; they likewiſe have ſuch pavement near their houſes, on which they ſit to eat and amuſe themſelves. Along the uppermoſt edge of the mountain a row of ſtakes or paliſadoes, cloſely connected together, were ſeen like a fortification, in which, by the help of glaſſes, appeared ſomething like huts, which ſeemed to bear a great reſemblance to the hippas of New Zealand, which will be deſcribed in ſpeaking of that country. Their canoes reſemble thoſe of Otaheitee, but not ſo large; their heads had commonly ſome flat upright piece, on which the human face was coarſely carved; and their ſails were made of mats, triangular in ſhape, and very broad at the top: the paddles which they uſed were of heavy hard wood; ſhort, but ſharp-pointed, and with a knob at the upper end; they were from 10 to 20 feet long, and about 15 inches broad.

Their weapons were all made of the club-wood, or caſuarina; and were either plain ſpears about 8 or 10 feet long, or clubs which commonly had a knob at one end. They have alſo ſlings, with which they throw ſtones with great velocity, and to a great diſtance, but not with a good aim.

The language of theſe people is much nearer to that of Otaheitee than any other dialect in the South-Sea, except that they could not pronounce the letter *r*.

The only quadrupeds ſeen here were hogs, except rats: here were fowls, and ſeveral ſmall birds in the woods, whoſe notes were very melodious. The chief difference between the inhabitants of the Marqueſas and thoſe of the Society Iſlands ſeems to conſiſt in their different degrees of cleanlineſs: the former do not bathe two or three times a day, nor waſh their hands and face before and after every meal, as the latter do; and they are beſides very ſlovenly in the manner of preparing their meals. Their diet is chiefly vegetable; though they have hogs and fowls, and catch abundance of fiſh at certain times. Their drink is pure water, cocoa-nuts being ſcarce here.

It was not long before the propenſity of the natives was diſcovered to be rather to receive than give; for, when they had taken a nail as the price of a bread-fruit, the article ſo purchaſed could not be obtained from them. To remove this diſhoneſt diſpoſition, captain Cook ordered a muſket to be fired over their heads, which terrified them into fair dealing.

Soon after the natives had gathered courage enough to venture on board the ſhip, one of them unfortunately ſtole an iron ſtanchion from the gang-way, with which he ſprang into the ſea, and, notwithſtanding its weight, ſwam with it to his canoe, and was making to the ſhore with all ſpeed. A muſket was fired over his head to frighten him back, but to no effect, he ſtill continuing to make off with his booty: the whiſtling of another ball over his head was as ineffectual: an officer, leſs patient of ſuch an injury than reaſon and humanity ſhould have taught him to be, levelled a muſket at the poor fellow, and ſhot him through the head. Captain Cook had given orders to fire *over* the canoe, but not to kill any one; he was in a boat, and came up with the canoe ſoon after. There were two men in her: one ſat bailing out the blood and water in a kind of hyſteric laugh; the other, a youth of about 14 or 15 years of age, who afterwards proved to be the ſon of the deceaſed, fixed his eyes on the dead body with a ſerious and dejected countenance. This act of ſeverity, however, did not eſtrange the iſlanders to the ſhip, and a traffic was carried on to the ſatisfaction of both parties; bread-fruit, bananas, plantains, and ſome hogs, were given in exchange for ſmall nails, knives, and pieces of Amſterdam cloth; red feathers of the Amſterdam Iſland were greatly eſteemed here. Captain Cook, accompanied with the gentlemen of the ſhip, in their walks about the country, lighted on the houſe which had been the habitation of the man who had been ſhot; there they found his ſon, who fled at their approach: they enquired for his female

relations, and were told that they remained at the top of the mountain, to weep and mourn for the dead. Notwithſtanding they were then among the relations of a man who had been killed by them, not the leaſt tokens of animoſity or revenge were diſcernible among the natives.

The weather being extremely hot, the inhabitants made uſe of large fans to cool themſelves, of which great numbers were purchaſed; theſe fans were formed of a kind of tough bark, or graſs, very firmly and curiouſly plaited, and frequently whitened with ſhell-lime. Some had large feathered leaves of a kind of palm, which anſwered the purpoſe of an umbrella.

The natives at length became ſo familiar as to mount the ſides of the ſhip in great numbers. They frequently danced upon deck for the diverſion of the ſailors: their dances very much reſembled thoſe of Otaheitee; their muſic too was very much the ſame.

A ſailor having been inattentive to his duty, received ſeveral blows from captain Cook; on ſeeing which, the natives exclaimed, *tape-a hei-te tina*, "he beats his brother." From other inſtances that had occurred, it was clear that they knew the difference between the commander and his people, but at the ſame time they conceived them all brethren; and, ſays Mr. Forſter, "to me the moſt natural inference is, that they only applied an idea to us in this caſe, which really exiſted with regard to themſelves; they probably look on themſelves as one family, of which the eldeſt born is the chief or king."

MARQUETRY, IN-LAID WORK; a curious kind of work, compoſed of pieces of hard fine wood of different colours, faſtened, in thin ſlices, on a ground, and ſometimes enriched with other matters, as tortoiſe-ſhell, ivory, tin, and braſs. There is another kind of marquetry made, inſtead of wood, of glaſſes of various colours; and a third, where nothing but precious ſtones and the richeſt marbles are uſed: but theſe are more properly called *moſaic-work*. See MOSAIC.

The art of inlaying is very ancient; and is ſuppoſed to have paſſed from the eaſt to the weſt, as one of the ſpoils brought by the Romans from Aſia. Indeed it was then but a ſimple thing; nor did it arrive at any tolerable perfection till the 15th century among the Italians: it ſeems, however, to have arrived at its height in the 17th century among the French.

Till John of Verona, a cotemporary with Raphael, the fineſt works of this kind were only black and white, which are what we now call *Moreſcos*: but that religious, who had a genius for painting, ſtained his woods with dyes or boiled oils, which penetrated them. But he went no farther than the repreſenting buildings and perſpectives, which require no great variety of colours. Thoſe who ſucceeded him, not only improved on the invention of dyeing the woods, by a ſecret which they found of burning them without conſuming, which ſerved exceedingly well for the ſhadows; but had alſo the advantage of a number of fine new woods of naturally bright colours, by the diſcovery of America. With theſe aſſiſtances the art is now capable of imitating any thing; whence ſome call it the *art of painting in wood*.

The ground whereon the pieces are to be ranged and glued, is ordinarily of oak or fir well dried; and, to prevent warping, is compoſed of ſeveral pieces glued together. The wood to be uſed, being reduced into leaves, of the thickneſs of a line, is either ſtained with ſome colour, or made black for ſhadow; which ſome effect by putting it in ſand extremely heated over the fire, others by ſteeping it in lime-water and ſublimate, and others in oil of ſulphur. Thus coloured, the contours of the piece are formed according to the parts of the deſign they are to repreſent.

The laſt is the moſt difficult part of marquetry, and that wherein moſt patience and attention are required. The two chief inſtruments uſed herein are the ſaw and the vice; the one, to hold the matters to be formed; the other, to take off from the extremes, according to occaſion. The vice is of wood, having one of its chaps fixed; the other moveable, and is opened and ſhut by the foot, by means of a cord faſtened to a treadle. Its ſtructure is very ingenious, yet ſimple enough.

The leaves to be formed (for there are frequently three or four of the ſame kind formed together) are put within the chaps of the vice, after being glued on the outermoſt part of the deſign whoſe profile they are to follow; then the workman preſſing the treadle, and thus holding faſt the piece, with his ſaw runs over all the outlines of the deſign. By thus joining and forming three or four pieces together, they not only gain time, but the matter is likewiſe the better enabled to ſuſtain the efforts of the ſaw: which, how delicate ſoever it may be, and how lightly ſoever the workman may conduct it, without ſuch a precaution would be apt to raiſe ſplinters, to the ruin of the beauty of the work.

When the work is to conſiſt of one ſingle kind of wood, or of tortoiſe-ſhell, on a copper or tin ground, or *vice verſa*, they only form two leaves on one another, *i. e.* a leaf of metal, and a leaf of wood or ſhell: this they call *ſawing in counter-parts*; for, by filling the vacuities of one of the leaves by the pieces coming out of the other, the metal may ſerve as a ground to the wood, and the wood to the metal.

All the pieces thus formed with the ſaw, and marked to know them again, and the ſhadow given in the manner already mentioned; they veneer or faſten each in its place on the common ground; uſing for that purpoſe the beſt Engliſh glue.

The whole is put in a preſs to dry, planed over, and poliſhed with the ſkin of the ſea-dog, wax and ſhave-graſs, as in ſimple veneering; with this difference, however, that in marquetry the fine branches, and ſeveral of the more delicate parts of the figures, are touched up and finiſhed with a graver.

It is the cabinet-makers, joiners, and toy-men among us who work in marquetry; it is the enamellers and ſtone-cutters who deal in moſaic-work: the inſtruments uſed in the former are moſtly the ſame with thoſe uſed by the eboniſts.

MARQUIS, a title of honour, next in dignity to that of duke. His office is to guard the frontiers and limits of the kingdom, which were called the *marches*, from the Teutonic word *marche* "a limit:" as, in particular, were the marches of Wales and Scotland, while they continued hoſtile to England. The perſons who had command there were called *lords marchers*, or *marqueſſes*; whoſe authority was aboliſhed by ſtatute 27 Hen. VIII. c. 27. though the title had long before been made a mere deſign of honour, Robert Vere earl of Oxford being created marquis of Dublin by Richard II. in the eighth year of his reign. A marquis is created by patent; his mantle is double ermine, three doublings and a half; his title is *moſt honourable*; and his coronet has pearls and ſtrawberry-leaves intermixed round, of equal height.

MARR, that part of Aberdeenſhire ſituated between the rivers Dee and Don.

MARRACCI (LEWIS), a very learned Italian, was born at Lucca in Tuſcany in 1612. After having finiſhed his juvenile ſtudies, he entered into the congregation of regular clerks of the Mother of God, and diſtinguiſhed himſelf early by his learning and merit. He taught rhetoric ſeven years, and paſſed through ſeveral offices of his order. He applied himſelf principally to the ſtudy of languages, and attained of himſelf the knowledge of the Greek, the Hebrew, the Syriac, the Chaldee, the Arabic; which laſt he taught ſome time at Rome, by the order of pope Alexander VII. Pope Innocent XI. choſe him for his confeſſor, and placed great confidence in him. He would have advanced him to eccleſiaſtical dignities,

if Marracci had not oppoſed him. Marracci died at Rome in 1700, aged 87. He was the author of ſeveral pieces in Italian; but the grand work, which has made him deſervedly famous all over Europe, is his edition of the Alkoran, in the original Arabic, with a Latin verſion, notes, and confutation of his own. It was beautifully printed in 2 vols. folio at Padua in 1698. The Latin verſion of the Alkoran, by Marracci, with notes and obſervations from him and others, and a ſynopſis of the Mahometan religion, by way of introduction, was publiſhed by Heineccius at Leipſic, 1721, in 8vo. Marracci had alſo a hand in the "Biblia ſacra Arabica, ſacræ congregationis de propaganda fide juſſu edita, ad uſum eccleſiarum orientalium," *Romæ* 1671, in 3 vols. folio.

MARRIAGE, a contract, both civil and religious, between a man and a woman, by which they engage to live together in mutual love and friendſhip for the ends of procreation, &c. See Moral *Philoſophy*.

Marriage is part of the law of nations, and is in uſe among all people. The Romaniſts account it a ſacrament. The woman, with all her moveable goods, immediately upon marriage, paſſes wholly *in poteſtatem viri*, "into the power and diſpoſal of the huſband."

The firſt inhabitants of Greece lived together without marriage. Cecrops, king of Athens, is ſaid to have been the firſt author of this honourable inſtitution among that people. After the commonwealths of Greece were ſettled, marriage was very much encouraged by their laws, and the abſtaining from it was diſcountenanced and in many places puniſhed. The Lacedemonians were very remarkable for their ſeverity towards thoſe who deferred marriage beyond a limited time, as well as to thoſe who wholly abſtained from it. The Athenians had an expreſs law, that all commanders, orators, and perſons intruſted with any public affair, ſhould be married men. Polygamy was not commonly tolerated in Greece. The time of marriage was not the ſame in all places. The Spartans were not permitted to marry till they arrived at their full ſtrength; the reaſon aſſigned for which cuſtom by Lycurgus was, that the Spartan children might be ſtrong and vigorous: and the Athenian laws are ſaid to have once ordered, that men ſhould not marry till 35 years of age. The ſeaſon of the year which they preferred for this purpoſe was the winter, and particularly the month of January, called *Gamelion*. The Greeks thought it ſcandalous to contract marriage within certain degrees of conſanguinity; whilſt moſt of the barbarous nations allowed inceſtuous mixtures.

Moſt of the Grecian ſtates, eſpecially ſuch as made any figure, required their citizens ſhould match with none but citizens, and the children were not allowed to marry without the conſent of their parents. The uſual ceremonies in promiſing fidelity was kiſſing each other, or giving their right hands, which was a general form of ratifying all agreements. Before the marriage could be ſolemnized, the gods were to be conſulted, and their aſſiſtance implored by prayers and ſacrifices, which were offered to ſome of the deities that ſuperintended theſe affairs, by the parents or neareſt relations of the perſons to be married. When the victim was opened, the gall was taken out and thrown behind the altar, as being the ſeat of anger and malice, and therefore the averſion of all the deities who had the care of love, as well as thoſe who became their votaries. See Bride and Bridegroom.

The Romans, as well as the Greeks, diſallowed of polygamy. A Roman might not marry any woman who was not a Roman. Among the Romans, the kalends, nones, and ides of every month were deemed unlucky for the celebration of marriage, as was alſo the feaſt of the *parentalia*, and the whole month of May. The moſt happy ſeaſon in every reſpect was that which followed the ides of June.

The Roman laws ſpeak of ſecond marriages in very hard and odious terms: *Matre jam ſecundis nuptiis funeſtata*, L. iii. C. de ſec. nuptiis. By theſe laws it was enacted, that the effects of the huſband or wife deceaſed ſhould paſs over to the children, if the ſurvivor ſhould marry a ſecond time. By the law *Hac edictali* (Cod. de ſec. nupt.), the ſurvivor, upon marrying a ſecond time, could not give the perſon he married a portion more than equal to that of each of the children. In the primitive church the reſpect to chaſtity was carried ſo high, that a ſecond marriage was accounted no other than a lawful whoredom, or a ſpecies of bigamy; and there are ſome ancient canons which forbid the eccleſiaſtics from being preſent at ſecond marriages.

Marriage, by the Moſaic law, was ſubject to ſeveral reſtrictions: thus by Levit. chap. xviii. ver. 16. a man was forbid to marry his brother's widow unleſs he died without iſſue; in which caſe it became enjoined as a duty. So it was forbid to marry his wife's ſiſter, while ſhe was living, ver. 18. which was not forbidden before the law, as appears from the inſtance of Jacob.

The ancient Roman law is ſilent on this head; and Papinian is the firſt who mentions it, on occaſion of the marriage of Caracalla. The lawyers who came after him ſtretched the bonds of affinity ſo far, that they placed adoption on the ſame foot with nature.

Affinity, according to the modern canoniſts, renders marriage unlawful to the fourth generation, incluſive; but this is to be underſtood of direct affinity, and not of that which is ſecondary or collateral. *Affinis mei affinis, non eſt affinis meus.* It is farther to be obſerved, that this impediment of marriage does not only follow an affinity contracted by lawful matrimony, but alſo that contracted by a criminal commerce; with this difference, that this laſt does extend beyond the ſecond generation; whereas the other, as has been obſerved, reaches to the fourth.

In Germany they have a kind of marriage called *morganatic*, wherein a man of quality contracting with a woman of inferior rank, he gives her the left hand in lieu of the right; and ſtipulates in the contract that the wife ſhall continue in her former rank or condition; and that the children born of them ſhall be of the ſame, ſo that they become baſtards as to matters of inheritance, though they are legitimate in effect. They cannot bear the name or arms of the family. None but princes and great lords of Germany are allowed this kind of marriage. The univerſities of Leipſic and Jena have declared againſt the validity of ſuch contracts; maintaining that they cannot prejudice the children, eſpecially when the emperor's conſent intervenes in the marriage.

The Turks have three kinds of marriages, and three ſorts of wives; *legitimate*, *wives in kebin*, and *ſlaves*. They marry the firſt, hire the ſecond, and buy the third.

Among all the ſavage nations, whether in Aſia, Africa, or America, the wife is commonly bought by the huſband from her father or thoſe other relations who have an authority over her; and the concluſion of a bargain for this purpoſe, together with the payment of the price, has therefore become the uſual form or ſolemnity in the celebration of their marriages. The Hebrews alſo purchaſed their wives by paying down a competent dowry for them; and Ariſtotle makes it one argument to prove that the ancient Grecians were an uncivilized people, becauſe they uſed to buy their wives; and in proportion as they laid aſide their barbarous manners they left off this practice.

The Engliſh law conſiders marriage in no other light than as a civil contract; the holineſs of the matrimonial ſtate being left entirely to the eccleſiaſtical law, to which it pertains, to puniſh or annul inceſtuous or other unſcriptural marriages. The law allows marriage to be good and valid, where the parties at the time of making it were willing and able to contract, and actually did contract, in the proper forms and ſolemnities required by law. The diſabilities for contracting are of two

ſorts: firſt, ſuch as are canonical, and therefore ſufficient by the eccleſiaſtical laws to void the marriage in the ſpiritual court; ſuch as pre-contract, conſanguinity, or relation by blood; and affinity, or relation by marriage, and ſome particular corporal infirmities. But theſe diſabilities in our law do not make the marriage *ipſo facto* void, but voidable only by ſentence of ſeparation; and marriages are eſteemed valid to all civil purpoſes, unleſs ſuch ſeparation is actually made during the life of the parties. Thus when a man had married his firſt wife's ſiſter, and after her death the biſhop's court was proceeding to annul the marriage and baſtardiſe the iſſue, the court of king's bench granted a prohibition *quoad hoc*; but permitted them to proceed to puniſh the huſband for inceſt.

By 32 Hen. VIII. c. 38. it is declared, that all perſons may lawfully marry but ſuch as are prohibited by God's law, &c. And that nothing (God's law excepted) ſhall impeach any marriage but within the Levitical degrees: theſe are enumerated in the 18th chapter of Leviticus, and are illuſtrated by Lord Coke in this manner: A man may not marry his mother, father's ſiſter, mother's ſiſter, ſiſter, daughter, daughter of his ſon or daughter, father's wife, uncle's wife, father's wife's daughter, brother's wife, wife's ſiſter, ſon's wife or wife's daughter, and daughter of his wife's ſon or daughter. And a woman may not marry her father, father's brother, mother's brother, brother, ſon, ſon of her huſband's ſon or daughter, mother's huſband, aunt's huſband, ſiſter's huſband, huſband's brother, and ſon of her huſband's ſon or daughter. By the civil law firſt couſins are allowed to marry; but by the canon law both firſt and ſecond couſins are prohibited. Therefore when it is vulgarly ſaid that firſt couſins may marry, but ſecond couſins cannot, this probably aroſe by confounding theſe two laws; for firſt couſins may marry by the civil law, and ſecond couſins cannot by the canon law. But by the foreſaid ſtat. 32 Hen. VIII. c. 38. it is clear, that both firſt and ſecond couſins may marry. By the ſame ſtatute all impediments ariſing from pre-contracts to other perſons were aboliſhed, and declared of none effect unleſs they had been conſummated with bodily knowledge; in which caſe the canon law holds ſuch contract to be a marriage *de facto*. But this branch of the ſtatute was repealed by 2 & 3 Ed. VI. c. 23. How far the act of 26 Geo. II. c. 33. (which prohibits all ſuits in eccleſiaſtical courts to compel a marriage in conſequence of any contract) may collaterally extend to revive this clauſe of Henry VIII.'s ſtatute, and aboliſh the impediment of pre-contract, judge Blackſtone leaves to be conſidered by the canoniſts. We ſhall here obſerve, that on a promiſe of marriage, if it be mutual on both ſides, damages may be recovered in caſe either party refuſes to marry; and though no time for the marriage is agreed on, if the plaintiff avers that he offered to marry the defendant who refuſed it, an action is maintainable for the damages; but no action ſhall be brought upon any agreement except it is in writing, and ſigned by the party to be charged. The canonical hours for celebrating marriage are from 8 to 12 in the forenoon.

The other ſort of diſabilities are thoſe which are created, or at leaſt enforced, by the municipal laws. Theſe civil diſabilities make the contract void *ab initio*, by rendering the parties incapable of forming any contract at all. The firſt legal diſability is a prior marriage, or having another huſband or wife living; in which caſe, beſides the penalties conſequent upon it as a felony, the ſecond marriage is to all intents and purpoſes void. See BIGAMY and POLYGAMY.

The next legal diſability is want of age; therefore if a boy under 14, or a girl under 12 years of age, marries, when either of them comes to the age of conſent, they may diſagree and declare the marriage void, without any divorce or ſentence in the ſpiritual court. However, in our law it is ſo far a marriage, that if at the age of conſent they agree to continue together, they need not be married again. Another incapacity ariſes from want of conſent of parents or guardians. By ſeveral ſtatutes, viz. 6 & 7 W. III. c. 6. 7. 8 W. III. c. 35. 10 Ann. c. 19. penalties of 100l. are laid on every clergyman who marries a couple either without publication of banns, which may give notice to parents or guardians, or without a licence, to obtain which the conſent of parents or guardians muſt be ſworn to. And by 4 & 5 Ph. & M. c. 8. whoſoever marries any woman child under the age of 16 years, without conſent of parents or guardians, ſhall be ſubject to fine or five years impriſonment; and her eſtate during her huſband's life ſhall be enjoyed by the next heir. Thus alſo in France the ſons cannot marry without conſent of parents till 30 years of age, nor the daughters till 25; and in Holland the ſons are at their own diſpoſal at 25, and the daughters at 20. And by the marriage act, viz. 26 Geo. II. c. 33. it is enacted, that all marriages celebrated by licence (for banns ſuppoſe notice), where either of the parties is under 21, not being a widow or widower, without the conſent of the father, or, if he be not living, of the mother or guardians, ſhall be abſolutely void. However, proviſion is made where the mother or guardian is non compos, beyond ſea, or unreaſonably froward, to diſpenſe with ſuch conſent at the diſcretion of the lord chancellor; but no proviſion is made in caſe the father ſhould labour under any mental or other incapacity. A fourth incapacity is want of reaſon. It is provided by 15 Geo. II. c. 30. that the marriage of lunatics and ſons under phrenſies (if found lunatics under a commiſſion or committed to the care of truſtees by any act of parliament) before they are declared of found mind by the lord chancellor, or the majority of ſuch truſtees, ſhall be totally void. Laſtly, the parties muſt not only be willing and able to contract, but muſt actually contract themſelves in due form of law, to make it a good civil marriage. Any contract made *per verba de præſenti*, or in words of the preſent tenſe, and in caſe of cohabitation *per verba de futuro* alſo between perſons able to contract, was before the late act deemed a valid marriage to many purpoſes, and the parties might be compelled in the ſpiritual courts to celebrate it *in facie eccleſiæ*. But theſe verbal contracts are now of no force to compel a future marriage. Nor is any marriage at preſent valid that is not celebrated in ſome pariſh church, or public chapel, unleſs by diſpenſation from the archbiſhop of Canterbury. It muſt alſo be preceded by publication of banns or by licence from the ſpiritual judge. A marriage in purſuance of banns muſt be ſolemnized in one of the churches or chapels where the banns were publiſhed. No parſon, vicar, &c. ſhall be obliged to publiſh banns of matrimony, unleſs the perſons to be married ſhall, ſeven days before the time required for the firſt publication, deliver to him a notice in writing of their true names, and of the houſe or houſes of their reſpective abode within ſuch pariſh, &c. and of the time that they have dwelt in ſuch houſe or houſes. And the ſaid banns ſhall be publiſhed upon three Sundays preceding the ſolemnization of marriage during the time of public ſervice: in caſe the parents or guardians, or either of the parties who ſhall be under the age of 21 years, ſhall openly and publicly declare, or cauſe to be declared in the church or chapel where the banns ſhall be ſo publiſhed, at the time of ſuch publication, their diſſent to ſuch marriage, ſuch publication of banns ſhall be void. And when the parties dwell in divers pariſhes, the curate of the one pariſh ſhall not ſolemnize matrimony betwixt them without a certificate of the banns being thrice aſked from the curate of the other pariſh. A marriage in purſuance of a licence (except a ſpecial licence) muſt be ſolemnized in ſuch church or chapel where the licence is granted; and no licence of marriage ſhall be granted by any archbiſhop, biſhop, &c. to ſolemnize any marriage in any other church, &c. than in the pariſh church, &c. within which the uſual place of abode of one of the parties ſhall have been for four weeks immediately

before the granting ſuch licence. By the ſame ſtatute all marrieges ſhall be ſolemnized in the preſence of two credible witneſſes at the leaſt, beſides the miniſter, who ſhall ſign their atteſtation thereof; and immediately after the celebration of every marriage, an entry thereof ſhall be made in the pariſh-regiſter, expreſſing that the ſaid marriage was celebrated by banns or licence; and if both or either of the parties be under age, with conſent of the parents or guardians, as the caſe ſhall be, ſigned by the miniſter, and alſo by the parties married, and atteſted by the two witneſſes preſent. It is held to be alſo eſſential to a marriage, that it be performed by a perſon in orders; though the intervention of a prieſt to ſolemnize this contract is merely *juris poſitivi*, and not *juris naturalis aut divini*; it being ſaid that Pope Innocent III. was the firſt who ordained the celebration of marriage in the church, before which it was totally a civil contract. And in the times of the grand rebellion, all marriages were performed by the juſtices of the peace; and theſe marriages were declared valid without any freſh ſolemnization, by 12 Car. II. c. 33. But as the law now ſtands, we may upon the whole collect, that no marriage by the temporal law is *ipſo facto* void, that is celebrated by a perſon in orders; in a pariſh-church, a public chapel, or elſewhere, by a ſpecial diſpenſation; in purſuing of banns or a licence; between ſingle perſons; conſenting; of ſound mind; and of the age of 21 years; or of the age of 14 in males and 12 in females, with conſent of parents or guardians, or without it, in caſe of widowhood. And no marriage is voidable by the eccleſiaſtical law after the death of either of the parties; nor during their lives, unleſs for the canonical impediments of precontract, if that indeed ſtill exiſts; of conſanguinity; and of affinity or corporal imbecility ſubſiſting previous to the marriage.

By 26 Geo. II. c. 33. the ſubſtance of which has been already recited, if any perſon ſhall ſolemnize matrimony in any other place than a church, &c. where banns have been uſually publiſhed, unleſs by ſpecial licence, or without publication of banns, unleſs licence of marriage be firſt obtained from ſome perſon having authority to grant the ſame, every ſuch perſon knowingly ſo offending ſhall be guilty of felony, and tranſported for 14 years; the proſecution to be within three years. By the ſame ſtatute, to make a falſe entry into a marriage-regiſter; to alter it when made; to forge or counterfeit ſuch entry, or a marriage licence, or aid and abet ſuch forgery; to utter the ſame as true, knowing it to be counterfeit; or to deſtroy or procure the deſtruction of any regiſter in order to vacate any marriage, or ſubject any perſon to the penalties of this act; all theſe offences, knowingly and wilfully committed, ſubject the party to the guilt of felony without benefit of clergy.

In Scotland, the parties living together as man and wife, or declaring themſelves ſo before witneſſes, makes a valid though informal marriage.

For the proportions which marriages bear to births, and births to burials, in ſeveral parts of Europe, Mr. Derham gives us the following table:

Names of Places.	Marriages to Births, as	Births to Burials, as
England in general	1 to 4.63	1.12 to 1
London	1 to 4	1. to 1.1
Hantſhire, from 1569 to 1658	1 to 4	1.2 to 1
Tiverton in Devonſhire, from 1656 to 1664	1 to 3.7	1.26 to 1
Cranbrook in Kent, from 1560 to 1649	1 to 3.9	1.6 to 1
Aynho, in Northamptonſhire, for 118 years	1 to 6	1.6 to 1
Upminſter in Eſſex, for 100 years	1 to 4.6	1.8 to 1
Frankfort on the Maine, in 1695	1 to 3.7	1.2 to 1
Old, Middle, and Lower Marck, in 1698	1 to 3.7	1.9 to 1
Dominions of the Elector of Brandenburg, in 1698	1 to 3.7	1.5 to 1
Breſlaw in Sileſia, from 1687 to 91	——	1.6 to 1
Paris, in 1670, 1671, 1672	1 to 4.7	1.6 to 1

The following Table, ſimilar to the preceding, is formed from the obſervations collected and referred to by Dr. Price. It is taken from *Chambers's Cyclopædia*, by Dr. Rees:

Names of Places.	Marriages to Births, as	Births to Burials, as
London, Annual medium from 1716 to 1736	— — —	18,000 to 26,529, or 1 to 1.4, &c.
—— from 1759 to 1768	— — —	15,710 to 22,956, or 1 to 1.4, &c.
Northampton, ditto, from 1741 to 1770	— — —	155 to 191, or 1 to 1.2, &c.
Norwich, ditto, from 1740 to 1769	— — —	1057 to 1206, or 1 to 1.1, &c.
Shrewſbury, ditto, from 1762 to 1768	— — —	301 to 329, or 1 to 1.09, &c.
Mancheſter and Salford, excluſive of diſſenters		
Ditto, from 1755 to 1759	— — —	756 to 743,——
Ditto, ditto, including diſſenters, from 1768 to 1772	— — —	1098 to 958, or 1.14, &c. to 1.
Gainſborough in Lincolnſhire, ditto, from 1752 to 1771	1 to 3.7	126 to 105, or 1.2 to 1.
Madeira, ditto, from 1759 to 1766	1 to 4.68	2201 to 1293, or 1.7 to 1.
Boſton in New England, from 1731 to 1752	— — —	538 to 608, or 1 to 1.13, &c.
Chriſtiana in Norway, in 1761	— — —	11,024 to 6929, or 1.5 to 1.
Paris, mean of ſome of the laſt years	1 to 4.3	19,100 to 19,400, or 1 to 1.01, &c.
Vienna, annual medium from 1757 to 1769	— — —	5800 to 6600, or 1 to 1.1, &c.
Amſterdam, ditto, for ſome of the laſt years	1 to 1.9, &c.	4600 to 8000, or 1 to 1.1, &c.
Copenhagen, ditto	1 to 3.04, &c.	2700 to 3300, or 1 to 1.2, &c.
Berlin, ditto, for five years, ending at 1759	1 to 3.9, &c.	3855 to 5054, or 1 to 1.3, &c.
Breſlaw, ditto, from 1633 to 1734	— — —	1089 to 1256, or 1 to 1.15, &c.
——, ditto, from 1717 to 1725	— — —	1252 to 1507, or 1 to 1.2, &c.
Rome, ditto, from 1759 to 1761	— — —	5167 to 7153, or 1 to 1.3, &c.
Vaud in Switzerland, ditto, for 10 years before 1766	1 to 3.9	3155 to 2504, or 1.2, &c. to 1.

For an account of the numbers of male and female ſtill-born children and chriſoms, and of boys and girls under ten, of married men and married women, and of widows and widowers, who died for a courſe of years at Vienna, Breſlaw, Dreſden, Leipſic, Ratiſbon, and ſome other towns in Germany, ſee Phil. Tranſ. Abr. Vol. VII. Part IV. p. 46, &c.

The reader may find many curious calculations and remarks relating to this ſubject in Dr. Price's excellent work, intitled, Obſervations on Reverſionary Payments. From the preceding table it appears, that marriages, one with another, do each produce about four births, both in England and other parts of Europe. Dr. Price obſerves, that the births at Paris, as may be ſeen in the table, are above four times the weddings; and therefore it may ſeem, that in the moſt healthy country ſituations, every wedding produces above four children; and though this be the caſe in Paris, for reaſons which he has given, he has obſerved nothing like it in any other great town. He adds, that from comparing the births and weddings in countries and towns where regiſters of them have been kept, it appears that in the former, marriages one with another ſeldom produce leſs than four children each; generally between four and five, and ſometimes above five; but in towns ſeldom above four, generally between three and four, and ſometimes under three. It is neceſſary to be obſerved here, that though the proportion of annual births to weddings has been conſidered as giving the true number of children derived from each marriage, taking all marriages one with another; yet this is only true, when, for many years, the births and burials have kept nearly equal. Where there is an exceſs of the births occaſioning an increaſe, the proportion of annual births to weddings muſt be leſs than the proportion of children derived from each marriage; and the contrary muſt take place where there is a decreaſe: and by Mr. King's computation, about one in an hundred and four perſons marry; the number of people in England being eſtimated at five millions and a half, whereof about forty-one thouſand annually marry.

In the diſtrict of Vaud in Switzerland, the married are very nearly a third part of the inhabitants.

Major Graunt and Mr. King diſagree in the proportions between males and females, the latter making 10 males to 13 females in London; in other cities and towns, and in the villages and hamlets, 100 males to 99 females: but major Graunt, both from the London and country bills, computes, that there are in England 14 males to 13 females; whence he juſtly infers, that the Chriſtian religion, prohibiting polygamy, is more agreeable to the law of nature than Mahometaniſm and others that allow it.

This proportion of males to females Mr. Derham thinks pretty juſt, being agreeable to what he had obſerved himſelf. In the hundred years, for inſtance, of his own pariſh-regiſter of Upminſter, though the burials of males and females were nearly equal, being 633 males and 623 females in all that time; yet there were baptized 709 males and but 675 females, which is 13 females to 13.7 males.

From a regiſter kept at Northampton for 28 years, from 1741 to 1770, it appears that the proportion of males to females that were born in that period is 2361 to 2288, or nearly 13.4 to 13. However, though more males are born than females, Dr. Price has ſufficiently ſhown that there is a conſiderable difference between the probabilities of life among males and females in favour of the latter; ſo that males are more ſhortlived than females; and as the greater mortality of males takes place among children, as well as among males at all ages, the fact cannot be accounted for merely by their being more ſubject to untimely deaths by various accidents, and by their being addicted to the exceſſes and irregularities which ſhorten life. Mr. Kerſſeboom informs us, that during the courſe of 125 years in Holland, females have in all accidents of age lived about three or four years longer than the ſame number of males. In ſeveral towns of Germany, &c. it appears, that of 7270 married perſons who had died, the proportion of married men who died, to the married women, was 3 to 2; and in Breſlaw, for eight years, as 5 to 3. In all Pomerania, during nine years, from 1748 to 1756, this proporton was nearly 15 to 11. Among the miniſters and profeſſors in Scotland, 20 married men die to 12 married women, at a medium of 27 years, or in the proportion of 5 to 3; ſo that there is the chance of 3 to 2, and in ſome circumſtances even a greater chance, that the woman ſhall be the ſurvivor of a marriage, and not a man; and this difference cannot be accounted for merely by the difference of age between men and their wives, without admitting the greater mortality of males. In the diſtrict of Vaud in Switzerland, it appears that half the females do not die till the age of 46 and upwards, though half the males die under 36. It is likewiſe an indiſputable fact, that in the beginning of life the rate of mortality among males is much greater than among females.

From a table formed by Dr. Price, from a regiſter kept for 20 years at Gainſborough, it appears, that of thoſe who live to 80, the major part, in the proportion of 49 to 32, are females. Mr. Deparcieux at Paris, and Mr. Wargentin in Sweden, have farther obſerved, that not only women live longer than men, but that married women live longer than ſingle women. From ſome regiſters examined by Mr. Muret in Switzerland, it appears, that of equal numbers of ſingle and married women between 15 and 25, more of the former died than of the latter, in the proportion of 2 to 1.

With reſpect to the difference between the mortality of males and females, it is found to be much leſs in country pariſhes and villages than in towns; and hence it is inferred, that human life in males is more brittle than in females, only in conſequence of adventitious cauſes, or of ſome particular debility, that takes place in poliſhed and luxurious ſocieties, and eſpecially in great towns.

From the inequality above ſtated between the males and females that are born, it is reaſonable to infer, that one man ought to have but one wife; and yet that every woman without polygamy may have a huſband: this ſurpluſage of males above females being ſpent in the ſupplies of war, the ſeas, &c. from which the women are exempt.

Perhaps, ſays Dr. Price, it might have been obſerved with more reaſon, that this proviſion had in view that particular weakneſs or delicacy in the conſtitution of males, which makes them more ſubject to mortality; and which conſequently renders it neceſſary that more of them ſhould be produced, in order to preſerve in the world a due proportion between the two ſexes.

That this is a work of Providence, and not of chance, is well made out by the very laws of chance by Dr. Arbuthnot, who ſuppoſes Thomas to lay againſt John, that for 82 years running more males ſhould be born than females; and giving all allowances in the computation to Thomas's ſide, he makes the odds againſt Thomas, that it does not ſo happen, to be near five millions of millions of millions of millions to one; but for a ſes of ages, according to the world's age, to be near an infinite number to one.

According to Mr. Kerſſeboom's obſervations, there are about 325 children born from 100 marriages.

Mr. Kerſſeboom, from his obſervations, eſtimates the duration of marriages, one with another, as in the following table:

Thoſe whoſe ages, taken together, make

40,	live together between 24 and	25 years.
50	22	23
60	23	21

70, live together between	19	and 20 years.
80	17	18
90	14	15.
100	12	13

Phil. Trans. No. 468, sect. iii. p. 319.

Dr. Price has shown, that on De Moivre's hypothesis, or that the probabilities of life decrease uniformly (see COMPLEMENT *of Life*), the duration of survivorship is equal to the duration of marriage, when the ages are equal; or in other words, that the expectation of two joint lives, the ages being equal, is the same with the expectation of survivorship; and, consequently, the number of survivors, or (which is the same, supposing no second marriages) of widows and widowers, alive together, which will arise from any given set of such marriages constantly kept up, will be equal to the whole number of marriages; or half of them (the number of widows in particular) equal to half the number of marriages. Thus the expectation of two joint lives, both 40, is the third of 46 years, or their complement, *i. e.* 15 years and 4 months; and this is also the expectation of the survivor. That is, supposing a set of marriages between persons all 40, they will one with another last just this time, and the survivors will last the same time. In adding together the years which any great number of such marriages, and their survivorships, have lasted, the sums would be found to be equal. It is observed farther, that if the number expressing the expectation of single or joint lives, multiplied by the number of single or joint lives whose expectation it is, be added annually to a society or town, the sum gives the whole number living together, to which such an annual addition would in time grow: thus, since 19, or the third of 57, is the expectation of two joint lives whose common age is 29, or common complement 57, 20 marriages every year between persons of this age would in 57 years grow to 20 times 19, or 380 marriages always existing together. The number of survivors also arising from these marriages, and always living together, would in twice 57 years increase to the same number. Moreover, the particular proportion that becomes extinct every year, out of the whole number constantly existing together of single or joint lives, must, wherever this number undergoes no variation, be exactly the same with the expectation of those lives at the time when their existence commenced. Thus, if it were found that a 19th part of all the marriages among any body of men, whose numbers do not vary, are dissolved every year by the deaths of either the husband or wife, it would appear, that 19 was at the time they were contracted, the expectation of these marriages. Dr. Price observes, that the annual average of weddings among the ministers and professors in Scotland for the last 27 years has been 31; and the average of married persons for 17 years ending in 1767, had been 667. This number, divided by 31, gives 21½, the expectation of marriage among them; which, he says, is above 2½ years more than the expectation of marriage would be, by Dr Halley's table, on the supposition that all first, second, and third marriages, may be justly considered as commencing one with another so early as the age of 30; and he has proved, that the expectation of two equal joint lives is to the expectation of a single life of the same age as 2 to 3: consequently, the expectation of a single life at 30, among the ministers in Scotland, cannot be less than 32.25. If we suppose the mean ages of all who marry annually to be 23 and 25, the expectation of every marriage would be 50 years; or one with another they would be all extinct in 49 years: the marriages which continue beyond this term, though fewer in number, enjoying among them just as much more duration as those that fall short of it enjoy less. But it appears from the observations and tables of Mr. Muret, that, in the district of Vaud (dividing half the number of married persons, viz. 38,328, by the annual medium of weddings, viz 808), the expectation of marriage is only 23½ years: so much higher are the probabilities of life in the country than in towns, or than they ought to be, according to De Moivre's hypothesis.

MARRIAGE *(Maritagium)*, in law, signifies not only the lawful joining of man and wife, but also the right of bestowing a ward or a widow in marriage, as well as the land given in marriage.

Dissolution of MARRIAGE. See DIVORCE.

Forcible MARRIAGE. See FORCIBLE *Marriage*.

Frank MARRIAGE. See FRANK.

Jactitation of MARRIAGE, in law, is one of the first and principal matrimonial causes, when one of the parties boasts or gives out, that he or she is married to the other, whereby a common reputation of their matrimony may ensue. On this ground the party injured may libel the other in the spiritual court; and unless the defendant undertakes and makes out a proof of the actual marriage, he or she is enjoined perpetual silence on that head which is the only remedy the ecclesiastical courts can give for this injury.

MARRIAGE *Settlement*, is a legal act, previous to marriage, whereby a jointure is secured to the wife after the death of the husband. These settlements seem to have been in use among the ancient Germans, and their kindred nation the Gauls. Of the former Tacitus gives us this account: *Dotem non uxor marito, sed uxori maritus affert: interfunt parentes et propinqui, et munera probant* (De Mor Germ. c. 18.) And Cæsar, De Bell. Gallic. lib. vi. c. 18 has given us the terms of a marriage settlement among the Gauls, as nicely calculated as any modern jointure: *Viri, quantas pecunias ab uxoribus dotis nomine acceperunt, tantas ex suis bonis, æstimatione facta, cum dotibus communicant. Hujus omnis pecuniæ conjunctim ratio habetur, fructusque servatur. Uter eorum vita superavit, ad eum pars utriusque cum fructibus superiorum temporum pervenit.* The dauphin's commentator supposes that this Gaulish custom was the ground of the new regulations made by Justinian, Nov. 97. with regard to the provision for widows among the Romans; but surely there is as much reason to suppose, says judge Blackstone, that it gave the hint for our statutable jointures. Comment. vol. ii. p. 138. See an excellent marriage settlement by Blackstone in the Appendix to the second volume of his Commentaries.

Duty of MARRIAGE, is a term used in some ancient customs, signifying an obligation on women to marry. To understand this, it must be observed, that old maids and widows about sixty, who held fees in body, or were charged with any personal or military services, were anciently obliged to marry, to render those services to the lord by their husbands, or to indemnify the lord for what they could not do in person. And this was called *duty* or *service of marriage*.

Policy of encouraging MARRIAGE. Dr. Halley observes, that the growth and increase of mankind is not so much stinted by any thing in the nature of the species, as it is from the cautious difficulty most people make to adventure on the state of marriage, from the prospect of the trouble and charge of providing for a family; nor are the poorer sort of people herein to be blamed, who, besides themselves and families, are obliged to work for the proprietors of the lands that feed them; and of such does the greater part of mankind consist. Were it not for the backwardness to marriage, there might be four times as many births as we find; for, by computation, there are 15,000 persons above 16 and under 45, of which at least 7000 are women capable of bearing children; yet there are only 1238, or little more than a fixth part of these, that breed yearly: whereas, were they all married, it is highly probable that four of six should bring forth a child every year, the political consequences of which are evident. Therefore, as the strength

and glory of a kingdom or ſtate conſiſts in the multitude of ſubjects, celibacy above all things ought to be diſcouraged, as by extraordinary taxing or military ſervice: and, on the contrary, thoſe who have numerous families ſhould be allowed certain privileges and immunities, like the *jus trium liberorum* among the Romans; and eſpecially, by effectually providing for the ſubſiſtance of the poor.

MARROW, in anatomy, a ſoft oleaginous ſubſtance contained in the cavity of the bones. See ANATOMY.

MARRUBIUM, WHITE HORHOUND: a genus of the gymnoſpermia order, belonging to the didynamia claſs of plants; and in the natural method ranking under the 42d order, *Verticillatæ*. The calyx is falver-ſhaped, rigid, and ten-ſtriated; the upper lip of the corolla bifid, linear, and ſtraight. There are nine ſpecies, the moſt remarkable of which is the vulgare, a native of Britain, growing naturally in waſte places, and by way-ſides near towns and villages, but not common. It has a ſtrong and ſomewhat muſky ſmell, and bitter taſte. It is reputed attenuant and reſolvent; an infuſion of the leaves in water, ſweetened with honey, is recommended in aſthmatic and phthiſical complaints, and moſt other diſeaſes of the breaſt and lungs.

MARS, in aſtronomy, one of the five planets, and of the three ſuperior ones; its place being between the Earth and Jupiter. See ASTRONOMY.

MARS, in pagan worſhip, the god of war. He was, according to ſome, the ſon of Jupiter and Juno; while others ſay that he was the ſon of Juno alone, who, being diſpleaſed at Jupiter's having produced Minerva from his brain, without female aid, in revenge conceived without the aſſiſtance of the other ſex, by touching a flower ſhown to her by Flora in the plains of Olenus, and became the mother of this formidable deity. The amours of Mars and Venus, and the manner in which Vulcan caught and expoſed them to the laughter of the other gods, have been deſcribed by ſeveral of the ancient poets. He is repreſented as having ſeveral wives and miſtreſſes, and a conſiderable number of children. He was held in the higheſt veneration by the Romans, both from his being the father of Romulus their founder, and from their inclination to conqueſt; and had magnificent temples erected to him at Rome. Mars is uſually repreſented in a chariot, drawn by furious horſes. He is completely armed; and extends his ſpear with the one hand, and graſps a ſword, imbrued in blood, with the other. He has a fierce and ſavage aſpect. Diſcord is repreſented preceding his car; and Clamour, Fear, and Terror, appear in his train. The victims ſacrificed to him were the wolf, the horſe, the woodpecker, the vulture, and the cock.

MARS, among chemiſts, denotes *iron*; that metal being ſuppoſed to be under the influence of the planet Mars.

MARSAIS (CESAR CHESNEAU DU), was born at Marſeilles 1676. He attached himſelf at an early period of life to the order of the congregation of the oratory; but the ſituation was too narrow for his genius, and he ſoon left it. At Paris he married, became advocate, and entered on this new profeſſion with great ſucceſs and approbation. Diſappointed, however, in his expectations of making a ſpeedy fortune, he abandoned the law alſo. About this time the peeviſh humour of his wife occaſioned a ſeparation. We next find him as governor to the ſon of the preſident de Maiſons; and when the premature death of the father deprived him of the fruits of his induſtry, he engaged with the famous Law in the ſame capacity. After the fall of this extraordinary projector, he completed the education of the Marquis de Beaufremont's children, and reared pupils worthy of his genius and induſtry. Although he was accuſed of a tendency to Deiſm, and though there was good reaſon for the accuſation; yet he never infuſed into the minds of his ſcholars any principle inconſiſtent with ſound morality, or with the Chriſtian religion. When he left M. de Beaufremont's family, he took a boarding-houſe, in which, after a method of his own, he educated a certain number of young men. Unexpected circumſtances obliged him to abandon this uſeful undertaking. He was even conſtrained to give ſome occaſional leſſons for the bare neceſſaries of life. Without fortune, without hope, and almoſt without reſource, he was reduced to extreme indigence. In this ſituation he was found by the authors of the *Encyclopédie*, and made a partner in conducting that great work. Among many other excellent pieces, the article *Grammar* breathes the ſpirit of ſound philoſophy. His principles are clear and ſolid. He diſcovers an extreme knowledge of the ſubject, great accuracy in the rules, and great propriety in the application. M. le Comte de Lauraguais was ſo much affected with the diſtreſſes, and ſo much convinced of the merit of *Du Marſais*, that he procured him a penſion of one thouſand livres. Du Marſais died at Paris on the 11th June 1756, in his eightieth year, after having received the ſacrament. The compliment which he paid to the prieſt on this occaſion has been conſidered by ſome as rather equivocal. But there is no neceſſity to deprive religion of this triumph, or philoſophy of that honour which conviction and penitence muſt confer on it. "The faith of a great genius (ſays Bayle, who is entitled to credit on this ſubject) is not totally extinguiſhed: It is like a ſpark under the aſhes. Reflection and the proſpect of danger call forth its exertions. There are certain ſituations in which philoſophers are as full of anxiety and remorſe as other men." Whatever were the laſt ſentiments of Du Marſais, it cannot be denied that in the vigour of health he furniſhed ſeveral examples of irreligion, and to theſe have been added many abſurd ſtories. The ſuperiority of Du Marſais's talents conſiſted in exactneſs and perſpicuity. His ignorance of the world, and of the cuſtoms of mankind, together with the greateſt latitude in expreſſing whatever he thought, gave him that frank and unguarded ſimplicity which is often the chief ingredient of genuine humour. Fontenelle uſed to ſay of him, "that he was the moſt lively ſimpleton, and as a man of wit the moſt ſimple, he ever knew." He was the Fontaine of philoſophers. In conſequence of this character, he was a nice judge of what was natural in every production, and a great enemy to all kind of affectation. His principal works are, 1. *Expoſition de la doctrine de l'Egliſe Gallicane par rapport aux pretenſions de la Cour de Rome*, 12mo. This accurate work was begun at the deſire of the preſident de Maiſons, and did not appear till after the death of the author. 2, *Expoſition d'une methode raiſonnée pour apprendre la langue Latine*, 12mo. 1722, rare. This method appears conformable to the natural unfolding of the powers of the mind, and on that account renders the acquiſition of the language leſs difficult; but it was liable to two great objections to vulgar and unenlightened underſtandings, namely, its novelty, and the cenſure which it conveyed againſt the former method. 3. *Traite des tropes*, 1730, 8vo; again printed in 1771, 12mo. This work is intended to explain the different ſignifications of the ſame word. It is a maſter-piece of logic, of accuracy, of perſpicuity, and preciſion. The obſervations and the rules are illuſtrated by ſtriking examples calculated to ſhow both the uſe and the abuſe of the rhetorical figures. It is wonderful at the ſame time that this excellent book had very little ſale, and is ſcarcely known. A gentleman who wanted to compliment the author on this extraordinary performance, told him that he had heard a great deal of his *Hiſtoire des Tropes*, and begged to know in what particular part of the world the nation flouriſhed. 4. *Les véritable Principes de la Grammaire raiſonnée pour apprendre la langue Latine*, 1729, 4to. There was only the preface of this work publiſhed, in which he introduced the greateſt part of his *me-*

thode raiſonnée. 5. *Labiege de la fable du Pere Jouvenci,* arranged after the manner of the original plan, 1731, 12mo. 6. *Une reponſe manuſcrite a la Critique de l'hiſtoire des oracles par le Pere Baltus.* There are only imperfect fragments of theſe papers to be found.—7. *Logique, ou reflections ſur les operations de l'eſprit.* This is a ſhort tract, which nevertheleſs contains every thing neceſſary to be known on the art of reaſoning. It was reprinted at Paris, in two parts, together with the articles which he had furniſhed for the *Encyclopédie,* 1762. We ſhall altogether omit ſeveral other performances, calculated to diſſeminate the principles of Deiſm or Profanity; which, though they are publiſhed in his name, may be ſpurious, and at any rate deſerve not to be drawn from that oblivion in which they have fallen.

MARSAL, a town of France, in the department of Meurthe and late province of Lorrain. It is remarkable for its ſalt-works, and ſeated on the Selle, in a marſh of difficult acceſs; which, with the fortifications, renders it an important place. It is 17 miles north-eaſt of Nanci. E. lon. 6. 41. N. lat. 48. 49.

MARSALA, an ancient and ſtrong town of Sicily, in the valley of Mazara. It is well peopled, and built on the ruins of the ancient Lilybœum. E. lon. 12. 37. N. lat. 37. 52.

MARSAN, or MOUNT-MARSAN, a town of France, in the late province of Gaſcony, and capital of a ſmall territory of the ſame name, fertile in wine; ſeated on the river Midule, in W. lon. 0. 29. N. lat. 44. 0.

MARSAQUIVER, or MARSALQUIVER, a ſtrong and ancient town of Africa, on the coaſt of Barbary, and in the province of Beni-Arax, in the kingdom of Tremeſen, with one of the beſt harbours in Africa. It was taken by the Spaniards in 1732. It is ſeated on a rock near a bay of the ſea, in W. lon. 0. 10. N. lat. 35. 40.

MARSEILLES, a ſtrong city of France, in the department of the Mouths of the Rhone and late province of Provence. It was lately an epiſcopal ſee; and the inhabitants are computed to be 90,000. It was ſo celebrated in the time of the Romans, that Cicero ſtyled it the Athens of the Gauls, and Pliny called it the Miſtreſs of Education. It is ſeated on the Mediterranean, at the upper end of a gulf, covered and defended by many ſmall iſlands; and it is partly on the declivity of a hill, and partly in a plain. It is divided into the Old Town, or the City, and the New Town. The firſt appears like an amphitheatre to the veſſels which enter the port; but the houſes are mean, and the ſtreets dirty, narrow, and ſteep. In this part is the principal church, built by the Goths, on the ruins of the temple of Diana. The New Town is a perfect contraſt to the City, with which it has a communication by one of the fineſt ſtreets imaginable; and its other ſtreets, the ſquares, and the public buildings are beautiful. With reſpect to commerce, Marſeilles has been called Europe in Miniature, on account of the variety of dreſſes and languages which are here ſeen and heard. The port is a baſin of an oval form, 3480 feet long, by 960 in its wideſt part, with eighteen or twenty feet depth of water; and is defended by a citadel and a fort. In 1649, the plague raged with great violence, and with ſtill greater in 1720, when it carried off 50,000 of the inhabitants. The memory of this great calamity is preſerved by two pictures, painted by Serre, in the hall of the town-houſe. In 1793 Marſeilles revolted againſt the French National Convention, but was very ſoon reduced. It is 13 miles north-weſt of Toulon, and 362 ſouth by eaſt of Paris. E. lon. 5. 27. N. lat. 43. 18.

MARSH (NARCISSUS), an exemplary Iriſh prelate, born at Hannington in Wiltſhire in 1638. He was made principal of St. Alban's-hall, Oxford, in 1673, but removed to the proveſtſhip of Dublin college in 1678. He was promoted to the biſhopric of Leighlin and Ferns in 1682, tranſlated to the archbiſhopric of Caſhel in 1690, to Dublin in 1694, and to Armagh in 1703. While he held the ſee of Dublin, he built a noble library for the uſe of the public, filled it with choice books, and ſettled a proviſion for two librarians. He repaired, at his own expence, ſeveral decayed churches, beſides buying in and reſtoring many impropriations and preſenting a great number of oriental MSS. to the Bodleian library. He was a very learned and accompliſhed man; was well verſed in ſacred and profane literature, in mathematics, natural philoſophy, the learned languages, eſpecially the oriental, and in both the theory and practice of muſic. He publiſhed, 1. *Inſtitutiones logicæ.*—2. *Manuductio ad Logicam,* written by Philip de Trieu; to which he added the Greek text of Ariſtotle, and ſome tables and ſchemes. 3. An introductory eſſay on the doctrine of ſounds, &c. He died in 1713.

MARSH, ſignifies a piece of ground flowed with water, yet ſo that the graſs and other vegetables riſe above the ſurface of the water, and by their decaying give riſe to putrid effluvia, which are very pernicious to the human body.

MARSHAL, or MARESCHAL, (*marſcallus*), primarily denotes an officer who has the care or the command of horſes. Nicod derives the word from *polemarcus,* "maſter of the camp;" Matthew Paris from *Martis ſenſcallus.* In the old Gauliſh language, *march* ſignified "horſe;" whence *marechal* might ſignify "him who commanded the cavalry." Other derivations have been given by different authors; and the name itſelf has been applied to officers of very different employments.

MARSHAL *of France,* before the new order of things in that country, was reckoned the higheſt dignity of preferment in the French armies. The dignity of marſhal came to be for life, though at its firſt inſtitution it was otherwiſe. They were then only the king's firſt ecuyers under the conſtable; but in time they became the conſtable's lieutenants in the command of the army, the conſtable himſelf being then become captain-general. At firſt they were but two in number; and their allowance was but 500 livres *per annum* in time of war, and nothing in time of peace: but in the reign of Francis I. a third was added; Henry II. created a fourth. Louis XIV. increaſed it to 20. Their office at firſt was, to marſhal the army under the conſtable, and to command in his abſence.

Earl MARSHAL *of Scotland.* His office was to command the cavalry, whereas the CONSTABLE commanded the whole army. They ſeem, however, to have had a ſort of joint command, as of old all orders were addreſſed "to our conſtable and marſchal." The office of earl marſchal has never been out of the noble family of Keith. It was reſerved at the union; and when the heritable juriſdictions were bought, it was in the crown, being forfeited by the rebellion of George Keith, earl marſchal, in 1715.

Earl MARSHAL *of England* is the eighth great officer of ſtate. This office, until it was made hereditary, always paſſed by grant from the king, and never was held by tenure or ſerjeanty (by any ſubject) as the offices of lord high ſteward and lord high conſtable were ſometimes held. The title is perſonal, the office honorary and officiary. They were formerly ſtyled *lord marſhal* only, until king Richard II. June 20, 1397, granted letters patent to Thomas Mowbray, earl of Nottingham, and to the heirs male of his body lawfully begotten, by the name and ſtyle of *earl marſhal*: and further, gave them power to bear in their hand a gold truncheon, enamelled with black at each end; having at the upper end of it the king's arms engraven thereon, and at the lower end his own arms.

King James I. was pleaſed, by letters patent, dated Auguſt 29th 1622, to conſtitute Thomas Howard, earl of Arundel and Surrey, earl marſhal for life; and the next year, the ſame

king granted (with the advice of the privy-council) letters patent, wherein it was declared, that during the vacancy of the office of lord high conſtable of England, the earl marſhal had the like juriſdiction in the court of chivalry, as both conſtable and marſhal jointly ever exerciſed. See CHIVALRY (*Court of*).

On the 19th of October 1672, king Charles II. was pleaſed to grant to Henry lord Howard, and the heirs-male of his body lawfully begotten, the office and dignity of earl marſhal of England, with power to execute the ſame by deputy or deputies, in as full and ample a manner as the ſame was heretofore executed by Henry Howard, lord Maltravers, late earl of Arundel, Surrey, and Norfolk, grandfather to the ſaid Henry lord Howard; or by Thomas Howard late duke of Norfolk, grandfather to the ſaid Thomas Howard, late earl of Arundel, Surrey, and Norfolk; or by Thomas Howard duke of Norfolk, grandfather of the ſaid Thomas Howard duke of Norfolk; or by John Mowbray duke of Norfolk, or any other earl marſhal of England; with a penſion of 20l. each year, payable out of the Hanaper office in chancery; and on default of the iſſue-male of the ſaid Henry lord Howard, with limitation to the heirs-male lawfully begotten of the body of the ſaid Thomas Howard, earl of Arundel, &c.; and on the default of ſuch iſſue to deſcend in like manner to the heirs-male of Thomas late earl of Suffolk; and, on default of his iſſue-male, to the heirs-male of lord William Howard, late of Naworth in the county of Cumberland, youngeſt ſon to Henry Howard late duke of Norfolk; and on default of his iſſue-male, to Charles Howard earl of Nottingham, and the heirs-male of his body lawfully begotten.

Field-MARSHAL, an office of high rank in the European armies. It was long, however, diſuſed in the Britiſh army, but has lately been revived in the perſon of his Royal Highneſs the Duke of York, and ſome other general officers.

Knight MARSHAL, or MARSHAL *of the King's Houſe*, an Engliſh officer, whoſe buſineſs, according to Fleta, is to execute the commands and decrees of the lord ſteward, and to have the cuſtody of priſoners committed by the court of verge. Under him are ſix marſhal's men, who are properly the king's bailiffs, and arreſt in the verge of the court, when a warrant is backed by the board of green-cloth. The court where cauſes of this kind, between man and man, are tried, is called the *Marſhalſea*, and is under the knight-marſhal. See MARSHALSEA. This is alſo the name of the priſon in Southwark; the reaſon of which may probably be, that the marſhal of the king's houſe was wont to ſit there in judgement, or keep his priſon.

MARSHAL *of the King's Bench*, an officer who has cuſtody of the priſon called the *King's Bench*, in Southwark.—He gives attendance upon the court, and takes into his cuſtody all priſoners committed by the court; he is fineable for his abſence, and non-attendance incurs a forfeiture of his office. The power of appointing the marſhal of the king's bench is in the crown. In Fleta, mention is alſo made of a *marſhal of the exchequer*, to whom the court commits the cuſtody of the king's debtors, &c.

MARSHAL (Thomas), a very learned Engliſh divine in the 17th century, was educated at Oxford. This city being garriſoned upon the breaking out of the civil wars, he bore arms for the king. Afterward he had ſeveral ſucceſſive preferments in the church; and died at Lincoln-college, of which he was rector. By his will he left all his books and MSS. to the univerſity of Oxford, and money to Lincoln-college for the maintenance of three ſcholars. He was a noted critic, eſpecially in the Gothic and Engliſh-Saxon tongues; and eminent for his piety and other valuable qualities. He wrote, 1. *Obſervationes in Evangeliorum verſiones per antiquos duos, Goth. ſcilicet & Anglo-Sax.* &c. 2. Notes on the church-catechiſm, &c.

MARSHALLING *a* COAT, in heraldry, is the diſpoſal of ſeveral coats of arms belonging to diſtinct families in one and the ſame eſcutcheon or ſhield, together with their ornaments, parts, and apurtenances. See HERALDRY.

MARSHALSEA *(the Court of)*, and the *Palace-court* at Weſtminſter, though two diſtinct courts, are frequently confounded together. The former was originally holden before the ſteward and marſhal of the king's houſe, and was inſtituted to adminiſter juſtice between the king's domeſtic ſervants, that they might not be drawn into other courts, and thereby the king loſe their ſervice. It was formerly held in, though not a part of, the *aula regis*; and, when that was ſubdivided, remained a diſtinct juriſdiction: holding plea of all treſpaſſes committed within the verge of the court, where only one of the parties is in the king's domeſtic ſervice (in which caſe the inqueſt ſhall be taken by a jury of the country); and of all debts, contracts, and covenants, where both of the contracting parties belong to the royal houſehold; and then the inqueſt ſhall be compoſed of men of the houſehold only. By the ſtatute of 13 Ric. II. ſt. 1. c. 3. (in affirmance of the common law) the verge of the court in this reſpect extends for 12 miles round the king's place of reſidence. And, as this tribunal was never ſubject to the juriſdiction of the chief juſticiary, no writ of error lay from it (though a court of record) to the king's-bench, but only to parliament, till the ſtatutes of 5 Edw. III. c. 2. and 10 Edw. III. ſt. 2. c. 3. which allowed ſuch writ of error before the king in his place. But this court being ambulatory, and obliged to follow the king in all his progreſſes, ſo that by the removal of the houſehold, actions were frequently diſcontinued, and doubts having ariſen as to the extent of its juriſdiction, king Charles I. in the ſixth year of his reign, by his letters patent, erected a new court of record, called the *curia palatii*, or *palace-court*, to be held before the ſteward of the houſehold, and knight-marſhal, and the ſteward of the court, or his deputy; with juriſdiction to hold plea of all manner of perſonal actions whatſoever, which ſhall ariſe between any parties within 12 miles of his majeſty's palace at Whitehall. The court is now held once a week, together with the ancient court of marſhalſea, in the borough of Southwark: and a writ of error lies from thence to the court of king's-bench. But if the cauſe is of any conſiderable conſequence, it is uſually removed on its firſt commencement, together with the cuſtody of the defendant, either into the king's-bench or common-pleas by a writ of *habeas corpus cum cauſa*: and the inferior buſineſs of the court hath of late years been much reduced, by the new courts of conſcience erected in the environs of London; in conſideration of which the four counſel belonging to theſe courts had ſalaries granted them for their lives by the ſtat. 23 Geo. II. c. 27.

MARSHAM (Sir John), a very learned Engliſh writer in the 17th century. He ſtudied the law in the Middle Temple, and was ſworn one of the ſix clerks in the court of chancery in 1638. In the beginning of the civil wars he followed the king to Oxford; for which he was ſequeſtered of his place by the parliament at Weſtminſter, and plundered. After the declining of the king's affairs, he returned to London; compounded, among other royaliſts, for his real eſtate; and betook himſelf wholly to his ſtudies and a retired life, the fruits of which were ſome excellent works. He wrote *Diatriba Chronologica; Chronicus Canon, Ægyptiacus, Ebraicus, Græcus*, &c. He died in 1685.

MARSHFIELD, a town of Glouceſterſhire, 7 miles from Bath, 12 from Chipping-Sodbury, 12½ from Briſtol, 35 from Glouceſter, and 104 from London, on the road to Briſtol, and on the very borders of Wilts. It is a conſiderable clothing-town, drives a good trade in malt, and is famous for cakes. It conſiſts chiefly of one ſtreet of old buildings near a mile long; and is governed by a bailiff. It has a large church,

with a well-endowed alms-houſe and a chapel to it for eight poor people, and a charity-ſchool; and it has a weekly market and two fairs.

MARSHLAND, a marſhy peninſula in the county of Norfolk, oppoſite to King's-Lynn, almoſt ſurrounded with the Ouſe and other navigable rivers, and an arm of the ſea. It ſeems formerly to have been recovered out of the ocean, from whoſe inundations it could never be altogether defended; and in Sir Henry Spelman's time it ſuffered two general ones, viz. one from the ſalt-water, the other from the freſhes; by the laſt of which the inhabitants ſuffered 42,000l. damage. It contains about 30,000 acres, which turn to more profit by grazing than ploughing. It is about 10 miles in the wideſt place, and has no leſs than 111 brick bridges. The commonage of it belongs to ſeven villages that ſurround it. The air is ſo unhealthy, that an ague is commonly called the *Marſhland-Bailiff*.

MARSHMALLOW, in botany. See ALTHÆA.

MARSI, a nation of Germany, who afterwards came to ſettle in Italy, where they occupied the territory in the environs of the Fucine Lake. They at firſt proved very inimical to the Romans, but in proceſs of time they became its firmeſt ſupporters. They were allowed by the Romans to be the moſt intrepid ſoldiers of their legions when in friendſhip, and the moſt formidable of their enemies when at variance; and it was a common ſaying, that Rome could neither triumph over the Marſi nor without them. They are particularly celebrated for the civil war in which they were engaged, and which from them has received the name of the *Marſian war*. The large contributions they made to ſupport the intereſt of Rome, and the number of men which they continually ſupplied to the republic, rendered them bold and aſpiring; and they claimed, with the reſt of the Italian ſtates, a ſhare of the honour and privileges which were enjoyed by the citizens of Rome. This petition, though ſupported by the intereſt, the eloquence, and the integrity of the tribune Druſus, was received with contempt by the Roman ſenate; upon which, in the 662d year of Rome, the Marſi put themſelves at the head of the ſocial war, one of the moſt obſtinate and dangerous oppoſitions ever made to the progreſs of the Roman power. They obtained ſeveral victories: but they were at laſt defeated: though the war was not terminated but by a grant of thoſe privileges for which they contended.

MARSICO NUOVO, a ſmall, rich, and handſome town of Italy, in the kingdom of Naples, and in the Hither Principato, with a biſhop's ſee. It is ſeated at the foot of the Apennines, near the river Agri, in E. lon. 15. 49. N. lat. 20. 42.

MARSIGLI (LEWIS FERDINAND, COUNT), an Italian famous for letters as well as arms, was deſcended from an ancient and noble family, and born at Bologna in 1658. He acquired a great knowledge in the art of war and fortification; ſerved under the emperor Leopold II. againſt the Turks, by whom he was taken priſoner in 1683, but redeemed after a year's captivity. In the Spaniſh ſucceſſion war, Marſigli, then advanced to the rank of marſhal, being in the fortreſs of Briſac, which ſurrendered to the duke of Burgundy in 1703, when the place was deemed capable of holding out much longer, was ſtripped of all his commiſſions, and had his ſword broke over him; and the count d'Arco who commanded was beheaded. Marſigli now ſought for conſolation in the ſciences; as, amidſt all the hurry and fatigue of war, he had made all the advantages the moſt philoſophic man could do, who had travelled purely in queſt of knowledge. He had a rich collection of every thing proper to the advancement of natural knowledge, inſtruments aſtronomical and chemical, plans of fortifications, models of machines, &c. all which he preſented to the ſenate of Bologna by an authentic act in 1712, forming at the ſame time out of them what he called *the inſtitute of the arts and ſciences at Bologna*. He alſo founded a printing-houſe, and furniſhed it with the beſt types for Latin, Greek, Hebrew, and Arabic, which he preſented in 1728 to the Dominicans at Bologna, on condition of their printing all the writings of the *inſtitute* at prime coſt: this was called *the Printing-houſe of St. Thomas Aquinas*. His writings on philoſophical ſubjects are numerous and valuable, in Latin, Italian, and French: he died in 1730.

MARSTON (JOHN), an Engliſh dramatic writer, who lived in the time of James I. Wood ſays he was a ſtudent in Corpus Chriſti college Oxford; but we neither know his family nor the time of his birth. He contributed eight plays to the ſtage, which were all acted at Black-friars with applauſe; and one of them, called the *Dutch Courtezan*, was once revived ſince the Reſtoration, under the title of the *Revenge*, or a *Match in Newgate*. There is no account when he died; but we find his works were publiſhed after his death by Shakeſpeare, and may thence reaſonably conclude that it happened about the year 1614. He was a chaſte and pure writer; avoiding all that obſcenity, ribaldry, and ſcurrility, which too many of the dramatiſts of that time, and indeed much more ſo in ſome periods ſince, have made the baſis of their wit, to the great diſgrace and ſcandal of the ſtage.

MARSYAS (fab. hiſt.), a celebrated muſician of Celænæ in Phrygia, ſon of Olympus, or of Hyagnis, or Œagrus. He was ſo ſkilful in playing on the flute, that he is generally deemed the inventor of it. According to the opinion of ſome, he found it when Minerva had thrown it aſide on account of the diſtortion of her face when ſhe played upon it. Marſyas was enamoured of Cybele, and he travelled with her as far as Nyſa, where he had the imprudence to challenge Apollo to a trial of his ſkill as a muſician. The god accepted the challenge, and it was mutually agreed that he who was defeated ſhould be flayed alive by the conqueror. The Muſes, or (according to Diodorus) the inhabitants of Nyſa, were appointed umpires. Each exerted his utmoſt ſkill, and the victory with much difficulty was adjudged to Apollo. The god upon this tied his antagoniſt to a tree, and flayed him alive. The death of Marſyas was univerſally lamented; the Fauns, Satyrs, and Dryads, wept at his fate; and from their abundant tears aroſe a river of Phrygia, well known by the name of *Marſyas*. The unfortunate Marſyas is often repreſented on monuments, as tied with his hands behind his back to a tree, while Apollo ſtands before him with his lyre in his hands. In independent cities, among the ancients, the ſtatue of Marſyas was generally erected in the forum, to repreſent the intimacy which ſubſiſted between Bacchus and Marſyas as the emblems of liberty. At Celænæ, the ſkin of Marſyas was ſhown to travellers for ſome time. It was ſuſpended in the public place, in the form of a bladder or a foot ball. The ſources of the Marſyas were near thoſe of the Mæander, and thoſe two rivers had their confluence a little below the town of Celænæ.

MART, a great fair held every year for buying and ſelling goods. Public marts, or places of buying and ſelling, ſuch as markets and fairs, with the tolls thereunto belonging, can only be ſet up by virtue of the king's grant, or by long and immemorial uſage and preſcription, which preſuppoſes ſuch a grant. The limitation of theſe public reſorts, to ſuch time and place as may be moſt convenient for the neighbourhood, forms a part of economics, or domeſtic polity; which, conſidering the kingdom as a large family, and the king as the maſter of it, he has clearly a right to diſpoſe and order as he pleaſes.

MARTABAN, a province of Aſia, in the kingdom of Pegu, lying in the gulph of Bengal. It is a country that produces rice and all kinds of fruits proper to the climate. It has mines of ſeveral ſorts of metals, and carries on a great trade. The chief town, which is of the ſame name, is rich, handſome, and

very populous, with a good harbour. E. long. 97. 50. N. lat. 15. 35.

MARTEAU, the name given by French naturaliſts to a peculiar ſpecies of oyſters, called alſo *malleam* by others. It is one of the moſt curious ſhells in the world. Its figure is that of a hammer, with a very long head, or rather of a pick-ax. It has a body of moderate thickneſs, and two long arms. It is of a browniſh colour, with a beautiful tinge of a violet blue. Notwithſtanding the ſtrange ſhape of theſe ſhells, they cloſe very exactly.

MARTHA (St.), a province of South America, on the coaſt of Terra Firma, bounded on the north by the North Sea, on the eaſt by Rio de la Hache, on the ſouth by New-Granada, and on the weſt by Carthagena. It is 300 miles in length and 200 in breadth, is a mountainous country, and the land very high. Here begins the famous ridge of mountains called the *Cordilleras des los Andes*, which run from north to ſouth the whole length of the continent of South America. It is extremely hot on the ſea-coaſt; but cold in the internal parts, on account of the mountains. It abounds with the fruits proper to the climate; and there are mines of gold and precious ſtones, as alſo ſalt-works. The Spaniards poſſeſs but one part of this province, in which they have built Martha the capital. The air about the town is wholeſome; and is ſeated near the ſea, having a harbour ſurrounded with high mountains. It was formerly very conſiderable when the galleons were ſent thither, but is now come almoſt to nothing. W. lon. 74. 11. N. lat. 11. 20.

Martha (St.), or *Sierra Neveda*, a very high mountain in New Spain. Some ſay it is 100 miles in circumference at the bottom, and five miles in height. The top is always covered with ſnow in the hotteſt weather; and the French affirm, that they can perceive it from the iſland of St. Domingo, which is 370 miles diſtant. W. lon. 74. 35. N. lat. 8. 0.

Martha's *Vineyard*, an iſland of North America near the coaſt of New-England, 80 miles ſouth of Boſton. The inhabitants apply themſelves chiefly to their fiſheries, in which they have great ſucceſs. W. lon. 70. 35. N. lat. 41. 0.

MARTIAL, is ſometimes uſed to expreſs preparations of iron, or ſuch as are impregnated therewith; as the martial regulus of antimony, &c.

Martial-*Court*. See Court-*Martial*.

Martial *Law*, is the law of war that depends upon the juſt but arbitrary will and pleaſure of the king, or his lieutenant: for though the king doth not make any laws but by common conſent in parliament, yet, in time of war, by reaſon of the neceſſity of it to guard againſt dangers that often ariſe, he uſeth abſolute power, ſo that his word is a law. *Smith de Repub. Ang. lib.* 2. *c.* 4. But the martial law, according to Chief Juſtice Hale), is in reality not a law, but ſomething indulged rather than allowed as a law; and it relates only to members of the army, being never intended to be executed on others, who ought to be ordered and governed by the laws to which they are ſubject, though it be a time of war. And the exerciſe of martial law, whereby any perſon might loſe his life, or member, or liberty, may not be permitted in time of peace, when the king's courts are open for all perſons to receive juſtice.

MARTIALIS (Marcus Valerius), a famous Latin poet, born at Bilbilis, now called *Bubiera*, in the kingdom of Arragon in Spain, was of the order of knights. He went to Rome at the age of 21, and ſtaid there 35 years, under the reign of Galba and the ſucceeding emperors, till that of Trajan; and having acquired the eſteem of Titus and Domitian, he was created tribune. At length, finding that he was neglected by Trajan, he returned to his own country Bilbilis, where he married a wife, and had the happineſs to live with her ſeveral years. He admires and commends her much, telling her that ſhe alone was ſufficient to ſupply the want of every thing he enjoyed at Rome. "*Romam tu mihi ſola facis*," ſays he, in the [illegible] gram of the 12th book. She appears likewiſe to have been a lady of a very large fortune; for, in the 11ſt epigram of the ſame book, he extols the magnificence of the [illegible] he had received from her, and ſays that ſhe had made him a little kind of monarch.

Munera ſunt domino: poſt ſeptima luſtra reverſo,
Has Marcella domos, parvaque regna dedit.

There are ſtill extant 14 books of his epigrams, filled with points, a play upon words, and obſcenities. The ſtyle is affected. However, ſome of his epigrams are excellent: many of them are of the middling kind; but the greateſt part of them are bad: ſo that Martial never ſpoke a greater truth, than when he ſaid of his own works, *Sunt bona, ſunt quædam mediocra, ſunt mala plura*.

There is alſo attributed to him a book on the ſpectacles of the amphitheatre; but the moſt learned critics think that this laſt work was not written by Martial. The beſt editions of Martial are, that *in Uſum Delphini*, 4to. Paris, 1617, and that *cum Notis Variorum*.

MARTIGUES, a ſea-port of France, in the department of the Mouths of the Rhone and late province of Provence. It is ſeated near a lake, 12 miles long and five broad, which is twenty times leſs conſiderable than it was formerly, but whence they get very fine fiſh and excellent ſalt. Martigues is 20 miles north-weſt of Marſeilles. E. lon. 5. 2. N. lat. 43. 9.

MARTIN (St.), was born at Sabaria in Pannonia, (at preſent *Stain* in Lower Hungary), in the beginning of the fourth century. His father was a military tribune; and he himſelf was obliged to carry arms, although peace and ſolitude were much more agreeable to his inclination. He was remarkable for every virtue, in a profeſſion which is generally conſidered to give a ſanction to vice. He divided his coat with a naked wretch whom he met at the gate of Amiens; and it is reported, that Jeſus Chriſt appeared to him on the night following, clothed in this half of his coat. Martin was then a catechumen; but he ſoon afterwards received baptiſm, and renounced the military profeſſion for the eccleſiaſtical. After paſſing many years in ſolitude, St. Hilary biſhop of Poictiers gave him the power to caſt out devils. On his return to Pannonia, he perſuaded his mother to embrace Chriſtianity; and with great zeal and activity oppoſed the Arians, who governed the church in Illyria. When he was publicly whipt for giving teſtimony to the divinity of Chriſt, he bore the puniſhment with the conſtancy and patience of the firſt martyrs. This illuſtrious champion for Chriſtianity, when he heard that St. Hilary was returned from baniſhment, went and ſettled in the neighbourhood of Poictiers. In this retirement a great number of monks placed themſelves under his direction. His virtues became every day more ſplendid and remarkable, till he was drawn from his ſolitude, and with the general approbation of the clergy and people elected biſhop of Tours in the year 374. To the zeal and charity of a biſhop, he joined the humility and poverty of an anchorite. That he might detach himſelf more from the world, he built the celebrated monaſtery of Marmoutier, which ſtill remains, and which is believed to be the oldeſt abbey in France. It is ſituated near the city of Tours, betwixt the Loire and a ſteep rock. In this ſituation, together with 80 monks, St. Martin diſplayed the moſt exemplary ſanctity and mortification, nor were there any monks better diſciplined than thoſe of Marmoutier. After he had converted his dioceſe to the Chriſtian faith, he became the apoſtle of all Gaul. He diffuſed the doctrines of Chriſtianity among the heathens, deſtroyed their temples, and (according to the writers of his life) confirmed the truth by an infinite number of miracles. The emperor Valentinian, at that time in Gaul, received him

with every mark of reſpect and honour. The tyrant Maximus, who had revolted againſt the emperor Gratian, and ſeized on Spain, England, and Gaul, received him in a manner no leſs diſtinguiſhed. The holy biſhop attended him at Treves in the year 383, to ſolicit ſome favours. Maximus made him ſit at his table with the moſt illuſtrious perſons of his court, and placed him at his right hand. In drinking, the uſurper commanded his ſervants to give him a cup, that he might again receive it from him; but this extraordinary prelate gave it to the prieſt who accompanied him on his journey. This holy boldneſs, far from diſpleaſing them, gained him the favour of the emperor and of his court. Martin, who was an enemy to hereſy, but a friend to mankind, employed his influence with this prince to preſerve the Priſcillianiſts, who were perſecuted by Ithace and by Idace, biſhops of Spain. The biſhop of Tours would hold no communion with men whoſe principles of religion inclined them to ſhed the blood of mankind; and he obtained the life of thoſe whoſe death they had ſolicited. On his return to Tours, he prepared himſelf for the reward of his labours in another world. He died at Candes the 8th of November 397, but according to others on the 11th of November 400. His name is given to a particular opinion concerning the myſtery of the holy Trinity. St. Martin is the firſt of the ſaints confeſſors to whom the Latin church offered public prayers. His life is written in elegant Latin by Fortunatus and Sulpitius Severus one of his diſciples. Paul of Perigueux and Fortunatus of Poictiers have given us Sulpicius's life of Martin in verſe; but they have debaſed the admirable proſe of the author by a wretched poetical imitation. Nicolas Gervais wrote alſo the life of St. Martin, full of many curious and entertaining facts, publiſhed at Tours in 1699, in 4to. The tradition at Amiens is, that St. Martin performed the act of charity which rendered him ſo famous, near an ancient gate of the city, of which the ruins are ſtill viſible. The following Latin verſes, which do more honour to the ſaint than to the poet, are inſcribed on one of the ſtones:

Hic quondam veſtem Martinus dimidiavit;
Ut faceremus idem, nobis exemplificavit.

Martin (Benjamin), one of the moſt eminent artiſts and mathematicians of the age, was born in 1704. After publiſhing a variety of ingenious treatiſes, and particularly a Scientific Magazine under his own name, and carrying on for many years a very extenſive trade as an optician and globe-maker in Fleet-ſtreet, the growing infirmities of age compelled him to withdraw from the active part of buſineſs. Truſting too fatally to what he thought the integrity of others, he unfortunately, though with a capital more than ſufficient to pay all his debts, became a bankrupt. The unhappy old man, in a moment of deſperation from this unexpected ſtroke, attempted to deſtroy himſelf; and the wound, though not immediately mortal, haſtened his death, which happened February 9th 1782, in his 78th year. He had a valuable collection of foſſils and curioſities of almoſt every ſpecies; which, after his death, were almoſt given away by public auction. His principal publications, as far as they have occurred to recollection, are, The Philoſophic Grammar; being a view of the preſent ſtate of experimental phyſiology, or natural philoſophy, 1735, 8vo. A new, complete, and univerſal Syſtem or Body of Decimal Arithmetic, 1735, 8vo. The Young Student's Memorial Book, or Patent Library, 1735, 8vo. Deſcription and Uſe of both the Globes, the Armillary Sphere and Orrery, Trigonometry, 1736, 2 vols 8vo. Memoirs of the Academy of Paris, 1740, 5 vols. Syſtem of the Newtonian Philoſophy, 1759, 3 vols. New Elements of Optics, 1759. Mathematical Inſtitutions, viz. Arithmetic, Algebra, Geometry, and Fluxions, 1750. Natural Hiſtory of England, with a Map of each County, 1759, 2 vols. Philology, and Philoſophical Geography, 1750. Mathematical Inſtitutions, 1764, 2 vols. Lives of Philoſophers, their Inventions, &c. 1764. Introduction to the Newtonian Philoſophy, 1765. Inſtitutions of Aſtronomical Calculations, 2 parts, 1765. Deſcription and Uſe of the Air-Pump, 1766. Deſcription of the Torricellian Barometer, 1766. Appendix to the Deſcription and Uſe of the Globes, 1766. Philoſophia Britannica, 1778, 3 vols. Gentleman and Lady's Philoſophy, 3 vols. Miſcellaneous Correſpondence, 4 vols. Syſtem of Philology. Philoſophical Geography. Magazine complete, 14 vols. Principles of Pump-work. Theory of the Hydrometer. Doctrine of Logarithms.

Martin, (St.) a town of France, in the iſle of Rhe, with a harbour and ſtrong citadel, 15 miles weſt of Rochelle. W. lon. 1. 17. N. lat. 46. 10.

Martin (St.) one of the Leeward Carribean iſlands, in the W. Indies, lying to the north-weſt of St. Bartholomew, and to the ſouth-weſt of Anguilla. It is 24 miles in circumference, has neither harbour nor river, but ſeveral ſalt-pits. It was long jointly poſſeſſed by the French and Dutch; but at the commencement of the preſent war, the former were expelled by the latter. W. lon. 63. 0. N. lat. 18 4.

Cape Martin, a promontory of Valencia in Spain, near a town called *Denia*, and ſeparates the Gulph of Valencia from that of Alicant.

Martin, in zoology. See Hirundo and Mustela.

Free Martin, in zoology, is a name given in this country to a cow-calf caſt at the ſame time with a bull-calf, which is a kind of hermaphrodite that is never known to breed nor to diſcover the leaſt inclination for the bull, nor does the bull ever take the leaſt notice of it. See Hermaphrodite.

MARTINGALE, in the manege, a thong of leather, faſtened to one end of the girths under a horſe's belly, and at the other end to the muſs-roll, to keep him from rearing.

MARTINICO, the chief of the French Caribbee iſlands, the middle of which is ſituated in W. lon. 61. 0. N. lat. 14. 30. This iſland was firſt ſettled by M. Deſnambuc a Frenchman, in the year 1635, with only 100 men from St. Chriſtopher's. He choſe rather to have it peopled from thence than from Europe; as he foreſaw that men, tired with the fatigue of ſuch a long voyage, would moſtly periſh ſoon after their arrival, either from the climate, or from the hardſhips incident to moſt emigrations. They completed their firſt ſettlement without any difficulty. The natives, intimidated by their fire-arms, or ſeduced by promiſes, gave up the weſtern and ſouthern parts of the iſland to the new comers. In a ſhort time, however, perceiving the number of theſe enterpriſing ſtrangers daily increaſing, they reſolved to extirpate them, and therefore called in the ſavages of the neighbouring iſlands to aſſiſt them. They fell jointly upon a little fort that had been haſtily erected; but were repulſed with the loſs of 700 or 800 of their beſt warriors, who were left dead upon the ſpot.

After this check, the ſavages for a long time diſappeared entirely; but at laſt they returned, bringing with them preſents to the French, and making excuſes for what had happened. They were received in a friendly manner, and the reconciliation ſealed with pots of brandy. This peaceable ſtate of affairs, however, was of no long continuance; the French took ſuch undue advantages of their ſuperiority over the ſavages, that they ſoon rekindled in the others that hatred which had never been entirely ſubdued. The ſavages, whoſe manner of life requires a vaſt extent of land, finding themſelves daily more and more ſtraitened, had recourſe to ſtratagem, in order to deſtroy their enemies. They ſeparated into ſmall bands and way-laid the French as they came ſingly out into the woods to hunt, and, waiting till the ſportſman had diſcharged his piece, ruſhed upon and killed him before he could charge it again. Twenty men had been thus aſſaſſinated before any reaſon could be given for their ſudden diſappearance; but as

ſoon as the matter was known, the French took a ſevere and fatal revenge; the ſavages were purſued and maſſacred, with their wives and children, and the few that eſcaped were driven out of Martinico, to which they never returned.

The French being thus left ſole maſters of the iſland, lived quietly on thoſe ſpots which beſt ſuited their inclinations. At this time they were divided into two claſſes. The firſt conſiſted of thoſe who had paid their paſſage to the iſland, and theſe were called *inhabitants*; and to theſe the government diſtributed lands, which became their own, upon paying a yearly tribute. Theſe inhabitants had under their command a multitude of diſorderly people brought over from Europe at their expence, whom they called *engagés*, or bondſmen. This engagement was a kind of ſlavery for the term of three years; on the expiration of which they were at liberty, and became the equals of thoſe whom they had ſerved. They all confined themſelves at firſt to the culture of tobacco and cotton; to which was ſoon added that of arnotto and indigo. The culture of ſugar alſo was begun about the year 1650. Ten years after, one Benjamin d'Acoſta, a Jew, planted ſome cocoa-trees; but his example was not followed till 1684, when chocolate was more commonly uſed in France. Cocoa then became the principal ſupport of the coloniſts, who had not a ſufficient fund to undertake ſugar-plantations; but by the inclemency of the ſeaſon in 1718, all the cocoa trees were deſtroyed at once.—Coffee was then propoſed as a proper object of culture. The French miniſtry had received, as a preſent from the Dutch, two of theſe trees, which were carefully preſerved in the king's botanical garden. Two young ſhoots were taken from theſe, put on board a ſhip for Martinico, and entruſted to the care of one Mr. Deſclieux. The ſhip happened to be ſtraitened for want of freſh water; and the trees would have periſhed, had not the gentleman ſhared with them that quantity of water which was allowed for his own drinking. The culture of coffee was then begun, and attended with the greateſt and moſt rapid ſucceſs. About the end of laſt century, however, the colony had made but ſmall advances. In 1700, it had only 6597 white inhabitants. The ſavages, mulattoes, and free negroes, men, women, and children, amounted to no more than 507. The number of ſlaves was but 14,566. All theſe together made a population of 21,645 perſons. The whole of the cattle amounted to 3668 horſes or mules, and 9217 head of horned cattle. The iſland produced a great quantity of cocoa, tobacco, and cotton; had nine indigo houſes, and 183 ſmall ſugar-plantations.

After the peace of Utrecht, Martinico began to emerge from that feeble ſtate in which it had ſo long continued. The iſland then became the mart for all the windward French ſettlements. In the ports of it the neighbouring iſlands ſold their produce, and bought the commodities of the mother-country; and, in ſhort, Martinico became famous all over Europe. In 1736, There were on the iſland 447 ſugar-works; 11,953,232 coffee-trees, 193,870 of cocoa; 2,068,480 plants of cotton, 39,400 of tobacco, 6750 of arnotto. The ſupplies for proviſion conſiſted of 4,806,142, banana-trees; 34,483,000 trenches of caſſiva; and 247 plots of potatoes and yams. The number of blacks amounted to 72,000 men, women, and children. Their labour had improved the plantations as far as was conſiſtent with the conſumption then made in Europe of American productions; and the annual exports from the iſland amounted to about 700,000l.

The connections of Martinico with the other iſlands entitled her to the profits of commiſſion, and the charges of tranſport; as ſhe alone was in the poſſeſſion of carriages. This profit might be rated at the tenth of the produce; and the ſum total muſt have amounted to near 765,000l. This ſtanding debt was ſeldom called in, and left for the improvement of their plantations. It was increaſed by advances in money, ſlaves, and other neceſſary articles; ſo that Martinico became daily more and more a creditor to the other iſlands, and thus kept them in conſtant dependence; while they all enriched themſelves by her aſſiſtance.

The connections of this iſland with Cape Breton, Canada, and Louiſiana, procured a market for the ordinary ſugars, the inferior coffee, the molaſſes, and rum, which would not ſell in France. In exchange the inhabitants received ſalt-fiſh, dried vegetables, deals, and ſome flour. In the clandeſtine trade on the coaſts of Spaniſh America, conſiſting wholly of goods manufactured by the nation, ſhe commonly made a profit of 90 per cent. on the value of about 175,000l. ſent yearly to the carraccas, or neighbouring colonies.

So many proſperous engagements brought immenſe ſums into Martinico. Upwards of 787,000l. were conſtantly circulated in that iſland with great rapidity; and this is perhaps the only country in the world, where the ſpecie has been ſo conſiderable as to make it a matter of indifference to them whether they dealt in gold, ſilver, or commodities. This extenſive trade brought into the ports of Martinico annually 200 ſhips from France; 14 or 15 fitted out by the mother-country for the coaſt of Guinea, 60 from Canada, 10 or 12 from the iſlands of Margaretta and Trinidad; beſides the Engliſh and Dutch ſhips that came to carry on a ſmuggling trade. The private navigation from the iſland to the northern colonies, to the Spaniſh continent, and to the windward iſlands, employed 120 veſſels from 20 to 30 tons burden.

The war of 1744 put a ſtop to this proſperity. Not that the fault was in Martinico itſelf; its navy, conſtantly exerciſed, and accuſtomed to frequent engagements, which the carrying on a contraband trade required, was prepared for action. In leſs than ſix months, 40 privateers, fitted out at St. Peter's, ſpread themſelves about the latitude of the Caribbee iſlands. They ſignaliſed themſelves in a manner worthy of the ancient freebooters; returning conſtantly in triumph, and laden with an immenſe booty. Yet, in the midſt of theſe ſucceſſes, an entire ſtop was put to the navigation of the colony, both to the Spaniſh coaſt and to Canada, and they were conſtantly diſturbed even on their own coaſts. The few ſhips that came from France, in order to compenſate the hazards they were expoſed to by the loſs of their commodities, ſold them at a very advanced price, and bought them at a very low one. By theſe means the produce decreaſed in value, the lands were ill cultivated, the works neglected, and the ſlaves periſhing for want.

When every thing thus ſeemed tending to decay, the peace at laſt reſtored the freedom of trade, and with it the hopes of recovering the ancient proſperity of the iſland. The event, however, did not anſwer the pains that were taken to attain it. Two years had not elapſed after the ceſſation of hoſtilities, when the colony loſt the contraband trade ſhe carried on with the American Spaniards. This was owing to the ſubſtitution of regiſter-ſhips to the fleets; and thus were the attempts of the ſmugglers confined within very narrow bounds. In the new ſyſtem, the number of ſhips was undetermined, and the time of their arrival uncertain; which occaſioned a variation in the price of commodities unknown before; and from that time the ſmuggler, who only engaged in this trade from the certainty of a fixed and conſtant profit, would no longer purſue it when it did not ſecure him an equivalent to the riſks he ran. But this loſs was not ſo ſenſibly felt by the colony as the hardſhips brought upon them by the mother-country. An unſkilful adminiſtration clogged the reciprocal and neceſſary connection between the iſlands and North America with ſo many formalities, that in 1755 Martinico ſent but four veſſels to Canada. The direction of the colonies, now committed to the care of ignorant and avaricious clerks, ſoon loſt its importance, ſunk into contempt, and was proſtituted to venality. The debts

which had been contracted during a ſeries of calamities had not yet been paid off, when the war broke out afreſh. After a ſeries of misfortunes and defeats, the iſland fell into the hands of the Britiſh. It was reſtored, however, in July 1763, 16 months after it had been conquered; but deprived of all the neceſſary means of proſperity, that had made it of ſo much importance. For ſome years paſt, the contraband trade carried on to the Spaniſh coaſts was almoſt entirely loſt. The ceſſion of Canada had precluded all hopes of opening again a communication, which had only been interrupted by temporary miſtakes. The productions of the Grenades, St. Vincent, and Dominica, which were now become Britiſh dominions, could no longer be brought into their harbours; and a new regulation of them other-country, which forbade her having any intercourſe with Guadaloupe, left her no hopes from that quarter.

The colony, thus deprived of every thing as it were, and deſtitute, nevertheleſs contained, at the laſt ſurvey, which was taken on the firſt of January 1770, in the compaſs of 28 pariſhes, 12,450 white people, of all ages, and of both ſexes; 1814 free blacks or mulattoes; 70,553 ſlaves, and 443 fugitive negroes. The number of births in 1766, was in the proportion of one in 30 among the white people, and of one in 25 among the blacks. From this obſervation, if it were conſtant, it ſhould ſeem that the climate of America is much more favourable to the propagation of the Africans than of the Europeans; ſince the former multiply ſtill more in the labours and hardſhips of ſlavery, than the latter in the midſt of plenty and freedom. The conſequence muſt be, that in proceſs of time the increaſe of blacks in America will ſurpaſs that of the white men; and, perhaps, at laſt avenge this race of victims on the deſcendents of the oppreſſors.

The cattle of the colony conſiſts of 8283 horſes or mules; 12,376 head of horned cattle; 975 hogs; and 13,544 ſheep or goats.

Their proviſions are, 17,930,596 trenches of caſſava; 3,509,048 banana-trees; and 406 ſquares and a half of yams and potatoes.

Their plantations contain 11,444 ſquares of land, planted with ſugar; 6,638,957 coffee-trees; 871,043 cocoa-trees; 1,764,807 cotton-plants; 59,966 trees of caſſia, and 61 of arnotto.

The meadows or ſavannahs take up 10,072 ſquares of land; there are 11,966 in wood, and 8448 uncultivated or forſaken.

The plantations which produce coffee, cotton, cocoa, and other things of leſs importance, are 1515 in number. There are but 286 for ſugar. They employ 116 water-mills, 12 wind-mills, and 184 turned by oxen. Before the hurricane of the 13th of Auguſt 1766, there were 302 ſmall habitations and 15 ſugar-works more.

In 1769, France imported from Martinico, upon 202 trading veſſels, 177,116 quintals of fine ſugar, and 12,579 quintals of raw ſugar; 68,518 quintals of coffee; 11,731 quintals of cocoa; 6048 quintals of cotton; 2518 quintals of caſſia; 783 caſks of rum; 307 hogſheads of molaſſes; 150 pounds of indigo; 2147 pounds of preſerved fruits; 47 pounds of chocolate; 282 pounds of raſped tobacco; 494 pounds of rope-yarn; 334 cheſts of liqueurs; 234 hogſheads of molaſſes, &c. 451 quintals of wood for dyeing: and 12,108 hides in the hair. All theſe productions together have been bought in the colony itſelf, for 536,631l. 9s. 1cd. It is true, that the colony has received from the mother-country to the amount of 588,412l. 16s. 6d. of merchandiſe; but part of this has been ſent away to the Spaniſh coaſts, and another part has been conveyed to the Engliſh ſettlements.

The iſland is 16 leagues in length, and 45 in circumference, leaving out the capes, ſome of which extend two or three leagues into the ſea. It is very uneven, and interſected in all parts by a number of hillocks; which are moſtly of a conical form. Three mountains riſe above theſe ſmaller eminences. The higheſt bears the indelible marks of a volcano. The woods with which it is covered continually attract the clouds, which occaſions noxious damps, and contributes to make it horrid and inacceſſible; while the two others are in moſt parts cultivated. From theſe mountains iſſue the many ſprings that water the iſland. Theſe waters, which flow in gentle ſtreams, are changed into torrents on the ſlighteſt ſtorm. Their qualities are derived from the ſoil over which they flow. In ſome places they are excellent, in others ſo bad that the inhabitants are obliged to drink the water they have collected during the rainy ſeaſon.

Of all the French ſettlements in the Weſt Indies, Martinico is the moſt happily ſituated with regard to the winds which prevail in thoſe ſeas. Its harbours poſſeſs the ineſtimable advantage of affording a certain ſhelter from the hurricanes which annoy theſe latitudes. The harbour of Fort Royal is one of the beſt in all the windward iſlands; and ſo celebrated for its ſafety, that, when it was open to the Dutch, their ſhipmaſters had orders from the republic to take ſhelter there in June, July, and Auguſt, the three months in which the hurricanes are moſt frequent. The lands of the Lamentin, which are but a league diſtant, are the richeſt and moſt fertile in the whole iſland. The numerous ſtreams which water this fruitful country, convey loaded canoes to a conſiderable diſtance from the ſea. The protection of the fortifications ſecured the peaceable enjoyment of ſo many advantages; which, however, were balanced by a ſwampy and unwholeſome ſoil. This capital of Martinico was alſo the rendezvous of the men of war; which branch of the navy has always oppreſſed the merchantmen. On this account, Fort Royal was an improper place to become the centre of trade, and was therefore removed to St. Peter's. This little town, notwithſtanding the fires that have four times reduced it to aſhes, ſtill contains 1700 houſes. It is ſituated on the weſtern coaſt of the iſland, on a bay or inlet, which is almoſt circular. One part of it is built on the ſtrand along the ſea-ſide, which is called the *Anchorage*, and is the place deſtined for ſhips and warehouſes. The other part of the town ſtands upon a low hill: it is called the *Fort*, from a ſmall fortification that was built there in 1665, to check the ſeditions of the inhabitants againſt the tyranny of monopoly; but it now ſerves to protect the road from foreign enemies. Theſe two parts of the town are ſeparated by a rivulet.

The anchorage is at the back of a pretty high and ſteep hill. Shut up as it were by this hill, which intercepts the eaſterly winds, the moſt conſtant and moſt ſalubrious in theſe parts; expoſed, without any refreſhing breezes, to the ſcorching beams of the ſun, reflected from the hill, from the ſea, and the black ſand on the beech; this place is extremely hot, and always unwholeſome. Beſides, there is no harbour; and the ſhips which cannot winter ſafely upon this coaſt are obliged to take ſhelter at Fort Royal. But theſe diſadvantages are compenſated by the conveniency of the road of St. Peter's, for loading and unloading of goods; and by its ſituation, which is ſuch that ſhips can freely go in and out at all times, and with all winds.

MARTLETS, in heraldry, little birds repreſented without feet, and uſed as a difference or mark of diſtinction for younger brothers, to put them in mind that they are to truſt to the wings of virtue and merit, in order to raiſe themſelves, and not to their feet, they having little land to ſet their foot on. See HERALDRY.

MARTYNIA, in botany: a genus of the angioſpermia order, belonging to the didynamia claſs of plants; and in the natural method ranking under the 10th order, *Perſonatæ*. The calyx is quinquefid, the corolla ringent, the capſule ligneous,

covered with a bark, with a hooked beak, trilocular, and bivalved.—There are two ſpecies; both of them tender herbaceous, flowery plants of South America; one of them an annual, the other a perennial, riſing with erect ſtalks from a foot to two feet high, garniſhed with oblong ſimple leaves, and terminated by ſhort ſpikes of large, monopetalous, bell-ſhaped flowers, of blue and purple colours. They flower in July and Auguſt, and are very ornamental, but require always to be kept in the hotteſt part of the ſtove.

MARTYR, is one who lays down his life, or ſuffers death, for the ſake of his religion. The word is Greek, *μαρτυρ*, and properly ſignifies "a witneſs." It is applied, by way of eminence, to thoſe who ſuffer in witneſs of the truth of the goſpel.

The Chriſtian church has abounded in martyrs, and hiſtory is filled with ſurpriſing accounts of their ſingular conſtancy and fortitude under the moſt cruel torments human nature was capable of ſuffering. The primitive Chriſtians were accuſed by their enemies of paying a ſort of divine worſhip to the martyrs. Of this we have an inſtance in the anſwer of the church of Smyrna to the ſuggeſtion of the Jews, who, at the martyrdom of Polycarp, deſired the heathen judge not to ſuffer the Chriſtians to carry off his body, leſt they ſhould leave their crucified maſter, and worſhip him in his ſtead. To which they anſwered, "We can neither forſake Chriſt, nor worſhip any other: for we worſhip him as the Son of God; but love the martyrs as the diſciples and followers of the Lord, for the great affection they have ſhown to their King and Maſter." A like anſwer was given at the martyrdom of Fructuoſus in Spain. For when the judge aſked Eulogius, his deacon, Whether he would not worſhip Fructuoſus? as thinking, that though he refuſed to worſhip the heathen idols, he might yet be inclined to worſhip a Chriſtian martyr; Eulogius replied, "I do not worſhip Fructuoſus, but him whom Fructuoſus worſhips." The primitive Chriſtians believed, that the martyrs enjoyed very ſingular privileges; that upon their death they were immediately admitted to the beatific viſion, while other ſouls waited for the completion of their happineſs till the day of judgment; and that God would grant chiefly to their prayers the haſtening of his kingdom, and ſhortening the times of perſecution.

The churches built over the graves of the martyrs, and called by their names, in order to preſerve the memory of their ſufferings, were diſtinguiſhed by the title *martyrium confeſſio*, or *memoria*.

The feſtivals of the martyrs are of very ancient date in the Chriſtian church, and may be carried back at leaſt till the time of Polycarp, who ſuffered martyrdom about the year of Chriſt 168. On theſe days the Chriſtians met at the graves of the martyrs, and offered prayers and thankſgivings to God for the examples they had afforded them: they celebrated the euchariſt, and gave alms to the poor; which, together with a panegyrical oration or ſermon, and reading the acts of the martyrs, were the ſpiritual exerciſes of theſe anniverſaries.

Of the ſayings, ſufferings, and deaths of the martyrs, though preſerved with great care for the above purpoſe, and to ſerve as models to future ages, we have but very little left, the greateſt part of them having been deſtroyed during that dreadful perſecution which Diocleſian carried on for ten years with freſh fury againſt the Chriſtians; for a moſt diligent ſearch was then made after all their books and papers; and all of them that were found were committed to the flames. Euſebius, indeed, compoſed a martyrology, but it never reached down to us; and thoſe ſince compiled are extremely ſuſpected. From the eighth century downwards, ſeveral Greek and Latin writers endeavoured to make up the loſs, by compiling, with vaſt labour, accounts of the lives and actions of the ancient martyrs, but which conſiſt of little elſe than a ſeries of fables: nor are thoſe records that paſs under the name of Martyrology worthy of ſuperior credit, ſince they bear the moſt evident marks both of ignorance and falſehood.

MARTYR (Peter), a famous divine, born at Florence in 1500. He ſtudied philoſophy and the tongues at Padua and Bononia, was a regular Auguſtine in the monaſtery of Fiſcoli, and was counted one of the beſt preachers in Italy. Zuinglius and Bucer's writings gave him a good opinion of the Proteſtants, and his converſation with Valdes confirmed it. He preached that doctrine at Rome in private; but, being impeached, fled to Naples, and thence to Lucca, where he brought over to the Proteſtant intereſt Emanuel Tremellius, Celſus, Martinengas, Paul Laſcius, and Jeremiah Zanchy. He was ſent for to England by king Edward VI. and made profeſſor of divinity at Oxford in 1549. In queen Mary's reign he returned to Straſbourg, and was preſent at the conference of Poiſſy. His ſentiments were not the ſame with Calvin's about Chriſt's preſence in the euchariſt. He wrote a great number of works, and died in 1562.

MARTYROLOGY, a catalogue or liſt of martyrs, including the hiſtory of their lives and ſufferings for the ſake of religion. The term comes from *μαρτυρ* "witneſs," and *λεγω dico*, or *λεγω colligo*. The martyrologies draw their materials from the kalendars of particular churches, in which the ſeveral feſtivals dedicated to them are marked; and which ſeem to be derived from the practice of the ancient Romans, who inſerted the names of heroes and great men in their faſti or public regiſters.

The martyrologies are very numerous, and contain many ridiculous and even contradictory narratives; which is eaſily accounted for, if we conſider how many forged and ſpurious accounts of the lives of ſaints and martyrs appeared in the firſt ages of the church, which the legendary writers afterwards adopted without examining into the truth of them. However, ſome good critics, of late years, have gone a great way towards clearing the lives of the ſaints and martyrs from the monſtrous heap of fiction they laboured under. See the article LEGEND.

The martyrology of Euſebius of Cæſarea was the moſt celebrated in the ancient church. It was tranſlated into Latin by St. Jerom; but the learned agree that it is not now extant. That attributed to Beda, in the eighth century, is of very doubtful authority; the names of ſeveral ſaints being there found who did not live till after the time of Beda. The ninth century was very fertile in martyrologies; then appeared that of Florus, ſubdeacon of the church at Lyons; who, however, only filled up the chaſms in Beda. This was publiſhed about the year 830, and was followed by that of Waldenburtus, monk of the dioceſe of Treves, written in verſe about the year 848, and this by that of Uſuard, a French monk, and written by the command of Charles the Bald in 875, which laſt is the martyrology now ordinarily uſed in the Romiſh church. That of Rabanus Maurus is an improvement on Beda and Florus, written about the year 845: that of Notker, monk of St. Gal, was written about the year 894. The martyrology of Ado, monk of Ferrieres, in the dioceſe of Treves, afterwards archbiſhop of Vienne, is a deſcendant of the Roman, if we may ſo call it; for Du Sollier gives its genealogy thus: The martyrology of St. Jerom is the great Roman martyrology; from this was made the little Roman one printed by Roſweyd; of this little Roman martyrology was formed that of Beda, augmented by Florus. Ado compiled his in the year 858. The martyrology of Nevelon, monk of Corbie, written about the year 1089, is little more than an abridgement of that of Ado; father Kircher alſo makes mention of a Coptic martyrology preſerved by the Maronites at Rome.

We have alſo ſeveral Proteſtant martyrologies, containing

the ſufferings of the reformed under the Papiſts; viz. an Engliſh martyrology by J. Fox; with others by Clark, Bray, &c.

MARTYROLOGY is alſo uſed, in the Romiſh church, for a roll or regiſter kept in the veſtry of each church, containing the *names* of all the ſaints and martyrs, both of the univerſal church and of the particular ones of that city or monaſtery.

MARTYROLOGY is alſo applied to the painted or written catalogues in the Romiſh churches, containing the foundations, obits, prayers, and maſſes, to be ſaid each day.

MARVELL (ANDREW), an ingenious writer in the 17th century, was bred at Cambridge. He travelled through the moſt polite parts of Europe, and was ſecretary to the embaſſy at Conſtantinople. His firſt appearance in public buſineſs at home was as aſſiſtant to Mr. John Milton, Latin ſecretary to the protector. A little before the reſtoration, he was choſen by his native town, Kingſton upon Hull, to ſit in that parliament, which began at Weſtminſter April 25th 1660; and is recorded as the laſt member of parliament who received the wages or allowance anciently paid to repreſentatives by their conſtituents. He ſeldom ſpoke in parliament, but he had great influence without doors upon the members of both houſes; and prince Rupert had always the greateſt regard for his advice. He made himſelf very obnoxious to the government by his actions and writings; notwithſtanding which, king Charles II. took great delight in his converſation, and tried all means to win him over to his ſide, but in vain, nothing being ever able to ſhake his reſolution. There were many inſtances of his firmneſs in reſiſting the offers of the court; but he was proof againſt all temptations. The king having one night entertained him, ſent the lord-treaſurer Danby the next morning to find out his lodgings: which were then up two pair of ſtairs in one of the little courts in the Strand. He was buſy writing when the treaſurer opened the door abruptly upon him. Surpriſed at the ſight of ſo unexpected a viſitor, Mr. Marvell told his lordſhip, "That he believed he had miſtaken his way." Lord Danby replied, "Not, now I have found Mr. Marvell;" telling him he came from his majeſty, to know what he could do to ſerve him. Coming to a ſerious explanation, he told the lord-treaſurer, that he knew the nature of courts full well; that whoever is diſtinguiſhed by a prince's favour is certainly expected to vote in his intereſt. The lord Danby told him, that his majeſty had only a juſt ſenſe of his merits, in regard to which he only deſired to know if there was any place at court he could be pleaſed with. Theſe offers, though urged with the greateſt earneſtneſs, had no effect upon him. He told the lord-treaſurer that he could not accept of them with honour; for he muſt be either ungrateful to the king in voting againſt him, or falſe to his country in giving into the meaſures of the court. The only favour therefore he had to requeſt of his majeſty was, that he would eſteem him as dutiful a ſubject as any he had, and more in his proper intereſt by refuſing his offers, than if he had embraced them. The lord Danby finding no arguments could prevail, told him that the king had ordered a thouſand pounds for him, which he hoped he would receive till he could think what farther to aſk of his majeſty. The laſt offer was rejected with the ſame ſtedfaſtneſs of mind as the firſt; though, as ſoon as the lord-treaſurer was gone, he was forced to ſend to a friend to borrow a guinea. He died, not without ſtrong ſuſpicions of his being poiſoned, in 1678, in the 58th year of his age. In 1688 the town of Kingſton upon Hull contributed a ſum of money to erect a monument over him in the church of St. Giles in the Fields, where he was interred, and an epitaph compoſed by an able hand; but the miniſtry of that church forbid both the inſcription and monument to be placed there. He wrote many ingenious pieces; as, The Rehearſal tranſproſed; A ſhort Hiſtorical Eſſay concerning General Councils, Creeds, and Impoſitions in matters of religion, &c.; alſo Poems and Letters.

MARVEL *of Peru*, in botany. See MIRABILIS.

MARY, the Mother of our Saviour JESUS CHRIST, and a Virgin at the time that ſhe conceived him; daughter of Joachim and of Anna, of the tribe of Judah, and married to Joſeph of the ſame tribe. The ſcripture tells us nothing of her parents, not ſo much as their names, unleſs Heli mentioned by St. Luke iii. 23. be the ſame with Joachim. All that is ſaid concerning the birth of Mary and of her parents is only to be found in ſome apocryphal writings; which, however, are very ancient. Mary was of the royal race of David, as was alſo her huſband; 'a virgin, eſpouſed to a man whoſe name was *Joſeph*, of the houſe of David.'

Mary was a-kin to the race of Aaron, ſince Elizabeth the wife of Zacharias was her couſin (ver. 36). Mary very early made a vow of chaſtity, and engaged herſelf to perpetual virginity. The *Proto-evangelium* of St. James tells us, that ſhe was conſecrated to the Lord, and offered in the temple from her earlieſt youth; and that the prieſts gave her Joſeph for a ſpouſe, who was an holy and venerable old man, whom providence appointed for this purpoſe by a miracle, the rod which he commonly carried having grown green and flouriſhed as Aaron's did formerly. He eſpouſed Mary, not to live with her in the ordinary uſe of marriage, and to have children by her, but only that he might be the guardian of her virginity. Though theſe circumſtances are not to be relied on as certain, yet Mary's reſolution of continency, even in a married ſtate, cannot be called in queſtion, ſince her virginity is atteſted by the goſpel, and that herſelf ſpeaking to the angel, who declared to her, that ſhe ſhould become the mother of a ſon, told him that 'ſhe knew not a man,' (ver. 34.) or that ſhe lived in continency with her huſband: for which reaſon, when Joſeph perceived her pregnancy, he was extremely ſurprifed at it, knowing the mutual reſolution they had agreed to of living in continence though in a ſtate of marriage.

When Mary was ready to lie-in, an edict was publiſhed by Cæſar Auguſtus, which decreed, that all the ſubjects of the empire ſhould go to their own cities, there to have their names regiſtered according to their families. Thus Joſeph and Mary, who were both of the lineage of David, betook themſelves to the city of Bethlehem, from whence was the original of their family. But while they were in this place, the time being fulfilled in which Mary was to be delivered, ſhe brought forth her firſt-born ſon. She wrapped him in ſwaddling-clothes, and laid him in the manger of the ſtable or cavern whither they had retired: for they could find no place in the public inn, becauſe of the great concourſe of people that were then at Bethlehem on the ſame occaſion; or they were forced to withdraw into the ſtable of the inn, not being able to get a more convenient lodging, becauſe of the multitude of people then at Bethlehem.

At the ſame time the angels made it known to the ſhepherds who were in the fields near Bethlehem, and who came in the night to ſee Mary and Joſeph and the child lying in the manger, and to pay him their tribute of adoration.—Mary took notice of all theſe things, and laid them up in her heart (Luke ii. 19. Matth. ii. 8, 9, 10, 11, &c.). A few days after, the magi or wiſe men came from the eaſt, and brought to Jeſus the myſterious preſents of gold, frankincenſe, and myrrh; after which being warned by an angel that appeared to them in a dream, they returned into their own country by a way different from that by which they came. But the time of Mary's purification being come, that is 40 days after the birth of Jeſus, Mary went to Jeruſalem (Luke ii. 21.), there to preſent her ſon in the temple, and

there to offer the ſacrifice appointed by the law for the purification of women after childbirth. There was then at Jeruſalem an old man named *Simeon*, who was full of the Holy Ghoſt, and who had received a ſecret aſſurance that he ſhould not die before he had ſeen Chriſt the Lord. He came then into the temple by the influence of the Spirit of God, and taking the little Jeſus within his arms, he bleſſed the Lord: and afterwards addreſſing himſelf to Mary, he told her, 'That this child ſhould be for the riſing and falling of many in Iſrael, and for a ſign which ſhould be ſpoken againſt; even ſo far as that her own ſoul ſhould be pierced as with a ſword, that the ſecret thoughts in the hearts of many might be diſcovered.' Afterwards when Joſeph and Mary were preparing to return to their own country of Nazareth (Matth. ii. 13, 14.), Joſeph was warned in a dream to retire into Egypt with Mary and the child, becauſe Herod had a deſign to deſtroy Jeſus. Joſeph obeys the admonition, and they continued in Egypt till after the death of Herod; upon which he and Mary returned to Nazareth, not daring to go to Bethlehem, becauſe it was in the juriſdiction of Archelaus the ſon and ſucceſſor of Herod the great. Here the holy family took up their reſidence, and remained till Jeſus began his public miniſtry. We read of Mary being preſent at the marriage of Cana in Galilee, with her ſon Jeſus and his diſciples (John ii. 1, 2, &c.) On which occaſion Jeſus having turned water into wine, being the firſt public miracle that he performed, he went from thence to Capernaum with his mother and his brethren, or his parents and diſciples; and this ſeems to be the place where the holy virgin afterwards chiefly reſided. However, St. Epiphanius thinks that ſhe followed him everywhere during the whole time of his preaching; though we do not find the evangeliſts make any mention of her among the holy women that followed him and miniſtered to his neceſſities. The virgin Mary was at Jeruſalem at the laſt paſſover that our Saviour celebrated there; ſhe ſaw all that was tranſacted againſt him, followed him to Calvary, and ſtood at the foot of his croſs with a conſtancy worthy of the mother of God. There Jeſus ſeeing his mother and his beloved diſciple near her, he ſaid to his mother, "Woman, behold thy ſon!" and to the diſciple, "Behold thy mother!" And from that hour the diſciple took her home to his own houſe. It is not to be doubted, but that our Saviour appeared to his mother immediately after his reſurrection; and that ſhe was the firſt, or at leaſt one of the firſt, to whom he vouchſafed this great conſolation. She was with the apoſtles at his aſcenſion, and continued with them at Jeruſalem, expecting the coming of the Holy Ghoſt (Acts i. 14.). After this, ſhe dwelt in the houſe of St. John the Evangeliſt, who took care of her as of his own mother. It is thought that he took her along with him to Epheſus, where ſhe died in an extreme old age. There is a letter of the œcumenical council of Epheſus, importing that in the fifth century it was believed ſhe was buried there. Yet this opinion was not ſo univerſal, but that there are authors of the ſame age who think ſhe died and was buried at Jeruſalem.

MARY (Magdalen), who has been generally confounded with Mary the ſiſter of Martha and Lazarus, but very improperly, was probably that ſinner mentioned by St. Luke, chap. vii. 36, 37, &c. whoſe name he does not tell us. There are ſome circumſtances ſufficient to convince us, that ſhe is the ſame whom he calls *Mary Magdalen* in chap. viii. 2. and from whom he ſays Jeſus drove out ſeven devils. She followed Chriſt in the laſt journey that he made from Galilee to Jeruſalem, and was at the foot of the croſs with the holy virgin (John xix. 25. Mark xv. 47.). After which ſhe returned to Jeruſalem to buy and prepare the perfumes, that ſhe might embalm him after the ſabbath was over, which was then about to begin. All the ſabbath day ſhe remained in the city; and the next day early in the morning ſhe went to the ſepulchre, along with Mary the mother of James and Salome (Mark xvi. 1, 2. Luke xxiv. 1, 2.). On the way, they enquired of one another, who ſhould take away the ſtone from the mouth of the ſepulchre, and were ſenſible of a great earthquake. This was the token of our Saviour's reſurrection. Being come to his tomb, they ſaw two angels, who informed them that Jeſus was riſen. Upon this Mary Magdalen runs immediately to Jeruſalem, and acquaints the apoſtles with this good news, returning herſelf to the ſepulchre. Peter and John came alſo, and were witneſſes that the body was no longer there. They returned: but Mary ſtayed, and ſtooping forward to examine the inſide of the tomb, ſhe there ſaw two angels ſitting, one at the head and the other at the foot of the tomb: and immediately afterwards, upon turning about, ſhe beheld the Lord himſelf.

She returned then to Jeruſalem, and told the apoſtles that ſhe had ſeen the Lord, that ſhe had ſpoken to him, and told them what he had ſaid to her. But at firſt they did not believe her, till her report was confirmed by many other teſtimonies.—This is what the goſpel informs us concerning Mary Magdalen, different from Mary the ſiſter of Martha, though ſhe has been often called by this name. For as to the pretended Hiſtory of Mary Magdalen, which is ſaid to have been written in Hebrew by Marcella ſervant of Martha; this can only relate to Mary ſiſter of Martha, and beſides is a mere piece of impoſture.

MARY *of Medicis*, wife of Henry IV. king of France, was declared ſole regent of the kingdom in 1610, during the conſternation which the aſſaſſination of that beloved king had occaſioned. By her ambitious intrigues, the nation loſt all its influence abroad, and was torn to pieces at home by contending factions. After ſeveral viciſſitudes of fortune, ſhe was abandoned by her ſon Louis XIII. whoſe reign had been conſtantly diſturbed by the civil commotions ſhe had occaſioned; and died in indigence at Bruſſels, in 1642, aged 68. She built the ſuperb palace of Luxembourg at Paris, and embelliſhed that city with aqueducts and other ornaments.

MARY, queen of Scotland, daughter of James V. was born in the royal palace of Linlithgow on the 8th of December 1542. Her mother was Mary, the eldeſt daughter of Claude duke of Guiſe, and widow of Louis duke of Longueville. Her father dying a few days after her birth, ſhe ſcarcely exiſted before ſhe was hailed queen.

Hiſtorians are not agreed as to the true character of this unfortunate and imprudent queen; for which reaſon, we ſhall refer to their writings for what concerns her political life, and content ourſelves with enumerating her literary performances. She wrote, 1. Poems on various occaſions, in the Latin, French, and Scotch languages. One of her poems is printed among thoſe of A. Blackwood; another in Brantome's *Dames illuſtres*, written on the death of her firſt huſband Francis. 2. Conſolation of her long impriſonment, and royal advice to her ſon. 3. A copy of verſes, in French, ſent with a diamond ring to queen Elizabeth. There is a tranſlation of theſe verſes among the Latin poems of Sir Thomas Chaloner. 4. Genuine Letters of Mary queen of Scots, to James earl of Bothwell; tranſlated from the French, by E. Simmonds, 1726. There are, beſides, many other of her epiſtles to queen Elizabeth, ſecretary Cecil, Mildmaye, &c. which are preſerved in the Cottonian, Aſhmolean, and other libraries.

MARY *Magdalen's Day*, a feſtival of the Romiſh church, obſerved on the 22d of July.

MARY GERANE's-*Houſe*, a name given to Dunmore-head, in the pariſh of Dunqueen, county of Kerry, and province of Munſter in Ireland. It is the moſt weſtern point of all Europe, and called by the Iriſh *Ty Vorney Geerone*. It is a point as much celebrated by them as John-of-Groat's-houſe by the Scots, which is the utmoſt extremity of North Britain.

MARYBONE, or ST. MARY LE BONE. See MARIBONR.

MARYBOROUGH, a borough, market, and poſt town, and the aſſizes town to the Queen's county, in the province of Leinſter in Ireland, ſo called in honour of Mary queen of England, who reduced this part of the country to ſhire-ground by act of parliament 6th and 7th Philip and Mary. It is governed by a burgo-maſter and bailiffs, and has a barrack for a troop of horſe. It returns two members to parliament, and has five fairs. It is diſtant from Dublin 40 miles. N. lat. 53. 0. W. lon. 7. 20.

MARYBURGH. See *Fort*-WILLIAM.

MARYGOLD. See CALTHA.

Corn MARYGOLD. See CHRYSANTHEMUM.

French MARYGOLD. See TAYGETES.

MARYLAND, one of the Thirteen United States of America. It received that name in honour of Henrietta Maria, the conſort of king Charles I. who made a grant of this country, with very extraordinary powers, to lord Baltimore. It lies between 38 and 40 degrees north latitude, and in longitude from 74 to 78 degrees weſt from London. It is bounded on the north by Pennſylvania; on the eaſt by the Delaware ſtate; on the ſouth-eaſt and ſouth by the Atlantic Ocean, and a line drawn from the ocean over the peninſula (dividing it from Accomack county in Virginia) to the mouth of Patomack river, thence up the Patomack to its firſt fountain, thence by a due north line till it interſects the ſouthern boundary of Pennſylvania, in lat. 39° 43′ 18″; ſo that it has Virginia on the ſouth, ſouth-weſt, and weſt. It contains about 14,000 ſquare miles, of which about one ſixth is water. It is divided into 18 counties, 10 of which are on the weſtern and 8 on the eaſtern ſhore of Cheſapeak bay, St. Mary's, Somerſet, Calvert, Montgomery, Waſhington, Queen Ann's, Caroline, Kent, Charles, Talbot, Dorcheſter, Baltimore, Ann Arundel, Worceſter, Harford, Cœcil, Frederick, and Prince George's. Each of the counties ſends four repreſentatives to the houſe of delegates; beſides which the city of Anapolis and town of Baltimore ſend each two, making in the whole 76 members. The climate is generally mild and agreeable, ſuited to agricultural productions and a great variety of fruit-trees. In the interior hilly country the inhabitants are healthy; but in the flat country, in the neighbourhood of the marſhes and ſtagnant waters, they are, as in the other ſouthern ſtates, ſubject to intermittents. Cheſapeak bay divides this ſtate into the eaſtern and weſtern diviſions. It affords ſeveral good fiſheries; and, in a commercial view, is of immenſe advantage to the ſtate. It receives a number of the largeſt rivers in the United States. From the eaſtern ſhore in Maryland, among other ſmaller ones, it receives Pokomoke, Choptank, Cheſter, and Elk rivers; from the north the rapid Suſquehannah; and from the weſt Patapſco, Severn, Patuxent, and Patomack, half of which is in Maryland and half in Virginia. Except the Suſquehannah and Patomack, theſe are ſmall rivers. Eaſt of the blue ridge of mountains, which ſtretches acroſs the weſtern part of this ſtate, the land, like that in all the ſouthern ſtates, is generally level and free of ſtones. Wheat and tobacco are the ſtaple commodities of Maryland. In the interior country, on the uplands, conſiderable quantities of hemp and flax are raiſed.

The number of inhabitants in this ſtate, including the negroes, is 254,050; which is 18 for every ſquare mile. The inhabitants, except in the populous towns, live on their plantations, often ſeveral miles diſtant from each other. To an inhabitant of the middle, and eſpecially of the eaſtern ſtates, which are thickly populated, they appear to live very retired and unſocial lives. The effects of this comparative ſolitude are viſible in the countenances as well as in the manners and dreſs of the country people; there being among them very little of that cheerful ſprightlineſs of look and action which is the invariable and genuine offspring of ſocial intercourſe; nor do they pay that attention to dreſs which is common, and which decency and propriety have rendered neceſſary, among people who are liable to receive company almoſt every day. As the negroes perform all the manual labour, their maſters are left to ſaunter away life in ſloth, and too often in ignorance. Theſe obſervations, however, muſt in juſtice be limited to the people in the country, and to thoſe particularly whoſe poverty or parſimony prevents their ſpending a part of their time in populous towns, or otherwiſe mingling with the world.

The chief towns in this ſtate are Anapolis and Baltimore. *Anapolis*, the capital, and the wealthieſt town of its ſize in America, is ſituated juſt at the mouth of Severn river, 30 miles ſouth of Baltimore. The houſes are generally large and elegant; and the ſtadt-houſe is the nobleſt building of the kind in America. *Baltimore* has had the moſt rapid growth of any town on the continent, and is the fourth in ſize and the fifth in trade in the United States. It lies in lat. 39. 21. on the north ſide of Patapſco river, around what is called the Baſon. The ſituation of the town is low. The houſes were numbered in 1787, and found to be 1955; about 1200 of which were in the town and the reſt at Fell's point. The number of ſtores was 152; and of churches 9, which belong to German Calviniſts and Lutherans, Epiſcopalians, Preſbyterians, Roman Catholics, Baptiſts, Methodiſts, Quakers, Nicolites, or New Quakers. The number of inhabitants is between 10,000 and 11,000. There are many very reſpectable families in Baltimore, who live genteelly, are hoſpitable to ſtrangers, and maintain a friendly and improving intercourſe with each other; but the bulk of the inhabitants, recently collected from almoſt all quarters of the world, bent on the purſuit of wealth, varying in their habits, their manners, and their religions, if they have any, are unſocial, unimproved, and inhoſpitable. The trade of Maryland is principally carried on from Baltimore with the other ſtates, with the Weſt Indies, and with ſome parts of Europe. To theſe places they ſend annually about 30,000 hogſheads of tobacco, beſides large quantities of wheat, flour, pig iron, lumber, and corn—beans, pork, and flax-ſeed, in ſmaller quantities; and receive in return, clothing for themſelves and negroes, and other dry goods, wines, ſpirits, ſugars, and other Weſt India commodities. The balance is generally in their favour.

The Roman Catholics, who were the firſt ſettlers in Maryland, are the moſt numerous religious ſect. Beſides theſe, there are Proteſtant Epiſcopalians, Engliſh, Scots, and Iriſh Preſbyterians, German Calviniſts, German Lutherans, Friends, Baptiſts, Methodiſts, and Nicolites, or New Quakers. The colleges in this ſtate have all been founded ſince the year 1782, and are yet in their infancy. The names of the ſeveral ſeminaries are, Waſhington College at Cheſter-town, inſtituted in 1782; St. John's College at Annapolis, founded in 1784; Cakeſbury College at Abingdon, inſtituted by the Methodiſts in 1785; and a college founded by the Roman Catholics at George-town. There are a few other literary inſtitutions, of inferior note, in different parts of the ſtate, and proviſion is made for free-ſchools in moſt of the counties: though ſome are entirely neglected, and very few carried on with any ſucceſs; ſo that a great proportion of the lower claſs of people are ignorant, and there are not a few who cannot write their names.

But the revolution, among other happy effects, has roufed the fpirit of education, which is faft fpreading its falutary influences over this and the other fouthern ftates.

The legiflature of this ftate is compofed of two diftinct branches, a fenate and houfe of delegates; and ftyled *The General Aſſembly of Maryland.* The fenate conſiſts of 15 members, chofen every five years. Nine of thefe muft be refidents on the weftern fhore, and fix on the eaftern; they muft be more than 25 years of age, muft have refided in the ftate more than three years next preceding the election, and have real and perfonal property above the value of 1000l. The houfe of delegates is compofed of four members for each county, chofen annually on the firft Monday in October. The city of Anapolis and town of Baltimore fend each two delegates. The qualifications of a delegate are, full age, one year's refidence in the county where he is chofen, and real or perfonal property above the value of 500l. The qualifications of a freeman are, full age, a freehold eſtate of 50 acres of land, and actual refidence in the county where he offers to vote; property to the value of 30l. in any part of the ftate, and a year's refidence in the county where he offers to vote.

On the fecond Monday in November annually a governor is appointed by the joint ballot of both houfes. The governor cannot continue in office longer than three years fucceſſively, nor be elected until the expiration of four years after he has been out of office. The qualifications for the chief magiſtracy are, 25 years of age, five years refidence in the ſtate next preceding the election, and real and perſonal eſtate above the value of 5000l., 1000l. of which muſt be freehold eſtate. This conſtitution was eſtabliſhed by a convention of delegates at Anapolis, Auguſt 14, 1776.

Maryland was granted, as has been already noticed, by King Charles I. to Cecilius Calvert, baron of Baltimore in Ireland, June 20, 1632. The government of the province was by charter veſted in the proprietary; but it appears that he either never exerciſed theſe powers alone, or but for a ſhort time. The honourable Leonard Calvert, Eſq; Lord Baltimore's brother, was the firſt governor or lieutenant general. In 1638, a law was paſſed, conſtituting the firſt regular houſe of aſſembly, which was to conſiſt of ſuch repreſentatives, called *burgeſſes*, as ſhould be elected purſuant to writs iſſued by the governor. Theſe burgeſſes poſſeſſed all the powers of the perſons electing them; but by any other freemen, who did not aſſent to the election, might take their ſeats in perſon. Twelve burgeſſes or freemen, with the lieutenant-general and ſecretary, conſtituted the aſſembly or legiſlature. This aſſembly ſat at St. Mary's, one of the ſouthern counties, which was the firſt ſettled part of Maryland. In 1689, the government was taken out of the hands of Lord Baltimore by the grand convention of England. Mr. Copley was appointed governor by commiſſion from William and Mary in 1692, when the Proteſtant religion was eſtabliſhed by law. In 1716, the government of this province was reſtored to the proprietary, and continued in his hands till the late revolution; when, being an abſentee, his property in the lands was confiſcated, and the government aſſumed by the freemen of the province, who formed the conſtitution now exiſting. At the cloſe of the war, Henry Hatford, Eſq; the natural ſon and heir of Lord Baltimore, petitioned the legiſlature of Maryland for his eſtate; but his petition was not granted. Mr. Hatford eſtimated his loſs of quit-rents, valued at 20 years purchaſe, and including arrears, at 259,488l. 5s.—dollars at 7s. 6d. and the value of his manors and reſerved lands at 327,441l. of the ſame money.

MARYPORT, a ſea-port town of Cumberland, ſituated at the mouth of the Elne. It has a good harbour; and has 70 or 80 ſail of ſhipping from 30 to 250 tons burden, principally employed in the coal-trade; ſome of them ſail up the Baltic for timber, flax, iron, &c. They have a furnace for caſt-iron and a glaſs-houſe. A chapel was erected here in 1760.

MAS (Lewis du), natural ſon to Jean Louis de Montcalm Seigneur de Candiac, and a widow of rank of Rouergue, was born at Nimes in 1676. His firſt attention was beſtowed on juriſprudence; but afterwards he was altogether occupied with mathematics, philoſophy, and the ſtudy of the languages. Father Mallebranche cultivated his acquaintance and eſteemed his virtues. His firſt appearance was ſevere, his general temper tranquil; yet he had a lively and fertile imagination. His mind was active, full of reſources, and methodical. We are indebted to his induſtry for the Typographical Bureau. This invention is the more ingenious, as it preſents the tedious parts of education, namely, reading, writing, and the elements of languages, to the youthful mind as a delightful entertainment, and many people in France both in the capital and in the provinces have adopted it with ſucceſs. After he had conceived the idea of this invention, he made the firſt trial of it on the young Candiac, who was remarkable for his underſtanding in his earlieſt years. Du Mas conducted his pupil to Paris and the principal cities in France, where he was univerſally admired. This prodigy was carried off in the year 1726 before he was ſeven years of age, and his loſs had nearly deprived Du Mas of his reaſon. A dangerous illneſs was the conſequence of his vexation; and he would have died of want, if a gentleman had not taken him from his garret and entertained him in his own houſe. Du Mas afterwards retired with Madame de Vaujour within two leagues of Paris, and died in the year 1774, aged 68. He was a philoſopher both in genius and character. His works are, 1. *L' Art de tranſpoſer toutes ſortes de Muſiques ſans être obligé de connoitre, ni le temps, ni le mode*, publiſhed at Paris in 4to, 1711. This work is extremely curious, but of no advantage to the ſtudy of muſic. 2. A volume in quarto, printed at Paris 1733, in four parts, intitled, *Bibliotheque des enfans.* In this treatiſe he has placed, in a clear point of view, the ſyſtem and economy of his Typographical Bureau. This invention, like every thing new, was cenſured by ſome and admired by others. The author himſelf defended it with much ſucceſs in the journals and in ſeveral occaſional pamphlets. This collection, however, is become exceedingly ſcarce. The Typographical Bureau was brought to perfection by M. Reybert a citizen of Avignon, who enriched it with many articles containing uſeful and agreeable information in geography, hiſtory, fable, &c. &c. 3. *Memoirs de l' Ecoſſe ſous le regne de Marie Stuart*, by Crawford, and tranſlated from the Engliſh. This tranſlation was found in manuſcript in the library of the late marquis d'Aubais, with whom du Mas had lived in the moſt intimate habits of friendſhip.

Mas *Planta*, a plant which upon the ſame root produces male flowers only. See Masculus *Flos*.

MASAFUERO, an iſland of the South-Sea, lying in S. lat. 33. 45. W. lon. 80. 46. It is very high and mountainous, and at a diſtance ſeems to conſiſt of one hill or rock. It is of a triangular form, and ſeven or eight leagues in circumference. There is ſuch plenty of fiſh, that a boat with a few hooks and lines may very ſoon catch as many as will ſerve 100 people. Here are coal-fiſh, cavilliers, cod, hallibut, and crayfiſh. Captain Carteret's crew caught a king-fiſher that weighed 87 pounds, and was five feet and an half long. The ſharks were here ſo ravenous, that, in taking ſoundings, one of them ſwallowed the lead, by which they hauled him above water; but he regained his liberty by diſgorging his prey. Seals are ſo numerous here, that Captain Carteret ſays, if many thouſands were killed in a night, they would not be miſſed next morning. Theſe animals yield excellent train-oil; and their hearts and plucks are very good food, having a taſte ſomething

like thoſe of a hog; their ſkins are covered with a very fine fur. There are many birds here, and ſome very large hawks. Of the pintado bird one ſhip caught 700 in one night. Commodore Byron landed here with difficulty in 1765, in order to take in wood and water, of both which he found plenty. He found alſo great numbers of goats, whoſe fleſh taſted as well as veniſon in England.

MASBOTHÆI, or MESBOTHÆI, the name of a ſect, or rather of two ſects; for Euſebius, or rather Hegeſippus whom he cites, makes mention of two different ſects of Maſbothæans. The firſt was one of the ſeven ſects that aroſe out of Judaiſm, and proved very troubleſome to the church; the other was one of the ſeven Jewiſh ſects before the coming of Jeſus Chriſt. The word is derived from the Hebrew שבת, *ſebabat*, "to reſt or repoſe," and ſignifies *idle eaſy indolent people*. Euſebius ſpeaks of them as if they had been ſo called from one Maſbothæus their chief: but it is much more probable that their name is Hebrew, or at leaſt Chaldaic, ſignifying the ſame thing with a Sabbatarian in our language; that is, one who makes profeſſion of keeping Sabbath. Valeſius will not allow the two ſects to be confounded together: the laſt being a ſect of Jews before, or at leaſt contemporary with Chriſt; and the former a ſect of heretics deſcended from them. Rufinus diſtinguiſhes them in their names: the Jewiſh ſect he calls Maſbuthæi; and the heretics Maſbuthæani. The Maſbuthæans were a branch of the Simonians.

MASCARDI (AUGUSTIN), a diſtinguiſhed perſon in the republic of letters, was born at Sarzane, a city of the ſtate of Genoa, in 1591. He ſpent the early part of his life among the Jeſuits, and afterwards became chamberlain to Pope Urban VIII. He was naturally ſo eloquent, that this ſame pope, merely to exerciſe his talent, founded a profeſſorſhip of rhetoric for him in the college de la Sapienza 1628, and ſettled upon him for life a penſion of 500 crowns. Maſcardi filled the chair with great reputation; but his love of letters made him neglect what is of more conſequence than even letters, the management of his affairs: for he was always poor, and always in debt. He wrote a great many things in verſe and proſe; and among the reſt, a treatiſe intitled *Dell' arte hiſtorica*. In his "Hiſtory of the Conſpiracy of the Comte de Fieſque" he has very frequently attacked the religion of Hubert Folietta; and in his other books he uſed ſome writers in the ſame way, which occaſioned him to be attacked in his turn. The objections which were made to him, together with his anſwers, were added to the ſecond edition of the hiſtory juſt mentioned. He died at Sarzane, 1640, in his 49th year.

MASCARON (JULIUS), biſhop of Agen, and a moſt eminent French preacher, was born at Marſeilles in 1634. He inherited of his father, who was the moſt celebrated advocate of the parliament of Aix, that uncommon talent of eloquence which diſtinguiſhed him. He was admitted a member of the congregation of the oratory very young; and from his 22d year taught rhetoric at Mans. Soon after this he commenced preacher, and preached with great ſucceſs in St. Peter's church at Saumur. The biſhop of Mans, willing to engage ſo able a preacher in his church, made him prebendary of it. He was much admired at Paris, when he preached the advent at the oratory. He preached after this five or ſix years at court, and was promoted to the biſhopric of Tulle in 1671. He was afterwards tranſlated to the biſhopric of Agen. He was called in 1694 to preach the Lent ſermon at court. The year following, he opened the aſſembly of the clergy, and returned to his dioceſe; where he died of a dropſy in his cheſt, Dec. 6, 1703. There is nothing printed of this great man excepting a Collection of Funeral Orations made upon the queen-mother, the dauphineſs, the duke of Beaufort, the chancellor Seguier, mareſchal Turenne; and at the head of this collection there is a ſhort life of him.

MASCLEF (FRANCIS), was at firſt a curate in the dioceſe of Amiens, the place of his birth, and afterwards theologian and confidant to the virtuous De Brou biſhop of that dioceſe. He was appointed to the charge of a ſeminary of learning under that prelate. He deſerved this employment both from his piety and profound learning. The oriental languages were as familiar to him as his native tongue. He purſued his reſearches into the idioms of the eaſt with the ſpirit and the ingenuity of a philoſopher. He was made canon of Amiens a little before the death of De Brou, which happened in 1706. His opinions on the Janſeniſt controverſy were ſo offenſive to Sabbatier, the ſucceſſor of that worthy prelate, that he was removed from the care of the ſeminary, and from almoſt every other public office which he held. The regard of the dead comforted Maſclef under the oppreſſion of the living. He devoted himſelf to ſtudy with ſo much ardour, that he contracted a diſeaſe of which he died the 14th Nov. 1728, aged 66 years. His principal works are, 1. A Hebrew Grammar in Latin, after his new method, printed at Paris 1716, in 12mo. This grammar was again printed in two volumes in 12mo. in the year 1730, under the direction of M. de la Bletterie, at that time prieſt of the oratory, and the friend of Maſclef. All the objections which Father Guarin made in his Hebrew grammar to Maſclef's method of reading Hebrew without the uſe of points, are attended to in this edition. There is nothing more neceſſary, according to this plan, than to take the vowel which is next the conſonant in the order of the alphabet. This method was approved of by ſome learned men, but rejected by a great many more. 2. *Les Conferences Eccleſiaſtiques du dioceſe d'Amiens*, in 12mo. 3. *Le Catechiſme d'Amiens*, in 4to. 4. *Une Philoſophie et une Theologie*, in MS. Theſe would have been publiſhed had they not diſcovered a partiality to the principles of Janſeniſm. The author was an auſtere man, equally reſpectable for his manners and his knowledge.

MASCULINE, ſomething belonging to the male, or the ſtronger of the two ſexes. See MALE.

MASCULINE, is more ordinarily uſed in grammar to ſignify the firſt and worthieſt of the genders of nouns. See GENDER. The maſculine gender is that which belongs to the male kind, or ſomething analagous to it. Moſt ſubſtances are ranged under the heads of maſculine or feminine. This, in ſome caſes, is done with a ſhow of reaſon; but in others is merely arbitrary, and for that reaſon is found to vary according to the languages and even according to the words introduced from one language into another. Thus the names of trees are generally feminine in Latin, and maſculine in the French. Farther, the genders of the ſame word are ſometimes varied in the ſame language. Thus *alvus*, according to Priſcian, was anciently maſculine, but is now become feminine. And *navis*, "a ſhip," in French, was anciently feminine, but is now maſculine.

MASCULINE *Rhyme*, in the French poetry, is that made with a word which has a ſtrong, open, and accented pronunciation; as all words have, excepting thoſe which have an *e* feminine in their laſt ſyllable. For inſtance, *amour* and *jour*, *mort* and *fort*, are maſculine rhymes; and *pere* and *mere*, *gloire* and *memoire*, are feminine. Hence alſo verſes ending with a maſculine rhyme, are called *maſculine verſes*, and thoſe ending with a feminine rhyme *feminine verſes*. It is now a rule eſtabliſhed among the French poets never to uſe the above two maſculine or two feminine verſes ſucceſſively, except in the looſer kind of poetry. Marot was the firſt who introduced this mixture of maſculine and feminine verſes, and Ronſard was the firſt who practiſed it with ſucceſs. The maſculine verſes ſhould always have a ſyllable leſs than the feminine ones.

MASCULINE *Signs*. Aſtrologers divide the ſigns into maſculine and feminine; by reaſon of their qualities, which are either active, and hot or cold, accounted maſculine; or paſſive,

dry and moiſt, which are feminine.—On this principle they call the Sun, Jupiter, Saturn, and Mars, *maſculine*; and the Moon and Venus *feminine*. Mercury, they ſuppoſe, partakes of the two. Among the ſigns, Aries, Libra, Gemini, Leo, Sagittarius, Aquarius, are maſculine: Cancer, Capricornus, Taurus, Virgo, Scorpio, and Piſces, are feminine.

MASCULUS FLOS, in botany. See FLOS.

MASH, a drink given to a horſe, made of half a peck of ground malt put into a pail, into which as much ſcalding hot water is poured as will wet it very well: when that is done, ſtir it about, till, by taſting, you find it as ſweet as honey; and when it has ſtood till it is lukewarm, it is to be given to the horſe. This liquor is only uſed after a purge, to make it work the better; or after hard labour, or inſtead of drink in the time of any great ſickneſs.

MASK See MASQUE.

MASINISSA, a king of a ſmall part of Africa, who at firſt aſſiſted the Carthaginians in their wars againſt Rome; but afterwards joined the Romans, and became the firmeſt ally they ever had.

MASON, a perſon employed under the direction of an architect, in the raiſing of a ſtone-building. The chief buſineſs of a maſon is to make the mortar; raiſe the walls from the foundation to the top, with the neceſſary retreats and perpendiculars; to form the vaults, and employ the ſtones as delivered to him. When the ſtones are large, the buſineſs of hewing or cutting them belongs to the ſtone-cutters, though theſe are frequently confounded with maſons: the ornaments of ſculpture are performed by carvers in ſtones or ſculptors. The tools or implements principally uſed by them are the ſquare, level, plumb line, bevel, compaſs, hammer, chiſſel, mallet, ſaw, trowel, &c. See SQUARE, &c. Beſides the common inſtruments uſed in the hand, they have likewiſe machines for raiſing of great burdens, and the conducting of large ſtones: the principal of which are the lever, pulley, wheel, crane, &c. See LEVER, &c.

Free and Accepted MASONS, a very ancient ſociety or body of men: ſo called, either from ſome extraordinary knowledge of maſonry or building, which they are ſuppoſed to be maſters of, or becauſe the firſt founders of the ſociety were perſons of that profeſſion. Theſe are now very conſiderable, both for number and character, being found in every country in Europe, and conſiſting principally of perſons of merit and conſideration. As to antiquity, they lay claim to a ſtanding of ſome thouſand years. What the end of their inſtitution is, ſeems ſtill in ſome meaſure a ſecret; and they are ſaid to be admitted into the fraternity by being put in poſſeſſion of a great number of ſecrets, called the *maſon's word*, which have been religiouſly kept from age to age, being never divulged. See *Free*-MASONRY.

MASONRY, in general, a branch of architecture, conſiſting in the art of hewing or ſquaring ſtones, and cutting them level or perpendicular, for the uſes of building: but, in a more limited ſenſe, maſonry is the art of aſſembling and joining ſtones together with mortar. Hence ariſe as many different kinds of maſonry as there are different forms and manners for laying or joining ſtones. Vitruvius mentions ſeveral kinds of maſonry uſed among the ancient: three of hewed ſtone, *viz.* that in form of a net, that in binding, and that called the *Greek maſonry*; and three of unhewed ſtones, *viz.* that of an equal courſe, that of an unequal courſe, and that filled up in the middle; and the ſeventh was a compoſition of all the reſt.

Net maſonry, called by Vitruvius *reticulatum*, from its reſemblance to the meſhes of a net, conſiſts of ſtones ſquared in their courſes, and ſo diſpoſed as that their joints go obliquely; and their diagonals are the one perpendicular and the other level. This is the moſt agreeable maſonry to the eye, but it is very apt to crack. See pl. 2. fig. 1.

Bound-maſonry, that in which the ſtones were placed one over another, like tiles; the joints of their beds being level, and the mounters perpendiculars, ſo that the joint that mounts and ſeparates two ſtones always falls directly over the middle of the ſtone below. This is leſs beautiful than the net-work, but it is more ſolid and durable. See fig. 2.

Greek maſonry, according to Vitruvius, is that where after we have laid two ſtones, each of which makes a courſe, another is laid at the end, which makes two courſes, and the ſame order is obſerved throughout the building; this may be called *double-binding*, in regard the binding is not only of ſtones of the ſame courſe with one another, but likewiſe of one courſe with another courſe. See fig. 3.

Maſonry by equal courſes, called by the ancients *iſodomum*, differs in nothing from the bound maſonry, but only in this, that its ſtones are not hewn. See fig. 4.

Maſonry by unequal courſes, called *pſeudiſodomum*, is alſo made of unhewed ſtones, and laid in bound work; but then they are not of the ſame thickneſs, nor is there any equality obſerved excepting in the ſeveral courſes, the courſes themſelves being unequal to each other. See fig. 5.

Maſonry filled up in the middle, is likewiſe made of unhewed ſtones, and by courſes; but the ſtones are only ſet in order as to the courſes: (ſee fig. 6). A, the courſes; B, the parts filled up; C, a coat of plaſter.

Compound maſonry is of Vitruvius's propoſing, ſo called as being formed of all the reſt. In this the courſes are of hewed ſtone; and the middle being left void, is filled up with mortar and pebbles thrown in together: after this the ſtones of one courſe are bound to thoſe of another courſe with iron-cramps faſtened with melted lead: (ſee fig. 7). E, the ſtones cramped; F, the cramps; G, the middle part filled up.—Fig. 8. repreſents another ſort of compound maſonry, the middle of which is ſtone, and the edges boards.

All the kinds of maſonry now in uſe may be reduced to theſe five, *viz.* bound maſonry; that of brick-work, where the bodies and projectures of the ſtones incloſe ſquare ſpaces or pannels, &c. ſet with bricks; that de moilon, or ſmall work, where the courſes are equal, well ſquared, and their edges or beds ruſticated; that where the courſes are unequal; and that filled up in the middle with little ſtones and mortar.

Free-MASONRY, denotes the ſyſtem of myſteries and ſecrets peculiar to the ſociety of free and accepted maſons. The origin of this ſociety is very ancient; but we have no authentic account of the time when it was firſt inſtituted, or even what was the reaſon of ſuch an aſſociation of people under the title of *Maſons*, more than of any other mechanical profeſſion.—In Dr. Henry's hiſtory we find the origin of the Free Maſon's Society in Britain attributed to the difficulty found in former times, of procuring a ſufficient number of workmen to build the multitude of churches, monaſteries, and other religious edifices which the ſuperſtition of thoſe ages prompted the people to raiſe. Hence the maſons were greatly favoured by the popes, and many indulgences were granted in order to augment their numbers. In times like thoſe we ſpeak of, it may well be ſuppoſed that ſuch encouragement from the ſupreme paſtors of the church muſt have been productive of the moſt beneficial effects to the fraternity; and hence the increaſe of the ſociety may naturally be deduced. The Doctor quotes, in confirmation of this, the words of an author who was well acquainted with their hiſtory and conſtitution. "The Italians (ſays he), with ſome Greek refugees, and with them French, Germans, and Flemings, joined into a fraternity of architects, procuring papal bulls for their encouragement and their particular privileges; they ſtyled themſelves *Free-maſons*, and ranged from one nation to another, as they found churches to be built: their government was regular; and where they fixed near the building in hand, they made a camp of huts. A ſurveyor governed

in chief; every tenth man was called a *warden*, and overlooked each nine. The gentlemen in the neighbourhood, either out of charity or commutation of penance, gave the materials and carriages. Thoſe who have ſeen the accounts in records of the charge of the fabrics of ſome of our cathedrals near 400 years old, cannot but have a great eſteem for their economy, and admire how ſoon they erected ſuch lofty ſtructures."

By other accounts, however, the antiquity of maſonry is carried up much higher, even as early as the building of Solomon's temple. In Britain the introduction of maſonry has been fixed at the year 674, when glaſs-making was firſt introduced; and it appears indeed, that from this time many buildings in the Gothic ſtyle were erected by men in companies, who are ſaid to have called themſelves *free*, becauſe they were at liberty to work in any part of the kingdom. Others have derived the inſtitution of free maſons from a combination among the people of that profeſſion not to work without an advance of wages, when they were ſummoned from ſeveral counties, by writs of Edward III. directed to the ſheriffs, to aſſiſt in rebuilding and enlarging the caſtle, together with the church and chapel of St. George, at Windſor. At this time, it is ſaid, the maſons agreed on certain tokens by which they might know and aſſiſt each other againſt being impreſſed, and not to work unleſs free and on their own terms.

In a treatiſe on Maſonry publiſhed in 1792 by William Preſton, maſter of the Lodge of Antiquity, the origin of maſonry is traced from the creation. "Ever ſince ſymmetry began, and harmony diſplayed her charms (ſays he), our order has had a being." Its introduction into England he likewiſe ſuppoſes to have been prior to the Roman invaſion. There are, according to him, the remains yet exiſting of ſome ſtupendous works executed by the Britons, much earlier than the time of the Romans; and even theſe diſplay no ſmall ſhare of ingenuity of invention: ſo that we can have no doubt of the exiſtence of maſonry in Britain even during theſe early periods. The Druids are likewiſe ſaid to have had among them many cuſtoms ſimilar to thoſe of the maſons, and to have derived their government from Pythagoras; but the reſemblance betwixt their uſages and thoſe of the free-maſon ſocieties now exiſting cannot be accurately traced even by the maſons themſelves.

Maſonry is ſaid to have been encouraged by Cæſar, and many of the Roman generals who were appointed governors of Britain: but though we know, that at this period the fraternity were employed in erecting many magnificent fabrics, nothing is recorded concerning their lodges and conventions; and we have but a very imperfect account of the cuſtoms which prevailed in their aſſemblies.

For a long time the progreſs of maſonry in Britain was obſtructed by the frequent wars which took place; and it did not revive till the time of Carauſius, by whom it was patroniſed. This general, who hoped to be the founder of a Britiſh empire, encouraged learning and learned men; collecting alſo the beſt artificers from many different countries, particularly maſons, whom he held in great veneration, and appointing Albanus his ſteward the principal ſuperintendant of their aſſemblies. Lodges, or conventions of the fraternity began now to be introduced, and the buſineſs of maſonry to be regularly carried on. The maſons, through the influence of Albanus, obtained a charter from Carauſius to hold a general council, at which Albanus himſelf ſat preſident, and aſſiſted at the reception of many new members. This Albanus was the celebrated St. Alban, the firſt who ſuffered martyrdom in Britain for the Chriſtian faith. Mr. Preſton quotes an old MS. deſtroyed with many others, ſaid to have been in the poſſeſſion of Nicholas Stone, a curious ſculptor under Inigo Jones; from which we learn that St. Alban was a great friend to maſons, and gave them two ſhillings per week beſides threepence for their chear; while, before that time, they had no more than one penny per day and their meat. He likewiſe obtained "a charter from the king and his council for them to hold a general council, which was named an *aſſembly*." The ſame circumſtances are mentioned in a MS. written in the time of James II. only this increaſes the weekly ſalary of the maſons to 3s. 6d. and 3d. per day for the bearers of burthens.

The progreſs of maſonry was greatly obſtructed by the departure of the Romans from Britain; and in a ſhort time fell into abſolute neglect. This was occaſioned firſt by the furious irruptions of the Scots and Picts, which left no time for the cultivation of the arts; and afterwards by the ignorance of the Saxons, whom the ill-adviſed Britons called in as allies, but who ſoon became their maſters. After the introduction of Chriſtianity, however, the barbarity of theſe conquerors began to wear off, the arts received ſome encouragement, and maſonry particularly began to flouriſh. Lodges were now formed; but theſe being under the direction of foreigners, were ſeldom convened, and never attained to any degree of conſideration or importance. In this ſituation it continued till the year 557, when St. Auſtin, with 40 more monks, among whom the ſciences had been preſerved, came into England. By theſe the principles of Chriſtianity were propagated with ſuch zeal, that all the kings of the heptarchy were converted; after which maſonry was taken under the patronage of St. Auſtin, and the Gothic ſtyle of building was introduced into England by the numerous foreigners who reſorted at this time to the kingdom. Auſtin himſelf appeared at the head of the fraternity in founding the old cathedral of Canterbury in 600; that of Rocheſter in 602; St. Paul's in London in 604; St. Peter's in Weſtminſter in 605, as well as many others. The number of maſons in England was thus greatly increaſed, as well as by his other buildings of caſtles, &c. throughout the kingdom.

In 640 a few expert brethren arrived from France, and formed themſelves into a lodge under the direction of Bennet abbot of Wirral; whom Kenred king of Mercia ſoon after appointed inſpector of the lodges, and general ſuperintendant of the maſons. During the whole time of the heptarchy, however, maſonry was in a low ſtate, but began to revive in 856 under the patronage of St. Swithin, whom Ethelwolf employed to repair ſome religious houſes; and from that time the art gradually improved till the year 872, when it found a zealous protector in Alfred the Great. This prince was a moſt eminent patron of all kinds of arts and manufactures; and, with regard to maſonry in particular, he appropriated a ſeventh part of his revenue for maintaining a number of workmen, whom he conſtantly employed in rebuilding the cities, caſtles, &c. ruined by the Danes. During the reign of his ſucceſſor Edward, the maſons continued to hold their lodges under the ſanction of Ethred, huſband to the king's ſiſter, and Ethelward his brother, to whom the care of the fraternity was intruſted. The latter was a great architect, and founded the univerſity of Cambridge.

The true re-eſtabliſhment of maſonry in England, however, is dated from the reign of king Athelſtane; and there is ſtill extant a grand lodge of maſons at York, who trace their exiſtence from this period. This lodge, the moſt ancient in England, was founded in 926, under the patronage of Edwin the king's brother, who obtained for them a charter from Athelſtane, and became grand-maſter himſelf. By virtue of this charter it is ſaid, that all the maſons in the kingdom were convened at a general aſſembly in that city, where they eſtabliſhed a general or grand lodge for their future government. Under the patronage and juriſdiction of this lodge it is alſo alleged that the fraternity increaſed very conſiderably, and that kings, princes, and other eminent perſons who had been initiated into the myſteries, paid due allegiance to the aſſembly. But as the

times were yet turbulent and barbarous, the art of maſonry was ſometimes more ſometimes leſs patroniſed; and of courſe the aſſembly more or leſs reſpected according to the reſpect which the art itſelf met with. The appellation of *ancient York maſons* is well known both in Ireland and Scotland; and the general tradition is, that they originated at Auldby near York; and as Auldby was a ſeat of Edwin, this tradition gives conſiderable confirmation to the above account. There is indeed great reaſon to believe that York was the original ſeat of maſonic government, no other place having claimed it, and the whole fraternity having at various times owned allegiance to the authority there eſtabliſhed; though we know not whether that allegiance be now given or not. Certain it is, that if ſuch a lodge was once eſtabliſhed there, of which there is no reaſon to doubt, we have no account of its being regularly moved from that place to any other part of the kingdom with conſent of its members. Many reſpectable meetings have indeed been held at different times in other parts of the kingdom, but there is no account of any other general meeting being held in another place than York till very lately.

While prince Edwin lived, the maſons were employed as formerly in building churches, monaſteries, &c. and repairing thoſe which had ſuffered by the ravages of the Danes; and after his death the order was patroniſed by king Athelſtane himſelf; but on his deceaſe the maſons were diſperſed, and remained in an unſettled ſtate till the reign of Edgar in 960. They were now collected by St. Dunſtan, who employed them in works of the ſame kind: but as no permanent encouragement was given them, their lodges ſoon declined, and maſonry remained in a low ſtate for upwards of 50 years. It revived, however, in 1041, under Edward the Confeſſor, who ſuperintended the execution of ſeveral great works. By the aſſiſtance of Leoſrick earl of Coventry, he rebuilt Weſtminſter Abbey, the earl being appointed ſuperintendant of the maſons; and by this architect many other magnificent ſtructures were likewiſe erected. After the Conqueſt, in 1066, Gundulph biſhop of Rocheſter and Roger de Montgomery earl of Shrewſbury, both of them excellent architects, became joint patrons of the maſons; and under their auſpices the Tower of London was begun, though finiſhed only in the reign of William Rufus, who likewiſe rebuilt London bridge with wood, and in 1087 firſt conſtructed the palace and hall of Weſtminſter.

The maſons now continued to be patroniſed by the ſovereigns of England in ſucceſſion. The lodges aſſembled during the reign of Henry I. and during that of Stephen the ſociety were employed in building a chapel at Weſtminſter, now the houſe of commons, and ſeveral other works; the preſident of the lodges being now Gilbert de Clare, the marquis of Pembroke. During the reign of Henry II. the lodges were ſuperintended by the grand-maſter of the Knights Templars, who employed them in building their temple in Fleet-ſtreet in the year 1155. Maſonry continued under the patronage of this order till the year 1199, when John ſucceeded Richard I. in the throne of England, and Peter de Colechurch was then appointed grand-maſter. He began to rebuild London-bridge with ſtone, which was afterwards finiſhed by William Alemain in 1209. Peter de Rupibus ſucceeded Peter de Colechurch in the office of grand-maſter, and Geoffrey Fitz-Peter, chief ſurveyor of the king's works, acted as deputy under him; maſonry continued alſo to flouriſh under the auſpices of theſe two artiſts during this and the following reign. On the acceſſion of Edward I. in 1272, the ſuperintendence of the maſons was intruſted to Walter Giffard archbiſhop of York, Gilbert de Clare earl of Glouceſter, and Ralph lord of Mount Hermer, the progenitor of the family of the Montagues; and by theſe architects the abbey of Weſtminſter was finiſhed, after having been begun in 1220, during the minority of Henry II. During the reign of Edward II. the fraternity were employed in building Exeter and Oriel colleges in Oxford, Clare-hall in Cambridge, &c. under the auſpices of Walter Stapleton biſhop of Exeter, who had been appointed grand-maſter of the maſons in 1307.

Edward III. was a great encourager of learning in general, and not only patroniſed the maſons, but applied very aſſiduouſly to the conſtitutions of the order, reviſed and meliorated the ancient charges, and added ſeveral uſeful regulations to the original code by which the fraternity had been governed. He patroniſed the lodges, and appointed five deputies under him to inſpect their proceedings; and at this period it appears from ſome old records that the lodges were numerous, and that the fraternity held communications under the protection of the civil magiſtrates. William a Wykeham was continued grand-maſter on the acceſſion of Richard II. and by him both the New College in Oxford and Wincheſter College were founded at his own expence. After the acceſſion of Henry IV. Thomas Fitz-Allan earl of Surrey was appointed grand-maſter, who, after the engagement at Shrewſbury, founded Battle-abbey and Fotheringay; the Guildhall at London being alſo built in this reign. On the acceſſion of Henry V. the fraternity were directed by Henry Chichely archbiſhop of Canterbury, under whom the lodges and communications of the fraternity were frequent. In 1425, however, during the reign of Henry VI. an act was made againſt the meetings of the chapters and congregations of maſons, becauſe it was ſaid that by ſuch meetings "the good courſe and effect of the ſtatutes of labourers were openly violated and broken, in ſubverſion of the law, and to the great damage of all the commons." But this act was not put in force, nor did the fraternity ceaſe to meet as uſual under the protection of archbiſhop Chichely, who ſtill continued to preſide over them. The reaſon of this extraordinary edict is ſaid to have been as follows: The duke of Bedford, at that time regent of the kingdom, being in France, the regal power was veſted in his brother Humphrey duke of Glouceſter, who was ſtyled protector and guardian of the kingdom. The care of the young king's perſon and education was intruſted to Henry Beaufort, biſhop of Wincheſter, the duke's uncle. This prelate being of an ambitious diſpoſition, and aſpiring at the ſole government, had continual diſputes with his nephew the protector; and, by reaſon of the violent temper of that prince, gained frequent advantages over him. This animoſity increaſed to ſuch a degree, that the parliament was at length obliged to interpoſe. On the meeting of that aſſembly in the month of April 1425, however, the ſervants and followers of the peers came thither armed with clubs and ſtaves; on which account it received the name of the *Bat Parliament*, and at this time the act againſt maſons was made. This was owing to the influence of the biſhop, who wiſhed to deſtroy the meetings of the fraternity, on account of the ſecrecy obſerved in them. Dr. Anderſon, in the firſt edition of the Book of Conſtitutions, makes the following obſervation upon this act: "It was made in ignorant times, when true learning was a crime, and geometry condemned for conjuration; but it cannot derogate from the honour of the ancient fraternity, who, to be ſure, would never encourage any ſuch confederacy of their working brethren. By tradition, it is believed that the parliament were then too much influenced by the illiterate clergy, who were not accepted maſons, nor underſtood architecture (as the clergy of ſome former ages), and were generally thought unworthy of this brotherhood. Thinking they had an indefeaſible right to know all ſecrets by virtue of auricular confeſſion, and the maſons never confeſſing any thing thereof, the ſaid clergy were highly offended; and, at firſt, ſuſpecting them of wickedneſs, repreſented them as dangerous to the

fate during that minority; and ſoon influenced the parliament to lay hold of ſuch ſuppoſed arguments of the working maſons, for making an act that might ſeem to reflect diſhonour upon even the whole fraternity, in whoſe favour ſeveral acts had been made before that period, and were made after it."

The biſhop was ſoon after this diverted from his perſecution of the maſons by an affair of a more important kind. He had formed a deſign of ſurpriſing the city of London on the evening of St. Simon and St. Jude's day, that on which the lord-mayor was inveſted with his office. But the plot having been diſcovered by the duke of Glouceſter, the mayor was ſent for while at dinner, and ordered to keep a ſtrict watch for that night. The biſhop's party accordingly made an attempt to enter by the bridge about nine the next morning, but were repulſed by the vigilance of the citizens. At this the prelate was ſo much enraged, that he collected a numerous body of archers and men at arms, commanding them to aſſault the gate with ſhot. By the prudence of the magiſtrates, however, all violent meaſures were ſtopped; but no reconciliation could be procured betwixt the two parties, though it was attempted by the archbiſhop of Canterbury, and Peter duke of Coimbra, eldeſt ſon to the king of Portugal, with ſeveral other perſons of diſtinction. At laſt the biſhop wrote a letter to the duke of Bedford, urging his return to England, and informing him of the danger there was of a civil war, and reflecting upon the duke of Glouceſter. This letter had the deſired effect. The regent returned, and held a great council at St. Albans on the 21ſt of February, but adjourned it to the 15th of March at Northampton, and to the 25th of June at Leiceſter. Bats and ſtaves were now prohibited at theſe meetings; but the parties aſſembled with weapons no leſs formidable, viz. with ſlings, ſtones, and leaden plummets. The duke of Bedford employed all his authority to reconcile the differences; and at laſt obliged the two rivals to promiſe before the aſſembly that they would bury all animoſities in oblivion. During the diſcuſſion of this matter, five charges were exhibited by the duke of Glouceſter againſt the biſhop; one of which was, that "he had, in his letter to the duke of Bedford, at France, plainly declared his malicious purpoſe of aſſembling the people, and ſtirring up a rebellion in the nation, contrary to the king's peace." To this the biſhop anſwered, "That he never had any intention to diſturb the peace of the nation, or raiſe a rebellion; but that he ſent to the duke of Bedford to ſolicit his return to England, to ſettle all thoſe differences which were ſo prejudicial to the peace of the kingdom: that though he had indeed written in the letter, 'that if he tarried, we ſhould put the land in adventure by a field, ſuch a brother you have here,' he did not mean it of any deſign of his own, but concerning the ſeditious aſſemblies of maſons, carpenters, tylers, and plaiſterers; who being diſtreſſed by the late act of parliament againſt the exceſſive wages of theſe trades, had given out many ſeditious ſpeeches and menaces againſt certain great men, which tended much to rebellion," &c.

Notwithſtanding this heavy charge, the duke of Glouceſter, who knew the innocence of the parties accuſed, took the maſons under his protection, and transferred the charge of ſedition and rebellion from them to the biſhop and his followers. By the intereſt of the latter, however, the king granted him a pardon for all offences; and though the duke drew up freſh articles of impeachment againſt him in 1442, and preſented them in perſon to the king, the council, being compoſed moſtly of eccleſiaſtics, proceeded ſo ſlowly in the buſineſs, that the duke, wearied out with the tedioufneſs of the matter, dropped the proſecution entirely.

This conteſt terminated in the impeachment, impriſonment, and murder of the duke of Glouceſter himſelf. This event might have been attended with bad conſequences, had not their inveterate enemy, the prelate himſelf, been taken off by death in about two months after the duke. The maſons then continued not only to meet in ſafety, but were joined by the king himſelf. He was, that very year (1442) initiated into maſonry, and from that time ſpared no pains to become completely maſter of the art. He peruſed the ancient charges, reviſed the conſtitutions, and, with the conſent of his council, honoured them with his ſanction. The example of the ſovereign was followed by many of the nobility, who aſſiduouſly ſtudied the art. The king preſided over the lodges in perſon, nominating William Wanefleet biſhop of Wincheſter grand-maſter. This biſhop, at his own expence, built Magdalene-college, Oxford, and ſeveral religious houſes. Eton-college near Windſor, and King's-college at Cambridge, were alſo founded during this reign. Henry himſelf founded Chriſt's-college, Cambridge, as his queen Margaret of Anjou did Queen's college in the ſame univerſity.

About this time, alſo, the maſons were protected and encouraged by James I. of Scotland, who, after his return from captivity, became a zealous patron of arts and learning of all kinds. He honoured the lodges with his royal preſence, and ſettled an annual revenue of four pounds Scots (an Engliſh noble) to be paid by every maſter-maſon in Scotland, to a grand-maſter choſen by the grand-lodge, and approved by the crown, one nobly born, or an eminent clergyman who had his deputies in cities and counties: ſomething was likewiſe paid him by every new brother at his entry. His office entitled him to regulate every thing in the fraternity which could not come under the juriſdiction of the law-courts; and, to prevent law-ſuits, both maſon and lord, or builder and founder, appealed to him. In his abſence, they appealed to his deputy or grand-warden, who reſided next the premiſes.

The flouriſhing ſtate of maſonry was interrupted by the civil wars between the houſes of York and Lancaſter, which brought it almoſt totally into neglect. About 1471, however, it revived under the auſpices of Robert Beauchamp biſhop of Sarum, who had been appointed grand-maſter by Edward IV. and honoured with the title of *Chancellor of the Garter*, for repairing the caſtle and chapel of Windſor. It again declined during the reigns of Edward V. and Richard III; but came once more into repute on the acceſſion of Henry VII. in 1485. It was now patroniſed by the maſter and fellows of the order of St. John at Rhodes (now Malta); who aſſembled their grand-lodge in 1500, and choſe Henry for their protector. On the 24th of June 1502, a lodge of maſters was formed in the palace, at which the king preſided as grand-maſter; and having appointed John Iſlip abbot of Weſtminſter, and Sir Reginald Bray knight of the garter, his wardens for the occaſion, proceeded in great ſtate to the eaſt end of Weſtminſter abbey, where he laid the firſt ſtone of that excellent piece of Gothic architecture called *Henry the Seventh's Chapel*. The cape-ſtone of this building was celebrated in 1507. The palace of Richmond, as well as many other noble ſtructures, were raiſed under the direction of Sir Reginald Bray; and the colleges of Brazen-Noſe in Oxford, and Jeſus and St. John's in Cambridge, were all finiſhed in this reign.

On the acceſſion of Henry VIII. Cardinal Wolſey was appointed grand-maſter; who built Hampton-court, Whitehall, Chriſt-church college, Oxford, with ſeveral other noble edifices; all of which, upon the diſgrace of that prelate, were forfeited to the crown in 1530. Wolſey was ſucceeded as grand-maſter in 1534 by Thomas Cromwell earl of Eſſex; who employed the fraternity in building St. James's palace, Chriſt's hoſpital, and Greenwich caſtle. Cromwell being beheaded in 1540, John Touchet lord Audley ſucceeded to the office of grand-maſter, and built Magdalen college in Cambridge, and

many other ſtructures. In 1547, the duke of Somerſet, guardian to the king, and regent of the kingdom, became ſuperintendant of the maſons, and built Somerſet-houſe in the Strand; which, on his being beheaded, was forfeited to the crown in 1552.

After the death of the duke of Somerſet, John Poynet biſhop of Wincheſter preſided over the lodges till the death of the king in 1553. From this time they continued without any patron till the reign of Elizabeth, when Sir Thomas Sackville accepted of the office of grand-maſter. Lodges, however, had been held during this period in different parts of England; but the general or grand lodge aſſembled in the city of York, where it is ſaid the fraternity were numerous and reſpectable. —Of the queen we have the following curious anecdote with regard to the maſons: Hearing that they were in poſſeſſion of many ſecrets which they refuſed to diſcloſe, and being naturally jealous of all ſecret aſſemblies, ſhe ſent an armed force to York to break up their annual grand-lodge. The deſign was prevented by the interpoſition of Sir Thomas Sackville, who took care to initiate ſome of the chief officers whom ſhe had ſent on this duty in the ſecrets of maſonry. Theſe joined in communication with their new brethren, and made ſo favourable a report to the queen on their return, that ſhe countermanded her orders, and never afterwards attempted to diſturb the meeting of the fraternity. In 1567, Sir Thomas Sackville reſigned the office of grand-maſter in favour of Francis Ruſſel earl of Bedford, and Sir Thomas Greſham, an eminent merchant. The former had the care of the brethren in the northern part of the kingdom aſſigned to him, while the latter was appointed to ſuperintend the meetings in the ſouth, where the ſociety had conſiderably increaſed, in conſequence of the honourable report which had been made to the queen. The general aſſembly, however, continued to meet at York as formerly; and here all records were kept, and appeals made on every important occaſion to the aſſembly.

Sir Thomas Greſham abovementioned propoſed to erect a building in the city of London for the benefit of commerce, provided the citizens would purchaſe a ſpot proper for the purpoſe. Accordingly ſome houſes between Cornhill and Threadneedle-ſtreet, being pulled down, the foundation-ſtone of the building was laid on the 7th of June 1566, and with ſuch expedition was the work carried on, that the whole was finiſhed in November 1567. This building, which was conſtructed on the plan of the exchange of Antwerp, was called at firſt ſimply *the Bourſe*, but in January 1570. the queen having dined with Sir Thomas, returned through Cornhill, entered the Bourſe on the ſouth ſide, and having viewed every part of the building, particularly the gallery which extended round the whole ſtructure, and which was furniſhed with ſhops filled with all ſorts of the fineſt merchandize in the city, ſhe cauſed the edifice to be proclaimed, in her preſence, by herald and trumpet, the *Royal Exchange*; and on this occaſion, it is ſaid Sir Thomas appeared publicly in the character of grand-maſter.

The queen being now thoroughly convinced that the fraternity of maſons did not interfere in ſtate affairs, became quite reconciled to their aſſemblies, and from this time maſonry made a conſiderable progreſs; lodges were held in different parts of the kingdom, particularly in London and its neighbourhood, where the number of the brethren increaſed conſiderably. Several great works were carried on there under the auſpices of Sir Thomas Greſham, from whom the fraternity received every encouragement. Sir Thomas was ſucceeded in the office of grand-maſter by Charles Howard earl of Effingham, who continued to preſide over the lodges in the ſouth till the year 1588, when George Haſtings earl of Huntingdon was choſen grand-maſter, and remained in the office till the deceaſe of the queen in 1603.

On the acceſſion of James I. to the crown of England, maſonry flouriſhed in both kingdoms, and lodges were held in both kingdoms. A number of gentlemen returned from their travels, with curious drawings of the old Greek and Roman architecture, as well as ſtrong inclination to revive a knowledge of it. Among theſe was the celebrated Inigo Jones, who was appointed general ſurveyor to the king. He was named grand-maſter of England, and was deputed by the king to preſide over the lodges *. Several learned men were now initiated into the myſteries of maſonry, and the ſociety increaſed conſiderably in reputation and conſequence. Ingenious artiſts reſorted to England in great numbers; lodges were conſtituted, as ſeminaries of inſtruction in the ſciences and polite arts, after the model of the Italian ſchools; the communications of the fraternity were eſtabliſhed, and the annual feſtivals regularly obſerved. Under the direction of this accompliſhed architect, many magnificent ſtructures were raiſed; and among the reſt he was employed, by command of the ſovereign, to plan a new palace at Whitehall, worthy of the reſidence of the kings of England. This was executed; but for want of a parliamentary fund, no more of the plan was ever finiſhed than the banqueting-houſe. Inigo Jones continued in the office of grand-maſter till the year 1618, when he was ſucceeded by the earl of Pembroke; under whoſe auſpices many eminent and wealthy men were initiated, and the myſteries of the order held in high eſtimation.

After Charles I. aſcended the throne, Earl Pembroke was continued in his office till the year 1630, when he reſigned in favour of Henry Danvers earl of Danby. This nobleman was ſucceeded in 1633 by Thomas Howard earl of Arundel, the anceſtor of the Norfolk family. In 1635, Francis Ruſſel earl of Bedford accepted the government of the ſociety; but Inigo Jones having continued to patronize the lodges during his lordſhip's adminiſtration, he was re-elected the following year, and continued in office till the year of his death, 1646. The progreſs of maſonry, however, was for ſome time obſtructed by the breaking out of the civil wars; but it began to revive under the patronage of Charles II. who had been received into the order during his exile. Some lodges during this reign were conſtituted by *leave* of the *ſeveral* noble grand-maſters, and many gentlemen and famous ſcholars requeſted at that time to be admitted into the fraternity. On the 27th of December 1663, a general aſſembly was held, where Henry Jennyn earl of St. Alban's was elected grand-maſter; who appointed Sir John Denham his deputy, and Mr. Chriſtopher Wren, afterwards the celebrated Sir Chriſtopher Wren, and John Webb, his wardens. At this aſſembly ſeveral uſeful regulations were made, for the better government of the lodges; and the greateſt harmony prevailed among the whole fraternity. The carl of St. Alban's was ſucceeded in his office of grand-maſter by earl Rivers in the year 1666, when Sir Chriſtopher Wren was appointed deputy, and diſtinguiſhed himſelf beyond any of his predeceſſors in promoting the proſperity of the lodges which remained at that time, particularly that of St. Paul's, now the lodge of Antiquity, which he patronized upwards of 18 years. At this time he attended the meetings regularly; and during his preſidency made a preſent to the lodge of three mahogany candleſticks, which at that time were very valuable. They are ſtill preſerved, and highly valued as a teſtimony of the eſteem of the donor.

The fire which in 1666 deſtroyed ſuch a great part of Lon-

* Mr. Preſton obſerves, that the grand-maſter of the north bears the title of *grand maſter of all England*, which (ſays he) may probably have been occaſioned by the title of *grand-maſter*.

don, afforded ample opportunity for the maſons to exert their abilities. After a calamity ſo ſudden and extenſive, however, it became neceſſary to adopt ſome regulations to prevent ſuch a cataſtrophe in time to come. It was now determined, that in all the new buildings to be erected, ſtone ſhould be uſed inſtead of timber. Wren was ordered by the king and grand-maſter to draw up the plan of a city with broad and regular ſtreets. Sir Chriſtopher Wren was appointed ſurveyor general and principal architect for rebuilding the city, the cathedral of St. Paul, and all the parochial churches enacted by parliament, in lieu of thoſe that were deſtroyed, with other public ſtructures. This gentleman, however, conceiving the charge to be too important for a ſingle perſon, ſelected for his aſſiſtant Mr. Robert Hook profeſſor of geometry in Greſham college. The latter was immediately employed in meaſuring, adjuſting, and ſetting out the ground of the private ſtreets to the ſeveral proprietors. The model and plan were laid before the king and houſe of commons, and the practicability of the whole ſcheme, without any infringement of private property: but unfortunately it happened, that the greater part of the citizens were totally averſe to leaving their old habitations, and building houſes in other places; and ſo obſtinate were they in their determinations, that they choſe rather to have their old city again under all its diſadvantages, than a new one upon the improved plan. Thus an opportunity was loſt of making the new city the moſt magnificent as well as the moſt convenient for health and commerce of any in Europe. Hence the architect, being cramped in the execution of his plan, was obliged to alter and abridge it, and to model the city after the manner in which it has ſince appeared.—In 1673 the foundation-ſtone of the cathedral of St. Paul's was laid with great ſolemnity by the king in perſon, and the mallet which he uſed on this occaſion is ſtill preſerved in the lodge of antiquity as a great curioſity.

During the time that the city was rebuilding, lodges were held by the fraternity in different places, and many new ones conſtituted, to which the beſt architects reſorted. In 1674, earl Rivers reſigned the office of grand-maſter in favour of George Villiers duke of Buckingham, who left the care of the fraternity to his wardens, and Sir Chriſtopher Wren who ſtill continued to act as deputy. In 1679, the duke reſigned in favour of Henry Bennet earl of Arlington: but this nobleman was too deeply engaged in ſtate affairs to attend to his duty as a maſon, though the lodges continued to meet under his ſanction, and many reſpectable gentlemen joined the fraternity. During the ſhort reign of James II. the maſons were much neglected. In 1685, Sir Chriſtopher Wren was elected to the office of grand-maſter, who appointed Gabriel Cibber and Mr. Edward Strong his wardens: yet notwithſtanding the great reputation and abilities of this celebrated architect, maſonry continued in a declining way for many years, and only a few lodges were held occaſionally in different parts of the kingdom.

At the Revolution, the ſociety was in ſuch a low ſtate in the ſouth of England, that only ſeven regular lodges were held in London and its ſuburbs; and of theſe only two, viz, that of St. Paul's, and one at St. Thomas's hoſpital, Southwark, were of any conſequence. But in 1695 king William having been initiated into the myſteries, honoured the lodges with his preſence, particularly one at Hampton-court, at which he is ſaid to have frequently preſided during the time that the new part of his palace was building. Many of the nobility alſo were preſent at a general aſſembly and feaſt held in 1697, particularly Charles duke of Richmond and Lenox, who was elected grand-maſter for that year; but in 1698 reſigned his office to Sir Chriſtopher Wren, who continued at the head of the fraternity till king William's death in 1702.

During the reign of queen Anne, maſonry made no conſiderable progreſs. Sir Chriſtopher's age and infirmities drew off his attention from the duties of his office, the annual feſtivals were entirely neglected, and the number of maſons conſiderably diminiſhed. It was therefore determined that the privileges of maſonry ſhould not be confined to operative maſons, but that people of all profeſſions ſhould be admitted to participate in them, provided they were regularly approved and initiated into the order.

Thus the ſociety once more roſe into eſteem; and on the acceſſion of George I. the maſons, now deprived of Sir Chriſtopher Wren, reſolved to unite again under a grand-maſter, and revive the annual feſtivals. With this view, the members of the only four lodges at that time exiſting in London, met at the Apple-tree tavern in Charles-ſtreet, Covent Garden; and having voted the oldeſt maſter-maſon then preſent into the chair, conſtituted themſelves a grand-lodge *pro tempore*. It was now reſolved to renew the quarterly communications among the brethren; and at an annual meeting held on the 24th of June the ſame year, Mr. Anthony Sayer was elected grand-maſter, inveſted by the oldeſt maſter-maſon there preſent, inſtalled by the maſter of the oldeſt lodge, and had due homage paid him by the fraternity. Before this time a ſufficient number of maſons, met together within a certain diſtrict, had ample power to make maſons without a warrant of conſtitution; but it was now determined, that the privilege of aſſembling as maſons ſhould be veſted in certain lodges or aſſemblies of maſons convened in certain places, and that every lodge to be afterwards convened, excepting the four old lodges then exiſting, ſhould be authorized to act by a warrant from the grand-maſter for the time, granted by petition from certain individuals, with the conſent and approbation of the grand-lodge in communication; and that without ſuch warrant, no lodge ſhould hereafter be deemed regular or conſtitutional. The former privileges, however, were ſtill allowed to remain to the four old lodges then extant. In conſequence of this, the old maſons in the metropolis veſted all their inherent privileges as individuals in the four old lodges, in truſt that they never would ſuffer the ancient charges and land-marks to be infringed: The four old lodges, on their part, agreed to extend their patronage to every new lodge which ſhould hereafter be conſtituted according to the new regulations of the ſociety; and while they acted in conformity to the ancient conſtitutions of the order, to admit their maſters and wardens to ſhare with them all the privileges of the grand-lodge, that of precedence only excepted.

Matters being thus ſettled, the brethren of the four old lodges conſidered their attendance on the future communications of the ſociety as unneceſſary; and therefore truſted implicitly to their maſters and wardens, ſatisfied that no meaſure of importance would be adopted without their approbation. It was, however, ſoon diſcovered that the new lodges being equally repreſented with the old ones at the communications, would at length ſo far outnumber them, that by a majority they might ſubvert the privileges of the original maſons of England which had been centered in the four old lodges; on which account a code of laws was, with the conſent of the brethren at large, drawn up for the future government of the ſociety. To this the following was annexed, binding the grand-maſter for the time being, his ſucceſſors, and the maſter of every lodge to be hereafter conſtituted, to preſerve it inviolably: "Every annual grand-lodge has an inherent power and authority to make new regulations, or to alter theſe for the real benefit of this ancient fraternity, provided always that the old land-marks be carefully preſerved: and that ſuch alterations and new regulations be propoſed and agreed to at the third quarterly communication preceding the annual grand

feaſt; and that they be offered alſo to the peruſal of all the brethren before dinner, in writing, even of the youngeſt apprentice; the approbation and conſent of the majority of all the brethren preſent being abſolutely neceſſary to make the ſame binding and obligatory." To commemorate this circumſtance, it has been cuſtomary, ever ſince that time, for the maſter of the oldeſt lodge to attend every grand inſtallation; and, taking precedence of all preſent, the grand-maſter only excepted, to deliver the book of the original conſtitutions to the new inſtalled grand-maſter, on his promiſing obedience to the ancient charges and general regulations.

By this precaution the original conſtitutions were eſtabliſhed as the baſis of all ſucceeding maſonic juriſdiction in the ſouth of England; and the ancient *land-marks*, as they are called, or the boundaries ſet up as checks againſt innovation, were carefully ſecured from the attacks of any future invaders. No great progreſs, however, was made during the adminiſtration of Mr. Sayer, only two lodges being conſtituted, though ſeveral brethren joined the old ones. In 1718 Mr. Sayer was ſucceeded by Mr. George Payne, who collected many valuable manuſcripts on the ſubject of maſonry, and earneſtly requeſted, that the fraternity would bring to the grand lodge any old writings or records concerning the fraternity, to ſhow the uſages of ancient times: and in conſequence of this invitation, ſeveral old copies of the Gothic conſtitutions were produced, arranged, and digeſted. Another aſſembly and feaſt were held on the 24th of June 1719, when Dr. Deſaguliers was unanimouſly elected grand-maſter. At this feaſt the old, regular, and peculiar toaſts were introduced; and from this time we may date the riſe of free-maſonry on its preſent plan in the ſouth of England. Many new lodges were eſtabliſhed, the old ones viſited by many maſons who had long neglected the craft, and ſeveral noblemen initiated into the myſteries. In 1720, however, the fraternity ſuſtained an irreparable loſs by the burning of ſeveral valuable manuſcripts, concerning the lodges, regulations, charges, ſecrets, &c. (particularly one written by Mr. Nicholas Stone, the warden under Inigo Jones). This was done by ſome ſcrupulous brethren, who were alarmed at the publication of the maſonic conſtitutions. At a quarterly communication it was this year agreed, that, for the future, the new grand-maſter ſhall be named and propoſed to the grand lodge ſome time before the feaſt; and if approved and preſent, he ſhall be ſaluted as grand-maſter elect; and that every grand-maſter, when he is inſtalled, ſhall have the ſole power of appointing his deputy and wardens according to ancient cuſtom.

In the mean time maſonry continued to ſpread in the north as well as the ſouth of England. The general aſſembly, or grand lodge at York, continued to meet as uſual. Several lodges met in 1705, under the direction of Sir John Tempeſt baronet, then grand-maſter; and many perſons of worth and character were initiated into the myſteries of the fraternity. The greateſt harmony ſubſiſted between the two grand lodges, and private lodges were formed in both parts of the kingdom under their ſeparate juriſdiction. The only diſtinction which the grand lodge in the north appears to have retained is in the title of the *Grand Lodge of all England*; while the other was only called the *Grand Lodge of England*. The latter, however, being encouraged by ſome of the principal nobility, ſoon acquired conſequence and reputation, while the other ſeemed gradually to decline; but, till within theſe few years, the authority of the grand lodge at York was never challenged; on the other hand, every maſon in the kingdom held that aſſembly in the higheſt veneration, and conſidered himſelf bound by the charges which originated from that aſſembly. It was the glory and boaſt of the brethren, in almoſt every country where maſonry was eſtabliſhed, to be accounted deſcendants of the original York maſons: and from the univerſality of the idea that maſonry was firſt eſtabliſhed at York by charter, the maſons of England have received tribute from the firſt ſtates in Europe. At preſent, however, this ſocial intercourſe is aboliſhed, and the lodges in the north and ſouth are almoſt entirely unknown to one another; and neither the lodges of Scotland nor Ireland court the correſpondence of the grand lodge at London. This is ſaid to have been owing to the introduction of ſome innovations among the lodges in the ſouth; but for the coolneſs which ſubſiſts between the two grand lodges another reaſon is aſſigned. A few brethren at York having, on ſome trivial occaſion, ſeceded from their ancient lodge, they applied to London for a warrant of conſtitution. Their application was honoured without any inquiry into the merits of the caſe; and thus, inſtead of being recommended to the mother-lodge to be reſtored to favour, theſe brethren were encouraged to revolt, and permitted, under the ſanction of the grand lodge in London, to open a new lodge in the city of York itſelf. This illegal extenſion of power juſtly offended the grand lodge at York, and occaſioned a breach which has never yet been made up.

The duke of Buccleugh, who in 1723 ſucceeded the duke of Wharton as grand-maſter, firſt propoſed the ſcheme of raiſing a general fund for diſtreſſed maſons. The duke's motion was ſupported by lord Paiſley, colonel Houghton, and a few other brethren; and the grand lodge appointed a committee to conſider of the moſt effectual means of carrying the ſcheme into execution. The diſpoſal of the charity was firſt veſted in ſeven brethren; but this number being found too ſmall, nine more were added. It was afterwards reſolved that 12 maſters of contributing lodges, in rotation with the grand officers, ſhould form the committee; and by another regulation ſince made, it has been determined that all paſt and preſent grand officers, with the maſters of all regular lodges which ſhall have contributed within 12 months to the charity, ſhall be members of the committee. This committee meets four times in the year by virtue of a ſummons from the grand-maſter or his deputy. The petitions of the diſtreſſed brethren are conſidered at theſe meetings; and if the petitioner be conſidered as a deſerving object, he is immediately relieved with five pounds. If the circumſtances of the caſe are of a peculiar nature, his petition is referred to the next communication, where he is relieved with any ſum the committee may have ſpecified, not exceeding 20 guineas at one time. Thus the diſtreſſed have always found ready relief from this general charity, which is ſupported by the voluntary contributions of different lodges out of their private funds, without being burdenſome to any member in the ſociety. Thus has the committee of charity for free maſons been eſtabliſhed; and ſo liberal have the contributions been, that though the ſums annually expended for the relief of the diſtreſſed brethren have for ſeveral years paſt amounted to many thouſand pounds, there ſtill remains a conſiderable ſum.

The moſt remarkable events which of late have taken place in the affairs of maſonry, are the initiation of Omitul Omrah Bahauder, eldeſt ſon of the nabob of the Carnatic, who was received by the lodge of Trichinopoly in the year 1779. The news being officially tranſmitted to England, the grand lodge determined to ſend a congratulatory letter to his highneſs on the occaſion, accompanied with an apron elegantly decorated, and a copy of the book of Conſtitutions ſuperbly bound. The execution of this commiſſion was entruſted to Sir John Duy, advocate-general of Bengal; and in the beginning of 1780, an anſwer was received from his highneſs, acknowledging the receipt of the preſent, and expreſſing the warmeſt attachment and benevolence to his brethren in England. The letter was written in the Perſian language, and

incloſed in an elegant cover of cloth of gold, and addreſſed to the grand-maſter and grand-lodge of England. A proper reply was made; and a tranſlation of his highneſs's letter was ordered to be copied on vellum, and, with the original, elegantly framed and glazed, and hung up in the hall at every public meeting of the ſociety.

After ſuch a long hiſtory of the riſe and progreſs of maſonry, it muſt be natural to enquire into the uſes of the inſtitution, and for what purpoſe it has been patroniſed by ſo many great and illuſtrious perſonages. The profound ſecrecy, however, in which every thing relating to maſonry is involved, prevents us from being very particular on this head. The maſons themſelves ſay, in general, that it affords relief to the poor and needy, promotes philanthropy, friendſhip, and morality; and that in proportion as maſonry has been cultivated, the countries have been civilized. How far this can be depended upon, the fraternity themſelves beſt know. Another advantage, however, ſeems leſs equivocal, viz. that its ſigns ſerve as a kind of univerſal language, ſo that by means of them people of the moſt diſtant nations may become acquainted, and enter into friendſhip with one another. This certainly muſt be accounted a very important circumſtance; and conſidering the great number which have been, and daily are, admitted to the ſociety, and their inviolable attachment to the art, we muſt in candour conclude, that it contains ſomething of great importance to mankind at large.

Egyptian-Masonry, a new ſyſtem of maſonry taught by the celebrated impoſtor the count Caglioſtro.—It is not known whether this ſyſtem was an invention of his own, or whether any ſuch thing really has an exiſtence among the ſuperſtitious Egyptians. The ſcheme was firſt put in execution in London; and, by means of his pretended knowledge in the myſteries of this art, the count procured great ſums of money, and attached to himſelf a vaſt number of followers. The following particulars concerning it were confeſſed by him before the Inquiſition at Rome.

The Egyptian maſons are divided into ſeveral ſects, but there are two more eſteemed than the reſt. The firſt is that of the adepts, the members of which (ſay the inquiſitors) profeſs the moſt irreligious ſentiments, and employ magic in their operations; but their principal object is the deſtruction of the Catholic religion and of monarchy. The members of the other pretend to be occupied about the ſecrets of the hermetic art, and more eſpecially the philoſopher's ſtone. Caglioſtro owned that he was aſſociated in London with the ſecond of theſe ſects; that his wife was likewiſe a member, and received a diploma which coſt five guineas. The lady was preſented with a ribbon, on which were embroidered the words *Union*, *Silence*, and *Virtue*; and ſhe was deſired to ſleep the following night with the ribbon attached to her thigh. When a male candidate is to be admitted, his courage muſt be tried in a number of ways. Caglioſtro himſelf ſubmitted to theſe trials; among which the following are mentioned in the account of his life. He was firſt hoiſted up to the ceiling by means of a pulley, and, after ſuffering conſiderable pain, had his hands ſcorched by means of a candle. His eyes were then covered with a bandage, and he received an empty piſtol, with orders to charge it. This being done, he was ordered to diſcharge it againſt his head; and upon his refuſing to do ſo, the piſtol was taken from him with contempt, but returned after a number of ceremonies. This had ſuch an effect upon him, that, without any regard to ſelf-preſervation, he drew the trigger, and got a ſmart ſtroke on the ſkull, which, however, produced no bad conſequence. At the initiation of other candidates, he diſcovered that the piſtol was changed, an unloaded one being put into the hands of the perſon when blind-folded, and that one of the aſſiſtants ſtruck him a ſmart blow on the head, to make him think himſelf wounded. The ceremony was concluded with his taking an oath of ſecrecy and obedience to the grand-maſter.

MASORA, a term in the Jewiſh theology, ſignifying a work on the bible, performed by ſeveral learned rabbins, to ſecure it from any alterations which might otherwiſe happen. Their work regards merely the letter of the Hebrew text, in which they have, firſt, fixed the true reading by vowels and accents: they have, ſecondly, numbered not only the chapters and ſections, but the verſes, words, and letters of the text: and they find in the Pentateuch 5245 verſes, and in the whole Bible 23,206. The maſora is called, by the Jews, the *hedge or fence of the law*, becauſe this enumeration of the verſes, &c. is a means of preſerving it from being corrupted and altered. They have, thirdly, marked whatever irregularities occur in any of the letters of the Hebrew text; ſuch as the different ſize of the letters, their various poſitions and inverſions, &c. and they have been fruitful in finding out reaſons for theſe irregularities and myſteries in them. They are, fourthly, ſuppoſed to be the authors of the Keri and Chetibh, or the marginal corrections of the text in our Hebrew Bibles.

The text of the ſacred books, it is to be obſerved, was originally written without any breaks or diviſions into chapters or verſes, or even into words; ſo that a whole book, in the ancient manner, was but one continued word: of this kind we have ſtill ſeveral ancient manuſcripts, both Greek and Latin. In regard, therefore, the ſacred writings had undergone an infinite number of alterations, whence various readings had ariſen, and the original was become much mangled and diſguiſed, the Jews had recourſe to a canon, which they judged infallible, to fix and aſcertain the reading of the Hebrew text; and this rule they call *maſora*, "tradition," from מסר, *tradidit*, as if this critique were nothing but a tradition which they had received from their forefathers. Accordingly they ſay, that when God gave the law to Moſes at Mount Sinai, he taught him, firſt, the true reading of it; and, ſecondly, its true interpretation; and that both theſe were handed down by oral tradition, from generation to generation, till at length they were committed to writing. The former of theſe, viz. the true reading, is the ſubject of the maſora; the latter, or true interpretation, that of the miſhna and gemara.

According to Elias Levita, they were the Jews of a famous ſchool at Tiberias, about 500 years after Chriſt, who compoſed, or at leaſt began, the maſora; whence they are called *maſorites*, and *maſoretic doctors*. Aben Ezra makes them the authors of the points and accents in the Hebrew text, as we now find it; and which ſerve for vowels.

The age of the maſorites has been much diſputed. Archbiſhop Uſher places them before Jerom; Capel, at the end of the fifth century; father Morin, in the 10th century. Baſnage ſays that they were not a ſociety, but a ſucceſſion of men; and that the maſora is the work of many grammarians, who, without aſſociating and communicating their notions, compoſed this collection of criticiſms on the Hebrew text. It is urged that there were maſorites from the time of Ezra and the men of the great ſynagogue, to about the year of Chriſt 1030; and that Ben Aſher and Ben Naphtali, who were the beſt of the profeſſion, and who, according to Baſnage, were the inventors of the maſora, flouriſhed at this time. Each of theſe publiſhed a copy of the whole Hebrew text, as correct, ſays Dr. Prideaux, as they could make it. The eaſtern Jews have followed that of Ben Naphtali, and the weſtern that of Ben Aſher; and all that has been done ſince is to copy after them, without making any more corrections or maſoretical criticiſms.

The Arabs have done the ſame thing by their Koran that the maſorites have done by the Bible; nor do the Jews deny their having borrowed this expedient from the Arabs, who firſt put it in practice in the ſeventh century.

There is a great and little maſora printed at Venice and at Baſil, with the Hebrew text in a different character. Buxtorf has written a maſoretic commentary, which he calls *Tiberias*.

MASQUE, or MASK, a cover for the face, contrived with apertures for the eyes and mouth; originally worn chiefly by women of condition, either to preſerve their complexion from the weather, or out of modeſty to prevent their being known. Poppæa, wife of Nero, is ſaid to be the firſt inventor of the *maſque*; which ſhe did to guard her complexion from the ſun and weather, as being the moſt delicate woman, with regard to her perſon, that has been known. Theatrical maſques were in common uſe both among the Greeks and Romans: Suidas and Athenæus aſcribe the invention of them to the poet Choerilus, a contemporary of Theſpis; Horace attributes them to Æſchylus; but Ariſtotle informs us, that the real inventor, and conſequently the time of their firſt introduction and uſe, were unknown. Brantome obſerves, that the common uſe of modern maſques was not introduced till towards the end of the 16th century.

MASQUE is alſo uſed to ſignify any thing made uſe of to cover the face, and prevent a perſon's being known. The penitents of Lyons and Avignon hide their faces with large white veils, which ſerve them for maſques.

The Iron MASQUE *(Maſque de Fer)*, or *Man with the iron maſque*, a remarkable perſonage ſo denominated, who exiſted as a ſtate priſoner in France during the latter part of the laſt century. As the circumſtances of this perſon form a hiſtorical problem which has occaſioned much inquiry, and given riſe to many conjectures, as well as of late, in conſequence of the deſtruction of the Baſtile, excited in a particular manner the curioſity of the public, it ſhall be endeavoured to condenſe in this article the ſubſtance of every thing material that has been publiſhed on the ſubject. We ſhall firſt relate ſuch particulars concerning this extraordinary priſoner as appear to be well authenticated; and ſhall afterwards mention the different opinions and conjectures that have been entertained with regard to his real quality, and the cauſes of his confinement.

I. The authenticated particulars concerning the *iron Maſque* are as follows:—A few months after the death of Cardinal Mazarine, there arrived at the iſle of Sainte Marguerite, in the ſea of Provence, a young priſoner whoſe appearance was peculiarly attracting: his perſon was above the middle ſize, and elegantly formed; his mien and deportment were noble, and his manners graceful; and even the ſound of his voice, it is ſaid, had in it ſomething uncommonly intereſting. On the road he conſtantly wore a maſk made with iron ſprings, to enable him to eat without taking it off. It was at firſt believed that this maſque was made entirely with iron; whence he acquired the name of "the Man with the iron maſk." His attendants had received orders to diſpatch him if he attempted to take off his maſque or diſcover himſelf.—He had been firſt confined at Pigneol, under the care of the governor M. de St. Mars; and upon being ſent from thence to St. Marguerite, he was accompanied thither by the ſame perſon, who continued to have the charge of him. He was always treated with the moſt marked reſpect: he was ſerved conſtantly in plate; and the governor himſelf placed his diſhes on the table, retiring immediately after and locking the door behind him. He *tu-to'yoit* (thee'd and thou'd) the governor; who, on the other hand, behaved to him in the moſt reſpectful manner, and never wore his hat before him, nor ſat down in his preſence unleſs he was deſired. The Marquis de Louvoiſis, who went to ſee him at St. Marguerite, ſpoke to him ſtanding, and with that kind of attention which denotes high reſpect.

During his reſidence here, he attempted twice, in an indirect manner, to make himſelf known. One day he wrote ſomething with his knife on a plate, and threw it out of his window towards a boat that was drawn on ſhore near the foot of the tower. A fiſherman picked it up and carried it to the governor. M. de St. Mars was alarmed at the ſight; and aſked the man with great anxiety, whether he could read, and whether any one elſe had ſeen the plate? The man anſwered, that he could not read, that he had but juſt found the plate, and that no one elſe had ſeen it. He was, however, confined till the governor was well aſſured of the truth of his aſſertions.—Another attempt to diſcover himſelf proved equally unſucceſsful. A young man who lived in the iſle, one day perceived ſomething floating under the priſoner's window; and on picking it up, he diſcovered it to be a very fine ſhirt written all over. He carried it immediately to the governor; who, having looked at ſome parts of the writing, aſked the lad, with ſome appearance of anxiety, if he had not had the curioſity to read it? He proteſted repeatedly that he had not: but two days afterwards he was found dead in his bed.

The *Maſque de Fer* remained in this iſle till the year 1698, when M. St. Mars being promoted to the government of the Baſtile, conducted his priſoner to that fortreſs. In his way thither, he ſtopt with him at his eſtate near Palteau. The Maſque arrived there in a litter, ſurrounded by a numerous guard on horſeback. M. de St. Mars eat at the ſame table with him all the time they reſided at Palteau; but the latter was always placed with his back towards the windows; and the peaſants, who came to pay their compliments to their maſter, and whom curioſity kept conſtantly on the watch, obſerved that M. de St. Mars always ſat oppoſite to him with two piſtols by the ſide of his plate. They were waited on by one ſervant only, who brought in and carried out the diſhes, always carefully ſhutting the door both in going out and returning. The priſoner was always maſked, even when he paſſed through the court; but the people ſaw his teeth and lips, and alſo obſerved that his hair was grey. The governor ſlept in the ſame room with him, in a ſecond bed that was placed in it on that occaſion. In the courſe of their journey, the iron-maſk was, one day, heard to aſk his keeper whether the king had any deſign on his life? "No, Prince," he replied; "provided that you quietly allow yourſelf to be conducted, your life is perfectly ſecure."

The ſtranger was accommodated as well as it was poſſible to be in the Baſtile. An apartment had been prepared for him by order of the governor before his arrival, fitted up in the moſt convenient ſtyle; and every thing he expreſſed a deſire for was inſtantly procured him. His table was the beſt that could be provided; and he was ordered to be ſupplied with as rich clothes as he deſired: but his chief taſte in this laſt particular was for lace, and for linen remarkably fine. It appears that he was allowed the uſe of ſuch books as he deſired, and that he ſpent much of his time in reading. He alſo amuſed himſelf with playing upon the guitar. He had the liberty of going to maſs; but was then ſtrictly forbid to ſpeak or uncover his face: orders were even given to the ſoldiers to fire upon him if he attempted either; and their pieces were always pointed towards him as he paſſed through the court. When he had occaſion to ſee a ſurgeon or a phyſician, he was obliged, under pain of death, conſtantly to wear his maſk. An old phyſician of the Baſtile, who had often attended him when he was indiſpoſed, ſaid, that he never ſaw his face, though he had frequently examined his tongue, and different parts of his body; that there was ſomething uncommonly intereſting in the ſound of his voice; and that he never complained of his confinement, nor let fall from him any hint by which it might be gueſſed who he was. It is ſaid that he often paſſed the night in walking up and down his room.

This unfortunate prince died on the 19th of November 1703, after a ſhort illneſs; and was interred next day in the burying-place of the pariſh of St. Paul. The expence of his funeral amounted only to forty livres. The name given him was *Marchiali*: and even his age, as well as his real name, is

ſeemed of importance to conceal; for in the regiſter made of his funeral, it was mentioned that he was about forty years old; though he had told his apothecary, ſome time before his death, that he thought he muſt be ſixty. It is a well known fact, that immediately after the priſoner's death, his apparel, linen, clothes, mattreſſes, and in ſhort every thing that had been uſed by him, were burnt; that the walls of his room were ſcraped, the floor taken up, evidently from the apprehenſion that he might have found means of writing any thing that would have diſcovered who he was. Nay ſuch was the fear of his having left a letter or any mark which might lead to a diſcovery, that his plate was melted down; the glaſs was taken out of the window of his room, and pounded to duſt; the window-frame and doors burnt; and the ceiling of the room, and the plaſter of the inſide of the chimney, taken down. Several perſons have affirmed, that the body was buried without a head; and M. de St. Foix informs us, that "a gentleman having bribed the ſexton, had the body taken up in the night, and found a ſtone inſtead of the head."

The reſult of theſe extraordinary accounts is, that the Iron Maſque was not only a perſon of high birth, but muſt have been of great conſequence; and that his being concealed was of the utmoſt importance to the king and miniſtry. We come now, therefore, to notice,

II. The opinions and conjectures that have been formed concerning the real name and condition of this remarkable perſonage. Some have pretended that he was the duke of Beaufort; others, that he was the Count de Vermandois, natural ſon to Louis XIV. by the ducheſs de la Valliere. Some maintain him to have been the duke of Monmouth, natural ſon of Charles II. of England by Lucy Walters; and others ſay, that he was Gerolami Magni, miniſter to the duke of Modena.

Beſides theſe conjectures, none of which poſſeſſes ſufficient probability to entitle them to conſideration, a fifth has been advanced: namely, That the Iron Maſque was a ſon of Anne of Auſtria, queen to Louis XIII. and conſequently that he was a brother of Louis XIV.; but whether a baſtard brother, a brother-german, or a half brother, is a queſtion that has given riſe to three ſeveral opinions, which we ſhall ſtate in the order of time in which the reſpective tranſactions to which they allude happened.

1. The firſt opinion is, that the queen proved with child at a time when it was evident it could not have been by her huſband, who, for ſome months before, had never been with her in private. The ſuppoſed father of this child is ſaid by ſome to have been the duke of Buckingham, who came to France in May 1625, to conduct the princeſs Henrietta, wife of Charles I. to England. The private letters and memoirs of thoſe times ſpeak very ſuſpiciouſly of the queen and Buckingham: his behaviour at Amiens, whither the queen and queen-mother accompanied the princeſs in her way to Boulogne, *occaſioned much whiſpering*: notwithſtanding the pains that have been taken by La Porte in his *Memoires* to excuſe his miſtreſs, it appears that the king, on this occaſion, was extremely offended at her, and that it required all the influence and addreſs of the queen-mother to effect a reconciliation. It is ſaid that this child was privately brought up in the country; that when Mazarin became a favourite, he was entruſted with the care of him; and that Louis XIV. having diſcovered the ſecret on the death of the cardinal, thought it neceſſary to confine him in the manner that has been related.

But it may be obſerved, that this ſecret could ſcarcely have eſcaped the vigilance of the cardinal de Richlieu; and it is not improbable that a miniſter ſo little ſcrupulous, if inclined to ſave the honour of a queen, would have removed a child, who, if he lived, might have been made uſe of to diſturb the tranquillity of the kingdom. After this ſuppoſed birth, the queen had frequent quarrels with the king, and, what was more dangerous, with the cardinal; who even uſed every means in his power to enquire into her moſt private tranſactions. It was on a memorable occaſion of this kind, that her ſervant La Porte was thrown into the Baſtile; and it can ſcarcely be imagined ſhe would have had the firmneſs ſhe then diſplayed, while conſcious of ſo much guilt, and under the riſk of having it diſcovered. The priſoner with the maſque appears, by ſeveral accounts, to have been a youth of a handſome figure in the year 1661; and in 1703, when he died, to have been above ſixty; but had he been a ſon of Buckingham, he would have been about thirty-ſix in 1661, when he could not be ſaid to have been a youth; and in November 1703, above ſeventy-eight.

2. The ſecond opinion is, that he was the twin-brother of Louis XIV. born ſome hours after him. This firſt appeared in a ſhort anonymous work publiſhed without date, and without the name of place or printer. It is therein ſaid, "Louis XIV. was born at St. Germains en Laye, on the 5th of September 1638, about noon; and the illuſtrious priſoner, known by the appellation of the *Iron Maſque*, was born the ſame day, while Louis XIII. was at ſupper. The king and the cardinal, fearing that the pretenſions of a twin-brother might one day be employed to renew thoſe civil wars with which France had been ſo often afflicted, cautiouſly concealed his birth, and ſent him away to be brought up privately. Having but an imperfect knowledge of the circumſtances that followed, I ſhall ſay nothing more, for fear of committing errors; but I firmly believe the fact I have mentioned; and time will probably prove to my reader, that I have ground for what I have advanced."

This opinion has been more noticed ſince the publication of a work called *Memoires du Marechal Duc de Richlieu*, written by the Abbé Soulavie; concerning which it may be proper to premiſe, that the preſent duke of Richlieu, ſon of the marechal, diſavows this work; while the Abbé Soulavie, who had been employed by the marechal, inſiſts on the authenticity of his papers. He informs us, that the duke of Richlieu was the lover of Mademoiſelle de Valois, daughter of the regent duke of Orleans, and afterwards ducheſs of Modena, who in return was paſſionately fond of him: that the regent had ſomething more than a paternal affection for his daughter; and that, though ſhe held his ſentiments in abhorrence, the duke of Richlieu made uſe of her influence with her father to diſcover the ſecret of the priſoner with the maſque: that the regent, who had always obſerved the moſt profound ſilence on this ſubject, was at laſt perſuaded to entruſt her with a manuſcript, which ſhe immediately ſent to her lover, who took a copy of it. This manuſcript is ſuppoſed to have been written by a gentleman on his death-bed, who had been the governor of the priſoner. The following is an extract of it, from what the Abbé Soulavie has told us.

"The birth of the priſoner happened in the evening of the 5th of September 1638, in preſence of the chancellor, the biſhop of Meaux, the author of the manuſcript, a midwife named Peronéte, and a ſieur Honorat. This circumſtance greatly diſturbed the king's mind: he obſerved, that the Salique law had made no proviſion for ſuch a caſe; and that it was even the opinion of ſome, that the laſt born was the firſt conceived, and therefore had a prior right to the other. By the advice of cardinal de Richlieu, it was therefore reſolved to conceal his birth, but to preſerve his life, in caſe by the death of his brother it ſhould be neceſſary to avow him. A declaration was drawn up, and ſigned and ſworn to by all preſent, in which every circumſtance was mentioned, and ſeveral marks on his body deſcribed. This document being ſealed by the chancellor with the royal ſeal, was delivered to the king; and all were commanded and took an oath never to ſpeak on the

ſubject, not even in private and among themſelves. The child was delivered to the care of Madame Peronéte the midwife, to be under the direction of cardinal de Richlieu, at whoſe death the charge devolved to cardinal de Mazarin. Mazarin appointed the author of the manuſcript his governor, and entruſted to him the care of his education. But as the priſoner was extremely attached to Madame Peronéte, and ſhe equally ſo to him, ſhe remained with him till her death. His governor carried him to his houſe in Burgundy, where he paid the greateſt attention to his education.

"As the priſoner grew up, he became impatient to diſcover his birth, and often importuned his governor on that ſubject. His curioſity had been rouſed, by obſerving that meſſengers from the court frequently arrived at the houſe; and a box, containing letters from the queen and the cardinal, having one day been inadvertently left out, he opened it, and ſaw enough to gueſs at the ſecret. From that time he became thoughtful and melancholy, 'which (ſays the author) I could not then account for. He ſhortly after aſked me to get him a portrait of the late and preſent king, but I put him off by ſaying that I could not procure any that were good. He then deſired me to let him go to Dijon; which I have known ſince was with an intention of ſeeing a portrait of the king there, and of going ſecretly to St. John de Lus, where the court then was on occaſion of the marriage with the infanta. He was beautiful; and love helped him to accompliſh his wiſhes. He had captivated the affections of a young houſekeeper, who procured him a portrait of the king. It might have ſerved for either of the brothers; and the diſcovery put him into ſo violent a paſſion, that he immediately came to me with the portrait in his hand, ſaying, *Voila mon frere, et voila qui je ſuis*, ſhowing me at the ſame time a letter of the cardinal de Mazarin that he had taken out of the box' Upon this diſcovery his governor immediately ſent an expreſs to court to communicate what had happened, and to deſire new inſtructions; the conſequence of which was, that the governor and the young prince under his care were arreſted and confined."

This memoir, real or fictitious, concludes with ſaying, "I have ſuffered with him in our common priſon: I am now ſummoned to appear before my Judge on high; and for the peace of my ſoul I cannot but make this declaration, which may point out to him the means of freeing himſelf from his preſent ignominious ſituation, in caſe the king his brother ſhould die without children. Can an extorted oath compel me to obſerve ſecrecy on a thing ſo incredible, but which ought to be left on record to poſterity?"

3. The third opinion is, that he was a ſon of the queen by the cardinal de Mazarin, born about a year after the death of her huſband Louis XIII.; that he was brought up ſecretly; and that ſoon after the death of the cardinal, which happened on the 9th of March 1661, he was ſent to Pignerol. To this account father Griffet objects, "that it was needleſs to maſque a face that was unknown; and therefore that this opinion does not merit diſcuſſion." But in anſwer it has been obſerved, That the priſoner might ſtrongly reſemble Louis XIV. which would be a ſufficient reaſon to have him maſked. This opinion is ſuppoſed to have been that entertained by Voltaire, who aſſerts his thorough knowledge of the ſecret, though he declined being altogether explicit. The abbé Soulavie, author of Memoirs of the Marechal de Richlieu, ſpeaking on this ſubject, ſays, "That he once obſerved to the marechal, that he certainly had the means of being informed who the priſoner was; that it even ſeemed that he had told Voltaire, who durſt not venture to publiſh the ſecret; and that he at laſt aſked him, whether he was not the elder brother of Louis XIV. born without the knowledge of Louis XIII.? That the marechal ſeemed embarraſſed, but afterwards ſaid, that he was neither the baſtard brother of Louis XIV. nor the duke of Monmouth, nor the count of Vermandois, nor the duke of Beaufort, as different authors had advanced; that their conjectures were nothing but reveries: but added, that they however had related many circumſtances that were true; that in fact the order was given to put the priſoner to death if he diſcovered himſelf; and that he finiſhed the converſation by ſaying, All I can tell you on the ſubject is, that the priſoner was not of ſuch conſequence when he died at the beginning of the preſent century, as he had been at the beginning of the reign of Louis XIV. and that he was ſhut up for important reaſons of ſtate." The abbé Soulavie tells us, that he wrote down what had been ſaid, and gave it to the marechal to read, who corrected ſome expreſſions. The abbé having propoſed ſome further queſtions, he anſwered, "Read what Voltaire publiſhed laſt on the ſubject of the priſoner with the maſque, eſpecially at the end, and reflect on it."—The paſſage of Voltaire alluded to is as follows:

"The *man with the maſque* (ſays he) is an enigma of which every one would gueſs the meaning. Some have ſaid that it was the duke of Beaufort; but the duke of Beaufort was killed by the Turks in the defence of Candy in 1669, and the priſoner with the maſque was at Pignerol in 1671. Beſides, how could the duke of Beaufort have been arreſted in the midſt of his army, and brought to France, without any one knowing it? and why confine him? and why that maſk?—Others have dreamed that he was the count de Vermandois, natural ſon of Louis XIV. who died publicly at the army in 1683 of the ſmall-pox, and was buried at the little town of Aire and not Arras; in which father Griffet was miſtaken, but in which to be ſure there is no great harm.—Others have imagined, that it was the duke of Monmouth, who was beheaded publicly in London in the year 1685. But for this he muſt have riſen again from the dead, and he muſt have changed the order of time, and placed the year 1662 in the room of the year 1685. King James, who never forgave any one, and who on that account deſerved all that happened to him, muſt have pardoned the duke of Monmouth, and got another to die in his ſtead, who perfectly reſembled him. This Socia muſt firſt have been found, and then he muſt have had the goodneſs to let his head be cut off in public, to ſave the duke of Monmouth. It was neceſſary that all England ſhould be miſtaken; and that king James ſhould beg of Louis XIV. to be ſo obliging as to be his gaoler; that Louis XIV. after having ſhown this trifling piece of civility to king James, ſhould not have been wanting in the ſame attention to his friend king William and to queen Anne (with both of whom he was engaged in war), and to pleaſe them, retained the dignity of gaoler, with which James had honoured him.

"All theſe illuſions being diſſipated, it then remains to know who this priſoner was, and at what age he died. It is clear, that if he was not permitted to croſs the court of the Baſtile, or to ſpeak to his phyſician, except covered with a maſque, it muſt have been from the apprehenſion that his features and countenance might have diſcovered ſome reſemblance. He could ſhow his tongue, but not his face. He ſaid himſelf to the apothecary of the Baſtile, a few days before his death, that he believed he was about 60. Mr. Marſoban, who was ſon-in-law to this apothecary, and ſurgeon to the marechal de Richlieu, and afterwards to the regent duke of Orleans, told me this frequently. Why give him an ITALIAN name?—They always called him *Marchiali*. He who writes this article perhaps knows more than father Griffet, but he will ſay nothing farther."

This opinion has been lately reſumed, illuſtrated, and enforced, by M. de Saint Mihiel, in a work entitled *Le Veritable Homme*, &c. "The real Man with the Iron Maſque." The

author, in ſupport of his idea, attempts to prove that Anne of Auſtria and cardinal Mazarin were married. This, ſays he, the ducheſs of Orleans aſſures us of in three of her letters. In the firſt, dated Sept. 13, 1713, ſhe expreſſes herſelf as follows: "Old Beauvais, who was firſt lady of the bed-chamber to the queen-dowager, was acquainted with the ſecret of the ridiculous marriage: this rendered it neceſſary for the queen to do every thing that her confidante wiſhed; and this circumſtance has given riſe in this country to an extenſion of the rights of firſt ladies of the bed-chamber." In the ſecond of theſe letters, dated Nov. 2, 1717, ſhe ſays, "The queen-mother, widow of Louis XIII. did worſe than love cardinal Mazarin; ſhe married him, for he was not a prieſt: he was not even in orders; and who could have hindered her? He was moſt horribly tired of the good queen-mother, and lived on very bad terms with her, which is the reward that people deſerve for entering into ſuch marriages." In her third letter, dated July 2, 1719, ſpeaking of the queen, the ducheſs ſays, "She was perfectly eaſy reſpecting cardinal Mazarin; he was not a prieſt, and therefore nothing could prevent their being married. The ſecret paſſage through which the cardinal went every evening to the queen's apartment is ſtill to be ſeen at the Palais-Royal." Among other proofs beſides the above, which M. de St. Mihiel brings to ſubſtantiate this marriage, he obſerves, that Mazarin held all councils of ſtate in his apartment whilſt he was ſhaving or dreſſing; that he never permitted any perſon to ſit down in his preſence, not even the chancellor nor marſhal de Villeroi; and that while they were deliberating with him on ſtate affairs, he would be often playing with his monkey or linnet. What man (continues the author) would have ſubjected to ſuch humiliations a chancellor, who holds the firſt office in the kingdom ſince that of conſtable has been ſuppreſſed, and a marſhal who was governor to the king, had he not been in reality a ſovereign himſelf, in virtue of his being huſband to the queen regent? He therefore concludes, that the man with the iron maſque was ſon to Anne of Auſtria and cardinal Mazarin; and endeavours to juſtify this aſſertion by a variety of conjectural proofs. Of ſome of theſe we ſhall give a ſhort ſketch:

1. No prince, or perſon of any conſideration, after the year 1644, at which time the man with the iron maſque was born, until the time when his exiſtence was known, diſappeared in France. This perſonage, therefore, was not a prince or great lord of France known at that time.

2. The man with the iron maſque was not a foreigner; for foreigners, even of the higheſt diſtinction, did not at that period ſtudy the French language in ſuch a manner as to attain ſo great perfection in it as to paſs for Frenchmen. If this priſoner had ſpoken with the leaſt foreign accent, the officers, phyſicians, ſurgeons, apothecaries, confeſſors, and others employed in the priſons where he was, and eſpecially the priſoners with whom he converſed at St. Marguerite, would not have failed to diſcover it. From all this M. de Mihiel infers that he muſt have been a Frenchman.

3. The exiſtence of the man with the iron maſque has been known for upwards of 90 years. Had any perſon of high rank diſappeared at an anterior period, his friends, relations, or acquaintances, would not have failed to claim him, or at leaſt to ſuppoſe that he was the man concealed by this maſque. But no one diſappeared, nor was any one claimed: the man with the iron maſque was therefore a perſon unknown.

4. This man was not torn away from ſociety on account of any criminal action; for when he was arreſted, it was foreſeen that he would cauſe much embarraſſment, and occaſion great expences. He was therefore not a criminal, elſe means would have been purſued to get rid of him; and conſequently all the importance of his being concealed was attached ſolely to his perſon.

5. This ſtranger muſt have been a perſon of very high birth; for the governor of the priſon St. Mars behaved always to him with the greateſt reſpect.

6. Louis XIII. played on the guitar; Louis XIV. did the ſame in a very maſterly manner; and the man with the iron maſque played alſo on that inſtrument: which gives us reaſon to believe that his education was directed by the ſame perſons who had preſided over that of Louis XIV. and who appear to have been the particular choice of Anne of Auſtria.

7. This ſtranger died on the 19th of November 1703; and a few days before his death, he told the apothecary of the Baſtile, that he believed he was about 60 years of age. Suppoſing that he was then 59 and a half, he muſt have been born towards the end of May 1644; and if he was 60 wanting three months, he muſt have been born in the end of Auguſt, or the beginning of September, of the ſame year; a period when the royal authority was in the hands of Anne of Auſtria, but in reality exerciſed more by Mazarin than by her. "I have already proved (continues the author), that from the firſt day of the regency of Anne of Auſtria, the greateſt friendſhip, and even intimacy, ſubſiſted between this princeſs and the cardinal; that theſe ſentiments were changed into a mutual love; and that they were afterwards united by the bonds of marriage. They might, therefore, well have a ſon about the month of September 1644, as Louis XIII. had been then dead more than 15 months, having died on the 15th of May the year preceding. But nothing of what I have related, or of what has been written, and acknowledged as fact, reſpecting the man with the iron maſque, can be applied, except to a ſon of Mazarin and Anne of Auſtria. The man with the iron maſque was indebted, therefore, for his exiſtence to cardinal Mazarin, and the regent widow of Louis XIII."—To account for the manner in which the queen was able to conceal her pregnancy and delivery, Madame de Motteville is quoted; who relates, under the year 1644, that Anne of Auſtria quitted the Louvre, becauſe her apartments there diſpleaſed her: that ſhe went to reſide at the Palais-Royal, which Richlieu, when he died, bequeathed to the deceaſed king: that when ſhe firſt occupied this lodging, *ſhe was dreadfully afflicted with the jaundice:* that the phyſicians aſcribed this diſorder to her dejection and application to buſineſs, which gave her much embarraſſment; but that being cured of her melancholy, as well as of her malady, ſhe reſolved to think only of enjoying tranquillity; which ſhe did, by communicating to her miniſter the burthen of public affairs. On this quotation, M. de St. Mihiel aſks, "Is it not very ſingular that the queen, who, during the 29 years of her former wedded ſtate, had always reſided in the Louvre, eſpecially from 1626, when Louis XIII. ceaſed to cohabit with her, until their re-union, which took place in the beginning of December 1637, ſhould have quitted it preciſely in 1644, becauſe ſhe was diſpleaſed with her apartments? How happened it that her apartments diſpleaſed her this year, and neither ſooner nor later? She might undoubtedly have had any kind of furniture there which ſhe deſired, and every alteration made according to her wiſhes, as ſhe was then abſolute miſtreſs: but the cauſe of her determination is plain; the apartments of the Palais-Royal, which front a garden, were much more convenient for her to be delivered in ſecret."

8. As it is neceſſary that ſome name ſhould be given to every man in order to diſtinguiſh him from another, that of *Marchiali* was given to the man with the iron maſque: a name which evidently ſhows that it had been invented by an Italian. [Cardinal Mazarin was a native of Piſcina in the Abruzzo.]

9. Anne of Auſtria was remarkably delicate reſpecting every thing that touched her perſon. It was with great difficulty that cambric could be found fine enough to make ſhifts and ſheets for her. Cardinal Mazarin once rallying her on this ſubject, ſaid, *That if ſhe ſhould be damned, her puniſhment in hell would be to ſleep in Holland ſheets.* The predominant taſte of the man with the iron maſque, was to have lace and linen of the moſt extraordinary fineneſs. "Who (ſays the author) does not perceive, in this ſimilarity of taſtes, the maternal tenderneſs of Anne of Auſtria, who would have thought her ſon a great ſufferer had he not been indulged with fine linen?"

"Louis XIII. (continues M. de St. Mihiel) was a huſband of a gloomy diſpoſition, and an enemy to pleaſure: while the queen, on the contrary, was fond of ſocial life; and introduced at the court of France, eſpecially after ſhe became free, that eaſe and politeneſs which diſtinguiſhed it under Louis XIV. from all the other courts of Europe. Louis XIII. had alſo a diſagreeable countenance, and a breath ſo offenſive that it was a puniſhment for Richlieu to remain near him. It is clear, therefore, that ſhe could not be much pleaſed with ſuch a huſband. When ſhe became regent of the kingdom by the king's death, which happened on the 14th of May 1643, as ſhe had not enjoyed that happineſs which ariſes from a cloſe union of hearts, it will not appear extraordinary that ſhe ſhould indulge the affection ſhe entertained for cardinal Mazarin, and that ſhe ſhould marry him. Every circumſtance that could tend to favour ſuch a marriage will be found united in her ſituation. She was at a diſtance from her family; abſolute miſtreſs of all her actions; and had, beſides, a heart formed for love. Mazarin, though a cardinal, had never entered into orders; he gave out that he was deſcended from a great family; he was handſome and well made; he was of a mild, inſinuating diſpoſition, and remarkably engaging in converſation; and his office, as prime miniſter, afforded him every opportunity of viſiting and converſing with the queen whenever he thought proper. Is it, therefore, ſo very aſtoniſhing, that, with ſo many advantages, he was able to captivate the queen ſo far as to induce her to marry him? Such a marriage was not, indeed, according to the uſual courſe of things: yet it was not without many precedents, particularly among ſovereigns of the other ſex, who had given their hands to perſons of inferior rank. Thus Chriſtian IV. of Denmark eſpouſed Chriſtina Monck; Frederick IV. eſpouſed Mademoiſelle Rewentlau; James II. heir to the throne of England, married the daughter of a counſellor; Peter the Great raiſed to the throne Catharine I. the daughter of a poor villager, yet perhaps the moſt accompliſhed woman at that time between the Viſtula and the Pole; and Louis XIV. eſpouſed the widow of a poet, but a woman poſſeſſed of the moſt extraordinary merit. As the women, however, are not forgiven ſo readily as the men for entering into ſuch marriages, Anne of Auſtria kept hers a ſecret from this motive, and becauſe ſhe would have been in danger of loſing the regency of the kingdom had it been known."

The reaſoning of M. de St. Mihiel is both ingenious and plauſible; though the probability of the account is ſomewhat diminiſhed by conſidering what muſt have been the queen's age at this period, after ſhe had been Louis's wife for 29 years before his death.—The account immediately preceding, without this objection, ſeems abundantly credible. But whether, upon the whole, either of them can be received as deciſive, or whether the myſtery of the iron maſque remains ſtill to be unravelled, we muſt leave to the reader to determine.

MASQUE, in architecture, is applied to certain pieces of ſculpture repreſenting ſome hideous forms, groteſque, or ſatyrs' faces, &c. uſed to fill up and adorn vacant places, as in friezes, the pannels of doors, keys of arches, &c. but particularly in grottos.

MASQUERADE, or MASCARADE, an aſſembly of perſons maſqued or diſguiſed, meeting to dance and divert themſelves. This was much in uſe with us, and has been long a very common practice abroad, eſpecially in carnival time. The word comes from the Italian *maſcarata*, and that from the Arabic *maſcara*, which ſignifies "raillery, buffoonery". Granacci, who died in 1543, is ſaid to have been the firſt inventor of maſquerades.

MASRAKITHA, a pneumatic inſtrument of muſic among the ancient Hebrews, compoſed of pipes of various ſizes, fitted into a kind of wooden cheſt, open at the top, and ſtopped at the bottom with wood covered with a ſkin. Wind was conveyed to it from the lips, by means of a pipe fixed to the cheſt: the pipes were of lengths muſically proportioned to each other, and the melody was varied at pleaſure, by ſtopping and unſtopping with the fingers the apertures at the upper extremity. See Plate 11.

MASS, in mechanics, the matter of any body cohering with it, *i. e.* moving and gravitating along with it. In which ſenſe, *maſs* is diſtinguiſhed from bulk, or volume, which is the expanſion of a body in length, breadth, and thickneſs. The maſs of any body is rightly eſtimated by its weight. And the maſſes of two bodies of the ſame weight are in a reciprocal ratio of their bulks.

MASS, *Miſſa*, in the church of Rome, the office or prayers uſed at the celebration of the euchariſt; or in other words conſecrating the bread and wine into the body and blood of Chriſt, and offering them ſo tranſubſtantiated as an expiatory ſacrifice for the quick and the dead.

As the maſs is in general believed to be a repreſentation of the paſſion of our bleſſed Saviour, ſo every action of the prieſt, and every particular part of the ſervice, is ſuppoſed to allude to the particular circumſtances of his paſſion and death.

Nicod, after Baronius, obſerves that the word comes from the Hebrew *miſſach, (oblatum;)* or from the Latin *miſſa miſſorum;* becauſe in the former times, the catechumens and excommunicated were ſent out of the church, when the deacons ſaid, *Ite, miſſa eſt*, after ſermon and reading of the epiſtle and goſpel; they not being allowed to aſſiſt at the conſecration. Menage derives the word from *miſſio*, "diſmiſſing:" others from *miſſa*, "miſſing, ſending;" becauſe in the maſs, the prayers of men on earth are ſent up to heaven.

The general diviſion of maſſes conſiſts in high and low. The firſt is that ſung by the choriſters, and celebrated with the aſſiſtance of a deacon and ſub-deacon; low maſſes are thoſe in which the prayers are barely rehearſed without ſinging.

There are a great number of different or occaſional maſſes in the Romiſh church, many of which have nothing peculiar but the name: ſuch are the maſſes of the ſaints; that of St. Mary of the ſnow, celebrated on the fifth of Auguſt; that of St. Margaret, patroneſs of lying-in women; that of the feaſt of St. John the Baptiſt, at which are ſaid three maſſes; that of the Innocents, at which the gloria in excelſis and the hallelujah are omitted, and it being a day of mourning, the altar is of a violet-colour. As to ordinary maſſes, ſome are ſaid for the dead, and, as is ſuppoſed, contribute to fetch the ſoul out of purgatory: at theſe maſſes the altar is put in mourning, and the only decorations are a croſs in the middle of ſix yellow wax-lights; the dreſs of the celebrant, and the very maſs-book, are black; many parts of the office are omitted, and the people are diſmiſſed without the benediction. If the maſs be ſaid for a perſon diſtinguiſhed by his rank or virtues, it is followed with a funeral oration; they erect a *chapelle ardente*,

that is, a repreſentation of the deceaſed with branches and tapers of yellow wax, either in the middle of the church, or near the deceaſed's tomb, where the prieſt pronounces a ſolemn abſolution of the deceaſed. There are likewiſe private maſſes ſaid for ſtolen or ſtrayed goods or cattle, for health, for travellers, &c. which go under the name of *votive maſſes*. There is ſtill a further diſtinction of maſſes denominated from the countries in which they were uſed; thus the Gothic maſs, or *miſſa moſarabum*, is that uſed among the Goths when they were maſters of Spain, and which is ſtill kept up at Toledo and Salamanca; the Ambroſian maſs is that compoſed by St. Ambroſe, and uſed only at Milan, of which city he was biſhop: the Gallic maſs, uſed by the ancient Gauls; and the Roman maſs, uſed by almoſt all the churches in the Romiſh communion.

Mass *of the Preſanctified*, (*miſſa præſanctificatorum*), is a maſs peculiar to the Greek church, in which there is no conſecration of the elements; but, after ſinging ſome hymns, they receive the bread and wine which was before conſecrated. This maſs is performed all Lent, except on Saturdays, Sundays, and the annunciation. The prieſt counts upon his fingers the days of the enſuing week on which it is to be celebrated, and cuts off as many pieces of bread at the altar as he is to ſay maſſes; and after having conſecrated them ſteeps them in wine, and then puts them in a box; out of which, upon every occaſion, he takes ſome of it with a ſpoon, and putting it on a diſh fets it upon the altar.

MASSA, a town of Italy, in the kingdom of Naples, and in the Terra di Lavoro, with a biſhop's ſee; ſeated on a mountain near the ſea, in E. lon. 10. 0. N. lat. 43. 5.

Massa, an ancient, populous, and handſome town of Italy, and capital of a ſmall territory of the ſame name, with the title of a principality, and a ſtrong caſtle. It is famous for its quarries of fine marble, and is ſituated in E. lon. 14. 23. N. lat. 40. 40.

MASSACHUSETS Colony, the principal ſubdiviſion of New England, having Hampſhire on the north, the Atlantic ocean on the eaſt and ſouth, and Connecticut and New York on the weſt. It is about 100 miles long, and 40 broad. See *New*-England.

MASSACRE, a term uſed to ſignify the ſudden and promiſcuous butchery of a multitude. The moſt atrocious example of this kind upon record is that called the *Pariſian* Massacre, or *Maſſacre of St. Bartholomew's Day*. The Pariſian maſſacre was carried on with ſuch deteſtable perfidy, and executed with ſuch a bloody cruelty, as would ſurpaſs all belief, were it not atteſted by the moſt undeniable evidence. In the year 1572, in the reign of Charles IX. many of the principal Proteſtants were invited to Paris, under a ſolemn oath of ſafety, upon occaſion of the marriage of the king of Navarre with the French king's ſiſter, viz. the king of Navarre's mother, Coligni admiral of France, with other nobles. The queen dowager of Navarre, a zealous Proteſtant, was poiſoned by a pair of gloves before the marriage was ſolemnized; and on the 24th of Auguſt 1572, being Bartholomew's day, about day-break, upon the toll of the bell of the church of St. Germain, the butchery began. The admiral was baſely murdered in his own houſe, and then thrown out of the window, to gratify the malice of the duke of Guiſe: his head was afterwards cut off, and ſent to the king and queen-mother; and his body, after a thouſand indignities offered to it, hung up by the feet on a gibbet. After this, the murderers ravaged the whole city of Paris, and butchered in three days above ten thouſand lords, gentlemen, preſidents, and people of all ranks. An horrible ſcene of things, ſays Thuanus, when the very ſtreets and paſſages reſounded with the noiſe of thoſe that met together for murder and plunder: the groans of thoſe who were dying, and the ſhrieks of ſuch as were juſt going to be butchered, were every where heard; the bodies of the ſlain thrown out of the windows; the courts and chambers of the houſes filled with them; the dead bodies of others dragged through the ſtreets, their blood running down the channels in ſuch plenty, that torrents ſeemed to empty themſelves in the neighbouring river; and, in a word, an innumerable multitude of men, women with child, maidens, and children, were all involved in one common deſtruction, and the gates and entrances of the king's palace all beſmeared with their blood.

From the city of Paris the maſſacre ſpread almoſt throughout the whole kingdom. In the city of Meaux they threw above two hundred into jail; and after they had raviſhed and killed a great number of women, and plundered the houſes of the Proteſtants, they executed their fury on thoſe they had impriſoned, and calling them out one by one, they were killed, as Thuanus expreſſes, like ſheep in a market; the bodies of ſome were flung into ditches, and of others into the river Maine. In Orleans they murdered above five hundred men, women, and children, and enriched themſelves with their ſpoil. The ſame cruelties were practiſed at Angers, Troyes, Bourges, La Charité, and eſpecially at Lyons, where they inhumanly deſtroyed above eight hundred proteſtants; children hanging on their parents' necks; parents embracing their children; putting ropes about the necks of ſome, dragging them through the ſtreets, and throwing them, mangled, torn, and half-dead, into the river.

It would be endleſs to mention the butcheries committed at Valence, Romaine, Rouen, &c. We ſhall therefore only add, that, according to Thuanus, above thirty thouſand proteſtants were deſtroyed in this maſſacre; or, as others with greater probability affirm, above one hundred thouſand.

Thuanus himſelf calls this a moſt deteſtable villainy; and, in abhorrence of St. Bartholomew's day, uſed to repeat theſe words of P. Statius, Silv. v. iii. ver. 88, &c.

Excidat illa dies ævo, ne poſtera credant
Secula. Nos certe taceamus, et obruta multa
Nocte tegi propriæ patiamus crimina gentis.

In the words of Job, chap. iii. ver. 3, &c. "Let that day periſh; and let it not be joined unto the days of the year. Let darkneſs and the ſhadow of death ſtain it," &c. And yet, as though this had been the moſt heroic tranſaction, and could have procured immortal glory to the authors of it, medals were ſtruck at Paris in honour of it.

But how was the news of this butchery received at Rome, that faithful city, that holy mother of churches! How did the vicar of Chriſt, the ſucceſſor of Peter, and the father of the Chriſtian world, reliſh it? Let Thuanus tell the horrid truth. When the news, ſays he, came to Rome, it was wonderful to ſee how they exulted for joy. On the 6th of September, when the letters of the pope's legate were read in the aſſembly of the cardinals, by which he aſſured the pope that all was tranſacted by the expreſs will and command of the king, it was immediately decreed that the pope ſhould march with his cardinals to the church of St. Mark, and in the moſt ſolemn manner give thanks to God for ſo great a bleſſing conferred on the ſee of Rome and the Chriſtian world; and that on the Monday after, ſolemn maſs ſhould be celebrated in the church of Minerva, at which the pope, Gregory XIII. and cardinals, were preſent; and that a jubilee ſhould be publiſhed throughout the whole Chriſtian world, and the cauſe of it declared to be, to return thanks to God for the extirpation of the enemies of the truth and church in France. In the evening, the cannon of St. Angelo were fired, to teſtify the public joy; the whole city was illuminated with bonfires; and no one

ſign of rejoicing omitted that was uſually made for the greateſt victories obtained in favour of the Roman church.

MASSAGETAE, an ancient people about whoſe ſeat there is as much doubt as about that of the Amazons: Tibullus and Ammian place them near Albania, beyond the Araxes, which ſometimes denotes the Oxus: it is probable they dwelt to the eaſt of Sogdiana. (Dionyſius Periegetes, Herodotus, Arrian.)

MASSALIANS, a ſet of enthuſiaſts who ſprang up about the year 361, in the reign of the emperor Conſtantius, who maintained that men have two ſouls, a celeſtial and a diabolical, and that the latter is driven out by prayer.

MASSETER, in anatomy. See ANATOMY, *Table of the Muſcles*.

MASSICOT. See MASTICOT.

MASSIEU (WILLIAM), a learned French writer, member of the Academy of Belles Lettres, and of the French Academy, was born at Caen in Normandy in 1665, and completed his ſtudies at Paris, when he entered amongſt the Jeſuits; but afterwards left them, that he might follow his inclination to polite literature with the greater freedom. In 1710 he was made Greek profeſſor in the Royal College; and enjoyed that poſt till his death, which happened at Paris in 1722. He wrote, 1. Several curious diſſertations in the memoirs of the academy of inſcriptions. 2. A hiſtory of the French poetry, in 12mo, &c.

MASSILIA, (anc. geog.), a town of Gallia Narbonenſis, a colony of Phoceans, from Phocæa, a city of Ionia, and in confederacy with the Romans, univerſally celebrated, not only for its port, commerce, and ſtrength, but eſpecially for its politeneſs of manners, and for its learning. According to Strabo, it was the ſchool for barbarians, who were excited by its means to a fondneſs for Greek literature, ſo that even their public and private tranſactions were all executed in that language. Strabo adds, "At this day the nobleſt Romans repair thither for ſtudy rather than to Athens." Now Marſeilles, a city and port-town of Provence.

MASSILLON (JEAN BAPTISTE), ſon of a notary at Hieres in Provence, was born in 1663, and entered into the congregation of the Oratory in 1681. He gained the affections of every perſon in the towns to which he was ſent, by the charms of his genius, the livelineſs of his character, and by a fund of the moſt delicate and affecting politeneſs. His firſt attempts in the art of eloquence were made at Vienne, while he was profeſſor of theology. His funeral oration on Henry de Villars, archbiſhop of that city, received univerſal approbation. This ſucceſs induced father de la Tour, who was at that time general of the congregation, to call him to Paris. Here the ſuperiority of his eloquence was clearly perceived, when he appeared at court. Upon preaching his firſt advent ſermon at Verſailles, he received this eulogium from the mouth of Louis XIV. "Father, when I hear others preach, I am very well pleaſed with them; but whenever I hear you, I am diſſatisfied with myſelf." The firſt time he preached his famous ſermon *on the ſmall number of the elect*, the whole audience were, at a certain place of it, ſeized with a ſudden and violent emotion, and almoſt every perſon half roſe from his ſeat by a kind of involuntary movement.

In 1704 Maſſillon made his ſecond appearance at court, and diſplayed ſtill more eloquence than before. Louis XIV. after expreſſing his ſatisfaction to him, added, in the moſt gracious tone of voice, *Et je veux, mon pere, vous entendre tous les deux ans*. Theſe flattering encomiums did not leſſen his modeſty. When one of his fellows was congratulating him upon his preaching admirably, according to cuſtom, "Oh! give over, father (replied he), the devil has told me ſo already, much more eloquently than you."

Maſſillon was admitted into the French Academy a year afterwards, in 1719. The abbacy of Savigny becoming vacant, the cardinal du Bois, to whom he had been weak enough to give an atteſtation for being a prieſt, procured it for him. The funeral oration of the ducheſs of Orleans, in 1723, was the laſt diſcourſe he pronounced in Paris. He never afterwards left his dioceſe, where his gentleneſs, politeneſs, and kindneſs, had gained him the affection of all who knew him. He reduced the exorbitant rights of the epiſcopal roll to moderate ſums. In two years he cauſed 20,000 livres to be privately conveyed to the Hotel-Dieu of Clermont. His peaceable diſpoſition was never more diſplayed than while he was a biſhop. He took great pleaſure in collecting the fathers of the Oratory and the Jeſuits at his country-houſe, and in making them join in ſome diverſion. He died on the 28th of September 1742, at the age of 79. His name has become that of eloquence itſelf. Nobody ever knew better how to touch the paſſions. Preferring ſentiment to every thing elſe, he communicated to the ſoul that lively and ſalutary emotion which excites in us the love of virtue.

An excellent edition of Maſſillon's works was publiſhed by his nephew at Paris in 1745 and 1746, in 14 vols. large 12mo. and 12 vols. of a ſmall ſize.—Among them we find, 1. Complete ſets of ſermons for Advent and Lent. It is particularly in his moral diſcourſes, ſuch as are almoſt all thoſe of his ſermons for Advent and Lent, that Maſſillon's genius appears. He excels, ſays M. d'Alembert, in that ſpecies of eloquence, which alone may be preferred to all others, which goes directly to the heart, and which agitates without wounding the ſoul. He ſearches the inmoſt receſſes of the heart, and lays open the ſecret workings of the paſſions, with ſo delicate and tender a hand, that we are hurried along rather than overcome. His diction, which is always eaſy, elegant, and pure, every where partakes of that noble ſimplicity, without which there can be neither good taſte nor true eloquence; and this ſimplicity is, in Maſſillon, joined to the moſt attractive and the ſweeteſt harmony, from which it likewiſe borrows new graces. In ſhort, to complete the charm produced by this enchanting ſtyle, we perceive that theſe beauties are perfectly natural; that they flow eaſily from this ſource, and that they have occaſioned no labour to the compoſer. There even occur ſometimes in the expreſſions, in the turns, or in the affecting melody of his ſtyle, inſtances of negligence which may be called happy, becauſe they completely remove every appearance of labour. By thus abandoning himſelf to the natural current of thought and expreſſion, Maſſillon gained as many friends as hearers. He knew that the more anxious an orator appears to raiſe admiration, he will find thoſe who hear him the leſs diſpoſed to beſtow it. 2. Several funeral orations, diſcourſes, and panegyrics, which had never been publiſhed. 3. Ten diſcourſes, known by the name of *Petit Careme*. 4. The *Conferences Eccleſiaſtiques*, which he delivered in the ſeminary of St. Magloire upon his arrival at Paris; thoſe which he delivered to the curates of his dioceſe; and the diſcourſes which he pronounced at the head of the ſynods which he aſſembled every year. 5. Paraphraſes on ſeveral of the Pſalms. The illuſtrious author of theſe excellent tracts wiſhed that they had introduced into France a practice which prevails in England, of reading ſermons inſtead of preaching them from memory; a cuſtom which is very convenient, but by which all the warmth and fervour of eloquence are loſt.

MASSINGER (PHILIP), an Engliſh dramatic poet, was born at Saliſbury about the year 1581, and was educated at Oxford. He left the univerſity without taking any degree; and went to London to improve his poetical genius by polite converſation. There he wrote many tragedies and comedies, which were received with vaſt applauſe; and were greatly ad-

mired for the economy of the plots, and the purity of the ſtyle. He was at the ſame time a perſon of the moſt conſummate modeſty; which rendered him extremely beloved by the poets of his time, particularly by Fletcher, Middleton, Rowley, Field, and Decker, who thought it an honour to write in conjunction with him. He was as remarkable for his abilities as his modeſty. He died ſuddenly at his houſe on the Bankſide in Southwark, near the playhouſe, and was interred in St. Saviour's church-yard, in the ſame grave with Mr. Fletcher the poet.

MASSIVE, among builders, an epithet given to whatever is too heavy and ſolid: thus a maſſive column is one too ſhort and thick for the order whoſe capital it bears; and a maſſive wall is one whoſe openings or lights are too ſmall in proportion.

MASSON (Papirius), a French writer, was the ſon of a rich merchant, and born in the territory of Forez, May 1544. After ſtudying the belles lettres and philoſophy, and travelling to different places, he came to Paris, where he was made librarian to the chancellor of the duke of Anjou, in which place he continued ten years. In 1576 he was made an advocate of parliament; yet never pleaded but one cauſe, which, however, he gained with univerſal applauſe.—When the troubles of France were at an end, he married the ſiſter of a counſellor in parliament, with whom he lived thirty-four years, but had no iſſue by her.—The infirmities of age attacked him ſome time before his death, which happened Jan. 9, 1611. He wrote four books of French annals in Latin, firſt printed at Paris 1577, and afterwards in 1598, 4to. The ſecond edition, more enlarged than the firſt, deduces things from Pharamond to Henry II. Maſſon conſidered this as his principal performance; yet he is now chiefly known by his *Elogia virorum clariſſimorum*, although he publiſhed ſeveral other works.

Masson (John), a reformed miniſter in Holland ſome years ago. He was originally of France, but fled into England to enjoy that liberty in religion which his country refuſed him. He wrote, 1. *Hiſtoire critique de la republique des lettres*, from 1712 to 1717, in 15 vols. 12mo. 2. *Vitæ Horatii, Ovidii, et Plinii junioris*, 3 vols. ſmall 8vo. and printed abroad, though dedicated to Engliſhmen of rank: the firſt at Leyden, 1708, to lord Harvey; the ſecond at Amſterdam, 1708, to Sir Juſtinian Iſham; the third at Amſterdam, 1709, to the biſhop of Worceſter. Theſe lives are drawn up in a chronological order, very learnedly and very critically; and ſerve to illuſtrate the hiſtory, not only of thoſe particular perſons, but of the times alſo in which they lived. 3. *Hiſtoire de Pierre Bayle, & de ſes ouvrages*; Amſterdam, 1716, in 12mo. This at leaſt is ſuppoſed to be his, though at firſt it was given to M. la Monnoye.

Masson (Anthony), an eminent French engraver, who flouriſhed towards the concluſion of the laſt century, and reſided chiefly at Paris. It appears that he ſometimes amuſed himſelf with painting portraits from the life, ſome of which he alſo engraved. We have no account of the life of this extraordinary artiſt; nor are we even informed from what maſter he learned the principles of engraving. He worked entirely with the graver, and handled that inſtrument with aſtoniſhing facility. He ſeems to have had no kind of rule to direct him with reſpect to the turning of the ſtrokes; but twiſted and twirled them about, without the leaſt regard to the different forms he intended to expreſs, making them entirely ſubſervient to his own caprice. Yet the effect he has produced in this ſingular manner (Mr. Strutt obſerves), is not only far ſuperior to what one could have ſuppoſed, but is often very picturesque and beautiful. It was not in hiſtorical engraving that his greateſt ſtrength conſiſted. He could not draw the naked parts of the human figure ſo correctly as was neceſſary; but where the ſubject required the figures to be clothed, he ſucceeded in a wonderful manner. Among the moſt eſteemed works by this admirable artiſt, may be reckoned the following: The aſſumption of the Virgin, a large upright plate from Rubens; a holy family, a middling ſized plate, lengthwiſe, from N. Mignard; Chriſt with the pilgrims at Emaus, a large plate, lengthwiſe, from Titian, the original picture of which was in the cabinet of the king of France. This admirable print is commonly known by the name of *the table-cloth*; for the cloth with which the table is covered is executed in a very ſingular ſtyle. Alſo the following portraits, among others: The comte de Harcourt, a large upright plate, reckoned a maſterpiece in this claſs of ſubjects; Guillaume de Briſacier, ſecretary to the queen of France; a middling ſized upright plate, uſually known in England by the name of *the grey-headed man*, becauſe the hair in this print is ſo finely executed.

MASSUAH, a ſmall iſland in the Red Sea, near the coaſt of Abyſſinia, about three quarters of a mile long, and half as broad, one-third of which is occupied by houſes, another by ciſterns for receiving rain-water, and one reſerved for a burial-place. It has an excellent harbour, with water ſufficiently deep for ſhips of any ſize to the very edge of the iſland; and ſo well ſecured, that they may ride in ſafety let the wind blow from what quarter or with what degree of ſtrength it will. By the ancients it was called *Sebaſticum Os*, and was formerly a place of great conſequence on account of its harbour, from whence a very extenſive commerce was carried on, and poſſeſſed a ſhare of the Indian trade in common with other ports of the Red Sea near the Indian Ocean.—A very conſiderable quantity of valuable goods was alſo brought thither from the tract of mountainous country behind it, which in all ages has been accounted very unhoſpitable, and almoſt inacceſſible to ſtrangers. The principal articles of exportation were gold, ivory, elephants, and buffaloes hides; but, above all, ſlaves, who, on account of their perſonal qualifications, were more eſteemed than thoſe from any other quarter.—Pearls of a conſiderable ſize, and of a fine water, are likewiſe found along the coaſt; from the abundance of all which valuable commodities, the great defect, a want of water, was forgot, and the inhabitants cheerfully ſubmitted to ſuch a great inconvenience. The iſland of Maſſuah fell under the power of the Turks in the time of the emperor Selim, ſoon after the conqueſt of Arabia Felix by Sinan Baſha, and was for ſome time governed by an officer from Conſtantinople. From thence the conqueſt of Abyſſinia was for ſome time attempted, but always without ſucceſs. Hence it began to loſe its value as a garriſon for troops, as it had done in the commercial way after the diſcovery of the paſſage to India by the Cape of Good Hope.—Being thus deprived of its importance in every reſpect, the Turks no longer thought it worth while to ſend a baſhaw thither as formerly, but conferred the government upon the chief of a tribe of Mahometans named *Belowie*, who inhabit the coaſts of the Red Sea under the mountains of Habab, in the latitude of about 14° north. On this officer they conferred the title of *Naybe*; and on the removal of the baſhaw he remained in fact maſter of the place, though, to ſave appearances, he pretended to hold it from the Ottoman Porte, by a firman from the grand ſignior for that purpoſe, and the payment of an annual tribute.

The Turks had originally put into the town of Maſſuah a garriſon of Janizaries; who, being left there on the withdrawing of the baſhaw, and intermarrying with the natives, ſoon became entirely ſubjected to the Naybe's influence. The latter, finding himſelf at a great diſtance from his protectors the Turks, whoſe garriſons were every where falling into decay, and that in conſequence of this he was entirely in the power of the emperor of Abyſſinia, began to think of taking ſome me-

thod of ſecuring himſelf on that ſide. Accordingly it was agreed that one half of the cuſtoms ſhould be paid to the Abyſſinian monarch; who in return was to allow him to enjoy his government unmoleſted. Having thus ſecured the friendſhip of the emperor of Abyſſinia, the Naybe began gradually to withdraw the tribute he had been accuſtomed to pay to the baſhaw of Jidda, to whoſe government Maſſuah had been aſſigned; and at laſt to pay as little regard to the government of Abyſſinia: and in this ſtate of independence he was when Mr. Bruce arrived there in 1769 on his way to Abyſſinia. This gentleman found both the prince and his people extremely unhoſpitable and treacherous; ſo that he underwent a variety of dangers during his reſidence there, nor was it without great difficulty that he could get away from thence at laſt.

The iſland of Maſſuah, as we have ſaid, is entirely deſtitute of water; nor can it be ſupplied with proviſions of any kind but from the mountainous country of Abyſſinia on the continent. Arkeeko, a large town in the bottom of the bay, has water, but is in the ſame predicament with regard to proviſions; for the adjacent tract of flat land, named *Samhar*, is a perfect deſert, inhabited only from the month of November to April by ſome wandering tribes, who carry all their cattle to the Abyſſinian ſide of the mountains when the rains fall there. Being thus in the territories of the Abyſſinians, it is in the power of the emperor of that country, or of his officer the Baharnagaſh, to ſtarve Maſſuah and Arkeeko, by prohibiting the paſſage of any proviſions from the Abyſſinian ſide of the mountains.

The houſes of Maſſuah are generally conſtructed of long poles and bent graſs, as is uſual with other towns of Arabia: only about 20 are of ſtone, and ſix or eight of theſe two ſtories high. The ſtones with which they are built have been drawn out of the ſea; and in them the bed of that curious muſcle found embodied in the ſolid rock at Mahon is frequently to be ſeen. Theſe are called *dattoli da mare*, or ſea-dates: but our author never ſaw any of the fiſh themſelves, though he has no doubt that they may be met with in the rocky iſlands of Maſſuah if they would take the trouble of breaking the rocks for them. All the neceſſaries of life are very dear in this place; and their quality is alſo very indifferent, owing to the diſtance from whence they muſt be brought, and the danger of carrying them through the deſert of Samhar, as well as to the extortions of the Naybe himſelf, who, under the name of *cuſtoms*, takes whatever part of the goods he thinks proper; ſo the profit left to the merchant is ſometimes little or nothing. All the money here is valued by the Venetian ſequin; and it is owing to the commercial intercourſe with the Arabian coaſt that any money at all is to be met with on this iſland or the eaſtern coaſt of Africa. Glaſs beads of all kinds and colours, whether whole or broken, paſs for ſmall money.

Though Maſſuah has now loſt very much of its commercial importance, a conſiderable trade is ſtill carried on from the place. From the Arabian ſide are imported blue cotton and other cloths; ſome of them from India being very fine. Other articles are Venetian beads, cryſtal, looking and drinking glaſſes, with cohol or crude antimony. Theſe three laſt articles come in great quantity from Cairo, firſt in the coffee-ſhips to Jidda, and then in ſmall barks to the port of Maſſuah. Old copper is alſo a valuable article of commerce. The Galla and all the various tribes to the weſtward of Gondar wear bracelets of this metal, which in ſome parts of that barbarous country is ſaid to ſell for its weight of gold. Here is alſo a ſhell, an univalve of the ſpecies of volutes, which ſells at an high price, and paſſes for money among the various tribes of Galla. The Banians were once the principal merchants of Maſſuah; but their number is now reduced to ſix, who are ſilver-ſmiths, and ſubſiſt by making ornaments for the women on the continent. They likewiſe eſſay gold, but make a poor livelihood.

MASSUET (Rene or Renatus), a very learned Benedictine of the congregation of St. Maur, was born at S. Owen de Macelles in 1665. He is chiefly known for the new edition of St. Irenæus, which he publiſhed in 1710. He conſulted ſeveral manuſcripts, which had never been examined, for that purpoſe, and made new notes and learned prefaces. He died in 17 6, after having written and publiſhed ſeveral other works.

MAST, a long round piece of timber, elevated perpendicularly upon the keel of a ſhip, to which are attached the yards, the ſails, and the rigging. A maſt, with regard to its length, is either formed of one ſingle piece, which is called a *pole-maſt*, or compoſed of ſeveral pieces joined together, each of which retains the name of maſt ſeparately. The loweſt of theſe is accordingly named the *lower-maſt*, *a*, fig. 1. pl. 15. the next in height is the top-maſt, *b*, which is erected at the head of the former; and the higheſt is the top-gallant maſt, *c*, which is prolonged from the upper end of the top-maſt. Thus the two laſt are no other than a continuation of the firſt upwards.

The lower-maſt is fixed in the ſhip by an apparatus, deſcribed in the articles Hulk and Sheers: the foot, or heel of it, reſts in a block of timber called the *ſtep*, which is fixed upon the *kelſon*: and the top-maſt is attached to the head of it by the *cap* and the *treſtle-trees*. The latter of theſe are two ſtrong bars of timber, ſupported by two prominences, which are as ſhoulders on the oppoſite ſides of the maſt, a little under its upper end: athwart theſe bars are fixed the *croſs-trees*, upon which the frame of the top is ſupported. Between the lower-maſt-head and the foremoſt of the croſs-trees, a ſquare ſpace remains vacant, the ſides of which are bounded by the two treſtle-trees. Perpendicularly above this is the foremoſt hole in the cap, whoſe after-hole is ſolidly fixed on the head of the lower-maſt. The top-maſt is erected by a tackle, whoſe effort is communicated from the head of the lower-maſt to the foot of the top-maſt; and the upper end of the latter is accordingly guided into and conveyed up through the holes between the treſtle-trees and the cap, as above-mentioned. The machinery by which it is elevated, or, according to the ſea-phraſe, *ſwayed up*, is fixed in the following manner: the top rope *d*, fig. 3. paſſing through a block *e*, which is hooked on one ſide of the cap, and afterwards through a hole, furniſhed with a ſheave or pulley *f*, on the lower end of the top-maſt, is again brought upwards on the other ſide of the maſt, where it is at length faſtened to an eye bolt in the cap *g*, which is always on the ſide oppoſite to the top-block *e*. To the lower end of the top-rope is fixed the top-tackle *h*, the effort of which being tranſmitted to the top-rope *d*, and thence to the heel of the top-maſt *f*, neceſſarily lifts the latter upwards, parallel to the lower-maſt. When the top-maſt is raiſed to its proper height, fig. 4. the lower end of it becomes firmly wedged in the ſquare hole above deſcribed, between the treſtle-trees. A bar of wood or iron called the *fid*, is then thruſt through a hole *i* in the heel of it, acroſs the treſtle-trees, by which the whole weight of the top-maſt is ſupported.

In the ſame manner as the top-maſt is retained at the head of the lower-maſt, the top-gallant-maſt is erected, and fixed at the head of the top-maſt.

Beſides the parts already mentioned in the conſtruction of maſts, with reſpect to their length, the lower-maſts of the largeſt ſhips are compoſed of ſeveral pieces united into one body. As theſe are generally the moſt ſubſtantial parts of various trees, a maſt, formed by this aſſemblage, is juſtly eſteemed much ſtronger than one conſiſting of any ſingle trunk, whoſe internal ſolidity may be very uncertain. The ſeveral pieces are formed and joined together, as repreſented in the ſection of a lower-maſt of this ſort, fig. 5. where *a* is the ſhaft, or principal piece into which the reſt are fixed, with their ſides or faces cloſe to each other. The whole is ſecured by ſeveral ſtrong hoops

of iron, driven on the outſide of the maſt, where they remain at proper diſtances.

The principal articles to be conſidered in equipping a ſhip with maſts are, 1ſt, the number; 2d, their ſituation in the veſſel; and, 3d, their height above the water.

The maſts being uſed to extend the ſails by means of their yards, it is evident, that if their number were multiplied beyond what is neceſſary, the yards muſt be extremely ſhort, that they may not entangle each other in working the ſhip, and by conſequence their ſails will be very narrow, and receive a ſmall portion of wind. If, on the contrary, there is not a ſufficient number of maſts in the veſſel, the yards will be too large and heavy, ſo as not to be managed without difficulty. There is a mean between theſe extremes, which experience and the general practice of the ſea have determined; by which it appears, that in large ſhips every advantage of ſailing is retained by three maſts and a bowſprit.

The moſt advantageous poſition of the maſts is undoubtedly that from whence there reſults an equilibrium between the reſiſtance of the water on the body of the ſhip on one part, and of the direction of their effort on the other. By every other poſition this equilibrium is deſtroyed, and the greateſt effort of the maſts will operate to turn the ſhip horizontally about its direction; a circumſtance which retards her velocity. It is counterbalanced indeed by the helm; but the ſame inconvenience ſtill continues; for the force of the wind, having the reſiſtance of the helm to overcome, is not entirely employed to puſh the veſſel forward. The axis of the reſiſtance of the water ſhould then be previouſly determined, to diſcover the place of the *main-maſt*, in order to ſuſpend the efforts of the water equally, and place the other maſts ſo as that their particular direction will coincide with that of the main-maſt. The whole of this would be capable of a ſolution if the figure of the veſſel were regular, becauſe the point, about which the reſiſtance of the water would be in equilibrio, might be diſcovered by calculation.

But when the real figure of the ſhip is conſidered, theſe flattering ideas will inſtantly vaniſh. This obſervation induced M. Saverien to employ a mechanical method to diſcover the axis of reſiſtance of the water, which he apprehended might be uſed with ſucceſs in the manner following:

When the veſſel is launched, before the places of the maſts are determined, extend a rope AB, fig. 6. from the head to the ſtern. To the extremities A and B attach two other ropes, AD, BC, and apply to the other ends of theſe ropes two mechanical powers, to draw the ſhip according to the direction BC, parallel to itſelf. The whole being thus diſpoſed, let a moveable tube Z, fixed upon the robe AB, have another rope ZR attached to it, whoſe other end communicates with a mechanical power R, equal to the two powers D and C. This laſt being applied to the ſame veſſel, in ſuch manner as to take off the effects of the two others by ſliding upon the rope AB, ſo as to diſcover ſome point Z, by the parallelism of the ropes AD, BC feebly extended with the rope ZR; the line ZR will be the axis of the equilibrium of the water's reſiſtance, and by conſequence the main-maſt ſhould be planted in the point Z.

The figures E, E, E, are three windlaſſes on the ſhore, by which this experiment is applied.

With regard to the ſituation of the other maſts, it is neceſſary, in the ſame manner, to diſcover two points; ſo that the direction of the two mechanical powers operating, will be parallel to the axis of reſiſtance RZ already found.

The exact height of the maſts, in proportion to the form and ſize of the ſhip, remains yet a problem to be determined. The more the maſts are elevated above the centre of gravity, the greater will be the ſurface of ſail which they are enabled to preſent to the wind; ſo far an additional height ſeems to have been advantageous. But this advantage is diminiſhed by the circular movement of the maſt, which operates to make the veſſel ſtoop to its effort; and this inclination is increaſed in proportion to the additional height of the maſt, an inconvenience which it is neceſſary to guard againſt. Thus what is gained upon one hand is loſt upon the other. To reconcile theſe differences, it is certain, that the height of the maſt ought to be determined by the inclination of the veſſel, and that the point of her greateſt inclination ſhould be the term of this height above the centre of gravity. See the article TRIM.

With regard to the general practice of determining the height of the maſts, according to the different rates of the ſhips in the royal navy, the reader is referred to the article SAIL.

In order to ſecure the maſts, and counterbalance the ſtrain they receive from the effort of the ſails impreſſed by the wind, and the agitation of the ſhip at ſea, they are ſuſtained by ſeveral ſtrong ropes, extended from their upper ends to the outſide of the veſſel, called *ſhrouds*, as repreſented in fig. 4. They are further ſupported by other ropes, ſtretched from their heads towards the fore-part of the veſſel.

The maſt, which is placed at the middle of the ſhip's length, is called the *main-maſt*; that which is placed in the forepart, the *fore-maſt*; and that which is towards the ſtern, is termed the *mizen-maſt*.

N. B. *Mizen* is applied to this maſt by all the nations of Europe, except the French, who alone call the fore-maſt *miſaine*.

MASTER, a title given to ſeveral officers and perſons of authority and command; particularly to the chiefs of the orders of knighthood, &c.—Thus we ſay the grand-maſter of Malta; of St. Lazarus; of the Golden Fleece; of the Free Maſons, &c.

MASTER *(magiſter)*, was a title frequent among the Romans: they had their maſter of the people, *magiſter populi*, who was the dictator. Maſter of the cavalry, *magiſter equitum*, who held the ſecond poſt in an army after the dictator. Under the later emperors there were alſo maſters of the infantry, *magiſtri peditum*. A maſter of the cenſus, *magiſter cenſus*, who had nothing of the charge of a cenſor, or ſubcenſor, as the name ſeems to intimate; but was the ſame with the *præpoſitus frumentariorum*.

MASTER *of the Militia (magiſter militiæ)*, was an officer in the lower empire, created, as it is ſaid, by Diocleſian, who had the inſpection and government of all the forces, with power to puniſh, &c. ſomewhat like a conſtable of France. At firſt there were two of theſe officers inſtituted, the one for the infantry, and the other for the cavalry; but the two were united into one under Conſtantine. Afterwards, as their power was increaſed, ſo was their number alſo; and there was one appointed for the court, another for Thrace, another for the Eaſt, and another for Illyria. They were afterwards called *comites*, *counts*, and *chriſſimi*. Their power was only a branch of that of the *præfectus prætorii*, who by that means became a civil officer.

MASTER *of Arms (magiſter armorum)*, was an officer or comptroller under the maſter of the militia.

MASTER *of the Offices (magiſter officiorum)*, had the ſuperintendance of all the officers of the court; he was alſo called *magiſter officii palatini*; ſimply *magiſter*; and his poſt *magiſteria*.—This officer was the ſame in the weſtern empire with the curopalates in the eaſtern.

MASTER *at arms*, among us, is an officer appointed to teach the officers and crew of a ſhip of war the exerciſe of ſmall arms; to confine and plant ſentinels over the priſoners, and ſuperintend whatever relates to them during their confinement. He is alſo to obſerve that the fire and lights are all extinguiſhed as ſoon as the evening-gun is fired, except thoſe which are permitted by proper authority, or under the inſpection of

ſentinels. It is likewiſe his duty to attend the gangway when any boats arrive aboard, and ſearch them carefully, together with their rowers, that no ſpirituous liquors may be conveyed into the ſhip unleſs by permiſſion of the commanding officer. In theſe ſeveral duties he is aſſiſted by proper attendants, called his *corporals*, who alſo relieve the ſentinels and one another at certain periods.

MASTER *of Arts*, the firſt degree taken up in foreign univerſities, but the ſecond in ours; candidates not being admitted to it till they have ſtudied in the univerſity ſeven years.

MASTER-*Attendant*, is an officer in the royal dock-yards, appointed to haſten and aſſiſt at the fitting out or diſmantling, removing, or ſecuring veſſels of war, &c. at the port where he reſides. He is particularly to obſerve, that his majeſty's ſhips are ſecurely moored, and for this purpoſe he is expected frequently to review the moorings which are ſunk in the harbour, and obſerve that they are kept in proper repair. It is alſo his duty to viſit all the ſhips in ordinary, and ſee that they are frequently cleaned and kept in order; and to attend at the general muſters in the dock yards, taking care that all the officers, artificers, and labourers, regiſtered at the navy-books, are preſent at their duty.

MASTER *of the Ceremonies*, is an officer inſtituted by king James I. for the more ſolemn and honourable reception of ambaſſadors, and ſtrangers of quality, whom he introduces into the preſence.—The badge of this office is a gold chain and medal, having on one ſide an emblem of peace, with king James's motto; and on the reverſe the emblem of war, with *Dieu & mon droit*. He is always ſuppoſed to be a perſon of good addreſs, and a maſter of languages, and has an appointment of 300l. a year: he is conſtantly attending at court, and hath under him an aſſiſtant-maſter, or deputy, at 6s. 8d. a day, who holds his place during the king's pleaſure. There is alſo a third officer, called *marſhal of the ceremonies*, with 100l. a-year, whoſe buſineſs is to receive and diſtribute the maſter's orders, or the deputy's for the ſervice; but without their order he can do nothing. This is the king's gift.

MASTERS *of Chancery* are uſually choſen out of the barriſters of the common law; and ſit in chancery, or at the rolls, as aſſiſtants to the lord chancellor and the maſter of the rolls. All theſe, ſo late as the reign of queen Elizabeth, were commonly doctors of the civil law.—To them are alſo committed interlocutory reports, examination of bills in chancery, ſtating of accounts, taxing coſts, &c. and ſometimes, by way of reference, they are empowered to make a final determination of cauſes.

They have time out of mind had the honour to ſit in the lords houſe, though they have neither writs nor patent to empower them; but they are received as aſſiſtants to the lord chancellor and maſter of the rolls. They had anciently the care of inſpecting all writs of ſummons, which is now performed by the clerk of the petty-bag. When any meſſage is ſent from the lords to the commons, it is carried by the maſters of chancery. Before them alſo affidavits are made, and deeds and recognizances acknowledged.

Beſides theſe, who may be called *maſters of chancery ordinary* (being 12 in number, whereof the maſter of the rolls is reputed the chief), there are alſo maſters of chancery extraordinary, appointed to act in the ſeveral counties of England beyond 10 miles diſtance from London, by taking affidavits, recognizances, &c. for the eaſe of the ſuitors of the court.

MASTER *of the Faculties*, an officer under the archbiſhop of Canterbury, who grants licenſes and diſpenſations; he is mentioned in the ſtatute 22 and 23 Car. II. See COURT *of Faculties*.

MASTER-*Gunner*. See GUNNER.

MASTER *of the Horſe* is reckoned the third great officer of the court, and is an office of great honour and antiquity, and always (when not put in commiſſion) filled by noblemen of the higheſt rank and abilities. He has the management and diſpoſal of all the king's ſtables and bred horſes. He has authority over the equerries and pages, coachmen, footmen, grooms, riders of the great horſe, farriers, and ſmiths. He appoints all the other tradeſmen who work for the king's ſtables; and by his warrant to the avenor, makes them give an oath to be true and faithful. In ſhort, he is entruſted with all the lands and revenues appropriated for the king's breed of horſes, the expences of the ſtable, and of the coaches, litters, &c. He alone has the privilege of making uſe of any of the king's horſes, pages, footmen, &c.; and at any ſolemn cavalcade he rides next the king, and leads a horſe of ſtate. His ſalary is 1276l. 13s. 4d. *per annum*. There is alſo a maſter of the horſe in the eſtabliſhment of her majeſty's houſehold, with a ſalary of 800l. a year.

MASTER *of the Houſehold*, is an officer under the treaſurer of the houſehold, in the king's gift: his buſineſs is to ſurvey the accounts of the houſehold.—He has 66l. 13s. 4d. a-year wages, and 433l. 6s. 8d. board-wages.

MASTER *of the Mint*, was anciently the title of him who is now called *warden of the mint*; whoſe office is to receive the ſilver and bullion which comes to the mint to be coined, and to take care thereof. The office of maſter and worker is now diſtinct: and this officer is allowed for himſelf and three clerks 650l. a year.

MASTER *of the Ordnance*. See ORDNANCE.

MASTER *of the Revels*, an officer with an appointment of 100l. a-year, whoſe buſineſs is to order all things relating to the performance of plays, maſques, balls, &c. at court. Formerly he had alſo a juriſdiction of granting licenſes to all who travel to act plays, puppet-ſhews, or the like diverſions; neither could any new play be acted at either of the two houſes till it had paſſed his peruſal and licenſe; but theſe powers were afterwards much abridged, not to ſay annihilated, by a ſtatute for regulating play-houſes, till the licenſing plays by the lord chamberlain was eſtabliſhed. This officer has a yeoman with 46l. 11s. 8d. a-year.

MASTER *of the Rolls*, a patent-officer for life; who has the cuſtody of the rolls and patents which paſs the great ſeal, and of the records of the chancery. In the abſence of the lord chancellor or keeper, he alſo ſits as judge in the court of chancery; and is by Sir Edward Coke called his *aſſiſtant*. At other times he hears cauſes in the rolls-chapel, and makes orders and decrees. He is alſo the firſt of the maſters of chancery, and has their aſſiſtance at the rolls: but all hearings before him are appealable to the lord chancellor.

He has the keeping of the parliament-rolls, and has the rolls-houſe for his habitation; as alſo the cuſtody of all charters, patents, commiſſions, deeds, and recognizances, which being made of rolls of parchment gave riſe to the name. Anciently he was called *clerk of the rolls*.

Concerning the authority of the maſter of the rolls to hear and determine cauſes, and his general power in the court of chancery, there were (not many years ſince) divers queſtions and diſputes very warmly agitated; to quiet which it was declared by ſtat. 3. Geo. II. cap. 30, that all orders and decrees by him made, except ſuch as by the courſe of the court were appropriated to the great ſeal alone, ſhould be deemed to be valid; ſubject nevertheleſs to be diſcharged or altered by the lord chancellor, and ſo as they ſhall not be inrolled till the ſame are ſigned by his lordſhip. In his gift are the ſix clerks in chancery, the examiners, three clerks of the petty-bag, and the ſix clerks of the rolls-chapel where the rolls are kept. See ROLLS, CLERK, &c. The maſter of the rolls is always of the privy-council; and his office is of great profit, though much ſhort of what it has been.

MASTER *of a Ship*, an officer to whom is committed the direction of a merchant-veſſel, who commands it in chief, and is charged with the merchandiſes aboard. In the Mediterranean the maſter is frequently called *patron*, and in long voyages *captain*. It is the proprietor of the veſſel that appoints the maſter; and it is the maſter who provides the equipage, hires the pilots, ſailors, &c. The maſter is obliged to keep a regiſter of the ſeamen and officers, the terms of their contract, the receipts and payments, and, in general, of every thing relating to his commiſſion.

MASTER *of a Ship of War*, is an officer appointed by the commiſſioners of the navy, to take charge of navigating a ſhip from port to port under the direction of the captain. The management and diſpoſition of the ſails, the working of a ſhip into her ſtation in the order of battle, and the direction of her movements in the time of action, and in other circumſtances of danger, are alſo more particularly under his inſpection. It is likewiſe his duty to examine the proviſions, and accordingly to admit none into the ſhip but ſuch as are ſound, ſweet, and wholeſome. He is moreover charged with the ſtowage; and for the performance of theſe ſervices he is allowed ſeveral aſſiſtants who are properly termed *mates* and *quarter-maſters*.

MASTER *of the Temple*. The founder of the order of the templars, and all his ſucceſſors were called *magni templi magiſtri*; and ever ſince the diſſolution of the order, the ſpiritual guide and director of the houſe is called by that name. See TEMPLE and TEMPLAR. There were alſo ſeveral other officers under this denomination, as maſter of the wardrobe, with a ſalary of 2000l. a-year; maſter of the harriers, with 2000l. a-year; maſter of the ſtag-hounds, with 800l. a-year; maſter of the jewel-office, &c. all now aboliſhed.

MASTER *and Servant*; a relation founded in convenience, whereby a man is directed to call in the aſſiſtance of others, where his own ſkill and labour will not be ſufficient to anſwer the cares incumbent upon him. For the ſeveral ſorts of ſervants, and how that character is created or deſtroyed, ſee the article SERVANT. In the preſent article we ſhall conſider, firſt, what Judge Blackſtone has ſaid of the effect of this relation, with regard to the parties themſelves; and ſecondly, its effects with regard to others.

1. The manner in which this relation affects either the maſter or ſervant. And, firſt, by hiring and ſervice for a year, or apprenticeſhip under indentures, a perſon gains a ſettlement in that pariſh wherein he laſt ſerved 40 days. In the next place, perſons ſerving ſeven years as apprentices to any trade have an excluſive right to exerciſe that trade in any part of England. This law, with regard to the excluſive part of it, has by turns been looked upon as a hard law, or as a beneficial one, according to the prevailing humour of the times; which has occaſioned a great variety of reſolutions in the courts of law concerning it: and attempts have been frequently made for its repeal, though hitherto without ſucceſs. At common law every man might uſe what trade he pleaſed; but this ſtatute reſtrains that liberty to ſuch as have ſerved as apprentices: the adverſaries to which proviſion ſay, that all reſtrictions (which tend to introduce monopolies) are pernicious to trade; the advocates for it allege, that unſkilfulneſs in trades is equally detrimental to the public as monopolies. This reaſon indeed only extends to ſuch trades, in the exerciſe whereof ſkill is required: but another of their arguments goes much farther; viz. that apprenticeſhips are uſeful to the commonwealth, by employing of youth, and learning them to be early induſtrious; but that no one would be induced to undergo a ſeven years ſervitude, if others, though equally ſkilful, were allowed the ſame advantages without having undergone the ſame diſcipline: and in this there ſeems to be much reaſon. However, the reſolutions of the courts have in general rather confined than extended the reſtriction. No trades are held to be within the ſtatute, but ſuch as were in being at the making of it: for trading in a country village, apprenticeſhips are not requiſite, and following the trade ſeven years is ſufficient without any binding; for the ſtatute only ſays, the perſon muſt ſerve *as* an apprentice, and does not require an actual apprenticeſhip to have exiſted.

A maſter may by law correct his apprentice for negligence or other miſbehaviour, ſo it be done with moderation: though, if the maſter or maſter's wife beats any other ſervant at full age, it is good cauſe of departure. But if any ſervant, workman, or labourer, aſſaults his maſter or dame, he ſhall ſuffer one year's impriſonment, and other open corporal puniſhment, not extending to life or limb.

By ſervice all ſervants and labourers, except apprentices, become entitled to their wages: according to agreement, if menial ſervants; or according to the appointment of the ſheriff or ſeſſions, if labourers or ſervants in huſbandry: for the ſtatutes for regulation of wages extend to ſuch ſervants only; it being impoſſible for any magiſtrate to be a judge of the employment of menial ſervants, or of courſe to aſſeſs their wages.

2. Let us now ſee how ſtrangers may be affected by this relation of maſter and ſervant; or how a maſter may behave towards others on behalf of his ſervant, and what a ſervant may do on behalf of his maſter.

And, firſt, the maſter may *maintain*, that is, abet and aſſiſt, his ſervant in any action at law againſt a ſtranger: whereas, in general, it is an offence againſt public juſtice to encourage ſuits and animoſities, by helping to bear the expence of them, and is called in law *maintenance*. A maſter alſo may bring an action againſt any man for beating or maiming his ſervant: but in ſuch caſe he muſt aſſign, as a ſpecial reaſon for ſo doing, his own damage by the loſs of his ſervice; and this loſs muſt be proved upon the trial. A maſter likewiſe may juſtify an aſſault in defence of his ſervant, and a ſervant in defence of his maſter: the maſter, becauſe he has an intereſt in his ſervant, not to be deprived of his ſervice; the ſervant, becauſe it is part of his duty, for which he receives his wages, to ſtand by and defend his maſter. Alſo, if any perſon do hire or retain my ſervant, being in my ſervice, for which the ſervant departeth from me and goeth to ſerve the other, I may have an action for damages againſt both the new maſter and the ſervant, or either of them: but if the new maſter did not know that he is my ſervant, no action lies; unleſs he afterwards refuſe to reſtore him upon information and demand. The reaſon and foundation upon which all this doctrine is built, ſeem to be the property that every man has in the ſervice of his domeſtics; acquired by the contract of hiring, and purchaſed by giving them wages.

As for thoſe things which a ſervant may do on behalf of his maſter, they ſeem all to proceed upon this principle, that the maſter is anſwerable for the act of his ſervant, if done by his command, either expreſsly given or implied: *nam qui facit per alium, facit per ſe*. Therefore, if the ſervant commit a treſpaſs by the command or encouragement of his maſter, the maſter ſhall be guilty of it: not that the ſervant is excuſed, for he is only to obey his maſter in matters that are honeſt and lawful. If an innkeeper's ſervants rob his gueſts, the maſter is bound to reſtitution; for as there is a confidence repoſed in him, that he will take care to provide honeſt ſervants, his negligence is a kind of implied conſent to the robbery; *nam, qui non prohibet, cum prohibere poſſit jubet*. So likewiſe if the drawer at a tavern ſells a man bad wine, whereby his health is injured, he may bring an action againſt the maſter; for although the maſter did not expreſsly order the ſervant to ſell it to that perſon in particular, yet his permiſ-

ting him to draw and ſell it at all is impliedly a general command.

In the ſame manner, whatever a ſervant is permitted to do in the uſual courſe of his buſineſs, is equivalent to a general command. If I pay money to a banker's ſervant, the banker is anſwerable for it: if I pay it to a clergyman's or a phyſician's ſervant, whoſe uſual buſineſs it is not to receive money for his maſter, and he imbezzles it, I muſt pay it over again. If a ſteward lets a leaſe of a farm, without the owner's knowledge, the owner muſt ſtand to the bargain; for this is the ſteward's buſineſs. A wife, a friend, a relation, that uſe to tranſact buſineſs for a man, are *quoad hoc* his ſervants; and the principal muſt anſwer for their conduct: for the law implies, that they act under a general command; and without ſuch a doctrine as this no mutual intercourſe between man and man could ſubſiſt with any tolerable convenience. If I uſually deal with a tradeſman by myſelf, or conſtantly pay him ready money, I am not anſwerable for what my ſervant takes up upon truſt; for here is no implied order to the tradeſman to truſt my ſervant: but if I uſually ſend him upon truſt, or ſometimes on truſt and ſometimes with ready money, I am anſwerable for all he takes up; for the tradeſman cannot poſſibly diſtinguiſh when he comes by my order and when upon his own authority.

If a ſervant, laſtly, by his negligence does any damage to a ſtranger, the maſter ſhall anſwer for his neglect: if a ſmith's ſervant lames a horſe while he is ſhoeing him, an action lies againſt the maſter, and not againſt the ſervant. But in theſe caſes the damage muſt be done while he is actually employed in the maſter's ſervice; otherwiſe the ſervant ſhall anſwer for his own miſbehaviour. Upon this principle, by the common law, if a ſervant kept his maſter's fire negligently, ſo that his neighbour's houſe was burned down thereby, an action lay againſt the maſter; becauſe this negligence happened in his ſervice: otherwiſe, if the ſervant, going along the ſtreet with a torch, by negligence ſets fire to a houſe; for there he is not in his maſter's immediate ſervice, and muſt himſelf anſwer the damage perſonally. But now the common law is, in the former caſe, altered by ſtatute 6 Ann. c. 3, which ordains, that no action ſhall be maintained againſt any in whoſe houſe or chamber any fire ſhall accidentally begin; for their own loſs is ſufficient puniſhment for their own or their ſervant's careleſſneſs. But if ſuch fire happen through negligence of any ſervant (whoſe loſs is commonly very little), ſuch ſervant ſhall forfeit 100 l. to be diſtributed among the ſufferers; and, in default of payment, ſhall be committed to ſome workhouſe, and there kept to hard labour for 18 months. A maſter is, laſtly, chargeable if any of his family layeth or caſteth any thing out of his houſe into the ſtreet or common highway, to the damage of any individual, or the common nuiſance of his majeſty's liege people: for the maſter hath the ſuperintendence of all his houſehold. And this alſo agrees with the civil law; which holds, that the *pater-familias*, in this and ſimilar caſes, *ob alterius culpam tenetur, ſive ſervi, ſive liberi*.

We may obſerve, that in all the caſes here put, the maſter may be frequently a loſer by the truſt repoſed in his ſervant, but never can be a gainer: he may frequently be anſwerable for his ſervant's miſbehaviour, but never can ſhelter himſelf from puniſhment by laying the blame on his agent. The reaſon of this is ſtill uniform and the ſame; that the wrong done by the ſervant is looked upon in law as the wrong of the maſter himſelf; and it is a ſtanding maxim, that no man ſhall be allowed to make any advantage of his own wrong.

Master-*Load*, in mining, a term uſed to expreſs the larger vein of a metal, in places where there are ſeveral veins in the ſame hill. Thus it often happens, that there are ſeven, ſometimes five, but more uſually three veins or loads, parallel to each other in the ſame hill. Of theſe the middle vein is always much the largeſt. This is called the *maſter-load*; and the others which lie three, two, or one, on each ſide of this, are called the *concomitants* of the maſter-load.

Master-*Wort*, in botany. See Imperatoria.

MASTICATION, the action of chewing, or of agitating the ſolid parts of our food between the teeth, by the motion of the jaws, the tongue and the lips, whereby it is broken into ſmall pieces, impregnated with ſaliva, and ſo fitted for deglutition and a more eaſy digeſtion.

MASTICH, a kind of reſin exuding from the lentiſcus tree; and brought from Chio, in ſmall yellowiſh tranſparent grains or tears, of an agreeable ſmell, eſpecially when heated or ſet on fire. See Pistachia. This reſin is recommended in old coughs, dyſenteries, hæmoptoës, weakneſs of the ſtomach, and in general in all debilities and laxity of the fibres. Geoffroy directs an aqueous decoction of it to be uſed for theſe purpoſes: but water extracts little or nothing from this reſin. Rectified ſpirit almoſt entirely diſſolves it, and the ſolution is very warm and pungent. Maſtich is to be choſen in drops, clear, well-ſcented, and brittle. We meet with a kind of cement ſometimes kept in the ſhops under the name of maſtich. It is compoſed of this gum, and ſeveral other ingredients, and is formed into cakes for uſe. This is intended for the ſervice of lapidaries, to fill up cracks in ſtones, &c. but is by no means to be uſed for any medicinal purpoſes.

MASTICOT, or yellow lead, is the calx or aſhes of lead, gently calcined, by which it is changed to a yellow or lighter or deeper tint, according to the degree of calcination. Maſticot is ſometimes uſed by painters, and it ſerves medicinally as a drier in the compoſition of ointments or plaſters. The maſticot which is uſed by the Dutch as the ground of their glazing, is prepared by calcining a mixture of one hundred weight of clean ſand, forty-four pounds of ſoda, ſold with us under the name of barilla, and thirty pounds of pearl-aſhes.

MASTIFF-Dog, or band-dog, *(canis villaticus* or *catenarius)*, is a ſpecies of great ſize and ſtrength, and a very loud barker. Manwood ſays, that it derives its name from *maſe thefeſe*, being ſuppoſed to frighten away robbers by its tremendous voice. Great Britain was formerly ſo noted for its maſtiffs, that the Roman emperors appointed an officer in this iſland, with the title of *Procurator Cynegii*, whoſe ſole buſineſs was to breed, and tranſmit from hence to the amphitheatre, ſuch as would prove equal to the combats of the place. Strabo, lib. iv. tells us, that the maſtiffs of Britain were trained for war, and uſed by the Gauls in their battles. See Canis.

MASTIGADOUR, or slabbering-bit, in the manege, a ſnaffle of iron, all ſmooth, and of a piece, guarded with paternoſters, and compoſed of three halfs of great rings, made into demi-ovals, of unequal bigneſs; the leſſer being incloſed within the greater, which ought to be about half a foot high.

MASULAPATAN, a populous town of Aſia in the Eaſt Indies, and on the coaſt of Coromandel, in the dominions of the Great Mogul. It carried on a great trade, and moſt nations in Europe had factories here; but the Engliſh have now left it, and even the Dutch themſelves have not above a dozen people here to carry on the chintz trade. The inhabitants are Gentoos, who will not feed on any thing that has life; and they had a famous manufacture of chintz, which is greatly decayed ſince the Engliſh left off buying. The Great Mogul has a cuſtom-houſe here; and the adjacent countries abound in corn, tobacco, and timber for building. It is ſeated on the weſt ſide of the Bay of Bengal, 200 miles north of Fort St. George. W. lon. 81. 25. N. lat. 16. 30.

MATACA, or Mantaca, a commodious bay in America, on the north coaſt of the iſland of Cuba. Here the galleons uſually come to take in freſh water in their return to Spain.

It is 35 miles from the Havannah. W. lon. 85. 6. N. lat. 25. 0.

MATAMAN, a country of Africa, bounded by Benguela on the north, by Monomotopa on the eaſt, by Cafraria on the ſouth, and by the Atlantic Ocean on the weſt. There is no town in it, and the inhabitants live in miſerable huts, it being a deſart country, and but little viſited by the Europeans.

MATAN, or MACTAN, an iſland of Aſia in the Eaſt-Indian ſea, and one of the Philippines. The inhabitants have thrown off the yoke of Spain; and it was here that Magellan was killed in April 1521.

Cape MATAPAN, the moſt ſouthern promontory of the Morea, between the gulph of Coran and that of Colo-China.

MATARAM, a large town of Aſia, formerly the capital of an empire of that name in the iſland of Java. It is ſtrong by ſituation, and is ſeated in a very fertile, pleaſant, and populous country, ſurrounded with mountains. E. lon. 111. 25. S. lat. 7. 55.

MATARO, a town of Spain, in Catalonia; ſeated on the coaſt of the Mediterranean, 15 miles north-eaſt of Barcelona, and 35 ſouth-weſt of Gironne. It is a ſmall town, but induſtrious and well-peopled; and the environs abound in vineyards, which produce wine much famed for its flavour. It likewiſe contains ſeveral manufactories, and is conſidered as one of the richeſt and moſt active towns in Catalonia. E. lon. 2. 35. N. lat. 41. 30.

MATCH, a kind of rope ſlightly twiſted, and prepared to retain fire for the uſes of artillery, mines, fire-works, &c. It is made of hempen-tow, ſpun on the wheel like cord, but very ſlack; and is compoſed of three twiſts, which are afterwards again covered with tow, ſo that the twiſts do not appear: laſtly, it is boiled in the lees of old wines. This, when once lighted at the end, burns on gradually and regularly, without ever going out till the whole be conſumed: the hardeſt and drieſt match is generally the beſt.

Quick-MATCH. See QUICK-*Match*.

MATCHING, in the wine-trade, the preparing veſſels to preſerve wines and other liquors, without their growing ſour or vapid. The method of doing it is as follows: Melt brimſtone in an iron ladle, and when thoroughly melted, dip into it ſlips of courſe linen-cloth; take theſe out, and let them cool: this the wine-coopers call a *match*. Take one of theſe matches, ſet one end of it on fire, and put it into the bung-hole of a caſk; ſtop it looſely, and thus ſuffer the match to burn nearly out: then drive in the bung tight, and ſet the caſk aſide for an hour or two. At the end of this time examine the caſk, and you will find that the ſulphur has communicated a violent pungent and ſuffocating ſcent to the caſk, with a conſiderable degree of acidity, which is the gas and acid ſpirit of the ſulphur. The caſk may after this be filled with a ſmall wine which has ſcarce done its fermentation; and bunging it down tight, it will be kept good, and will ſoon clarify: this is a common and very uſeful method; for many poor wines could ſcarce be kept potable even a few months without it.

MATE *of a* SHIP *of* WAR, an officer under the direction of the maſter, by whoſe choice he is generally appointed, to aſſiſt him in the ſeveral branches of his duty. Accordingly, he is to be particularly attentive to the navigation in his watch, &c. to keep the *log* regularly, and examine the line and glaſſes by which the ſhip's courſe is meaſured, and to adjuſt the ſails to the wind in the fore-part of the ſhip. He is to have a diligent attention to the cables, ſeeing that they are well *coiled* and kept clean when laid in the *tier*, and ſufficiently *ſerved* when employed to ride the ſhip. Finally, he is to ſuperintend and aſſiſt at the ſtowage of the hold, taking eſpecial care that all the ballaſt and proviſions are properly ſtowed therein.

MATE *of a Merchant-Ship*, the officer who commands in the abſence of the maſter thereof, and ſhares the duty with him at ſea; being charged with every thing that regards the internal management of the ſhip, the directing her courſe, and the government of her crew. The number of mates allowed to ſhips of war and merchantmen is always in proportion to the ſize of the veſſel. Thus a firſt-rate man of war has ſix mates, and an Eaſt-Indiaman the ſame number; a frigate of 10 guns, and a ſmall merchant-ſhip, but only one mate in each; and the intermediate ſhips have a greater or ſmaller number, according to their ſeveral ſizes, or to the ſervices on which they are employed.

DURA *and* PIA MATER, the names given by anatomiſts to the two membranes which ſurround the brain. See ANATOMY.

MATERA, a conſiderable town of Italy, in the kingdom of Naples, and in the Terra d'Otranto, with a biſhop's ſee, ſeated on the river Canapro. E. lon. 16. 43. N. lat. 40. 51.

MATERIA MEDICA,

A GENERAL name for every ſubſtance uſed in medicine, and by ſome extended even to every article uſed as food or drink.

Thus the materia medica becomes exceedingly extenſive: however, before we enter upon any particular diſcuſſion of the ſubject, it appears proper to give ſome general idea of medicines and their operation.

A *medicine*, properly ſo called, is a ſubſtance which, when applied to the living human body, makes ſuch an alteration in it as either to prevent the approach of diſeaſe, or to remedy a morbid ſtate when already preſent. Such ſubſtances as may be uſed for theſe purpoſes without any great preparation are called *ſimple medicines*, or *ſimples*; and with theſe the writers on materia medica are chiefly converſant. In treatiſes written profeſſedly on this ſubject, it is common to give a particular deſcription of each article, the characteriſtic marks by which it may be diſtinguiſhed from all other ſubſtances, and the methods by which an adulteration or an imperfection may be diſcovered in it, together with the doſe in which it can ſafely be given: but as all theſe particulars are taken notice of in different parts of this work, it is only neceſſary here to mention the general claſſification, and enumerate the names of the various ſubſtances uſed in medicine, after giving, as hath been already promiſed, a brief and general account of their mode of operation.

Concerning the manner in which medicines act, phyſicians have greatly differed, and each has followed his own particular theory. The followers of Boerhaave have ſuppoſed their action to be directly upon the ſolids and fluids; while thoſe who build their theories on the hypotheſis of Hoffman have aſſerted, that all medicines act immediately upon the nervous ſyſtem, and from thence only in a ſecondary manner are their effects diffuſed over the ſolids and fluids. To diſcuſs this queſtion is not our buſineſs at preſent: neither indeed is it a matter of

great conſequence whether it be diſcuſſed or not; ſeeing all parties muſt own, that certain effects follow the uſe of certain particular ſubſtances, whether theſe ſubſtances act firſt upon the nervous ſyſtem or upon the ſolids and fluids.

From their operations on the human body medicines are moſt uſually divided into claſſes. Some are found to have the property of rendering the ſolid parts of the body more lax than before, and are therefore called *relaxing* medicines: Others there are which have an effect directly contrary, and are therefore called *indurating* medicines: A third kind are found to excite inflammation in the part to which they are applied, and are therefore called *inflammatory* medicines: And, laſtly, a fourth kind are found remarkably either to increaſe or diminiſh the vigour of the body, or what is called the *tone* of the ſolids; and have therefore got the name of *tonics* if they increaſe, and *ſedatives* if they diminiſh, this tone.

Some medicines are ſuppoſed neither remarkably to increaſe nor diminiſh the tone of the ſolids; but to perform their office either by correcting ſome morbid matter in the body, or by evacuating it: in the former caſe they are called *alterants*, in the latter *evacuants*.

Theſe are the general diviſions or claſſes into which medicines are commonly divided; but when we begin more particularly to conſider their virtues, a great many inferior diviſions ariſe.—Of the relaxing medicines, ſome, when externally applied, are ſuppoſed only to ſoften the part; and in that caſe are called *emollients*: while others, which have a power of converting the humours ſtagnating in any inflamed part into pus, are called *maturants*, or *ſuppuratives*. Sedative medicines, externally applied, are ſometimes called *paregorics*: when taken internally, if they take off a ſpaſm then exiſting in the body, they are called *antiſpaſmodics*; if they mitigate pain, *anodynes*; if they produce a quiet ſleep, *hypnotics*; or if they produce a very deep and unnatural ſleep, together with a remarkable ſtupefaction of the ſenſes, they are then called *narcotics*.

Tonic medicines obtain the name of *corroboratives*, *analeptics*, or *nervine* medicines, when they ſlightly increaſe the contractile power of the ſolids; but of *aſtringents*, if they do this in a great degree, eſpecially if at the ſame time that they indurate the ſolids they alſo coagulate the fluids. Some of theſe medicines have received names from their ſuppoſed virtue of promoting the growth of the fleſh, conſolidating wounds, and ſtopping fluxes of blood; but it is now diſcovered that no medicines whatever are endowed with any ſuch powers; and therefore the diviſions into *ſarcotics*, *traumatics*, or *vulneraries*, &c. are ſeldom uſed. If aſtringent medicines are uſed with an intention to drive, by the conſtriction which they occaſion, any kind of matter from the ſurface towards the internal parts of the body, they are called *repellents*; but if they inſenſibly expel any kind of ſtagnating matter from the parts where it is contained, they are then called *diſcutients*; and, laſtly, *ſtimulants*, or *attractives*, if they bring a greater flux of humours to the part to which they are applied.

As to medicines of the inflammatory kind, they are divided into *veſicatories* or bliſters, which by their application raiſe watery bladders on the ſkin; and *catheretics*, *eſcharotics*, or *corroſives*, if they eat into and deſtroy the ſubſtance of the ſolid parts themſelves. Another ſubdiviſion has been added, viz. that of *rubefactive* medicines, or ſuch as only induce a redneſs on the part to which they are applied; but theſe belong to the veſicatories, and what proves only *rubefactive* to one will frequently bliſter another.

The alterants are divided into *abſorbents*, ſuch as by their alkaline quality neutraliſe and deſtroy any acid matter which may be in the ſtomach; and *antiſeptics*, or thoſe which correct any putrid matter in it; *coagulants* when they thicken the humours, and *reſolvents* if they thin them; *heating* medicines when they increaſe the velocity of the blood, and *refrigerating* if they diminiſh it.

The evacuating medicines are divided according to the nature of the humour they evacuate. Thus, if they evacuate the contents of the ſtomach by vomiting, they are called *emetics*; if they induce purging, they are called *cathartics*; if they only evacuate the immediate contents of the inteſtines, they are named *cccoprotics*; or if a moderate evacuation is produced, without ſickneſs or pain, they are called *laxatives*.—The medicines which gently promote the expulſion of humours through the pores of the ſkin, are called *diaphoretics*. If they do this in great quantity, and with violence, they are called *ſudorifics*. Such as excite urine, are called *diuretics*. Such as produce their evacuation by the glands of the palate, mouth, and falival ducts, are called *ſalivating* medicines; thoſe which promote the evacuation of mucus from the throat, are called *apophlegmatics*; while thoſe which evacuate by the noſe, are called *ptarmics*, *errhines*, *ſternutatories*; and thoſe which promote the menſtrual flux, *emmenagogues*. To the order of evacuants alſo ſome reduce thoſe medicines which expel any unnatural bodies, as worms, ſtones, and flatus. Thoſe which deſtroy worms are called *anthelmintics*; thoſe which diſſolve the ſtone in the bladder, *lithontriptics*; and ſuch as expel flatus, *carminatives*.

According to theſe diviſions, Mr. Vogel claſſes the articles of his Materia Medica; but Dr. Lewis chooſes to arrange them according to the natural qualities of the ſubſtances themſelves, and not their effects on the human body.

Writers on the materia medica (he obſerves) have taken great pains in arranging the various articles of which it is compoſed, into different diviſions and ſubdiviſions, according to their real or reputed medicinal powers.

It has been imagined, that the whole materia medica is reducible under the three diſtinctions of *alteratives*, *evacuants*, and *reſtoratives*: the firſt comprehending all that has any power to alter the conſtitution, without ſenſibly increaſing or diminiſhing any of the natural evacuations; the ſecond, whatever viſibly promotes thoſe diſcharges; and the third, all that contributes to leſſen them, and make the increaſe greater than the waſte. Theſe diviſions being too general, they are broken into ſubdiviſions; and theſe again are further divided into different claſſes, under more reſtrained denominations, as cardiac, carminative, hyſterie, ſtomachic, &c.

Specious as this plan may appear to be, he imagines the execution of it, to any uſeful purpoſe, would require a far more extenſive knowledge of the nature and operation of medicines than has yet been attained to. A juſt and uſeful method of ſimples is ſcarcely to be expected, while thoſe properties on which the method is founded are imperfectly known, and in many articles only conjectural.

In all the arguments that have been hitherto contrived upon this plan, there appears a ſtriking incongruity among the ſeveral articles of which even the ultimate ſubdiviſions are compoſed; ſubſtances extremely diſſimilar being claſſed together, as cantharides and tea, tobacco and bran, hemlock and cowſlips, ſcurvygraſs and raiſins, arum root and liquorice, wormwood and parſnips, cinnamon and nettles, raſberries and chalk, artichokes and alum, cloves and coffee, muſtard-ſeed and black cherries, &c. Nor are theſe incongruities to be laid always to the charge of the authors, the nature of the ſyſtem itſelf rendering them often unavoidable; for the particular effect which entitles a medicine to a particular claſs, may be produced by ſubſtances very diſſimilar, and even oppoſite, in their general powers: thus the alvine excretions are reſtrained by ſtarch, wax, tormentil-root, opium; among the capital diuretics are cantharides, nitre, ſalt, fixt alkaline ſalts, ſquills. It ſhould ſeem that the method of arrangement

cannot be a juſt one, which requires ſubſtances ſo diſcordant to be ranked together, and which further requires each of theſe ſubſtances to be ranked over again, in other claſſes, along with other ſubſtances to which they are equally diſcordant.

There is alſo a material imperfection in this ſcheme, even in the primary diviſions. Steel and its preparations act, in different circumſtances, both as evacuants and reſtoratives. Mercury and antimony afford, in their different preparations, both evacuants and alteratives; and there are many other drugs which are ſometimes uſed as alteratives, and ſometimes as evacuants; indeed, all evacuants, in diminiſhed doſes, ſeem to act merely as alteratives. It ſhould ſeem, therefore, that "the diviſion of the whole materia medica into alteratives, evacuants, and reſtoratives," is a diviſion not founded in nature, even if there was no objection to the vague meaning of the appellations themſelves.

Cartheuſer has divided the materia medica on a plan which appears more rational. Inſtead of the operations of medicines in the human body, which are precarious, complicated, and greatly diverſified according to the doſe, the preparation, and the circumſtances of the patient, he takes for the baſis of his arrangement their more ſimple, obvious, and conſtant properties, as bitterneſs, ſweetneſs, aſtringency, acidity, &c. Having conſidered the nature of bitterneſs, for inſtance, in general, he examines what effects medicines poſſeſſed of this property are capable of producing in the body, and in what circumſtances they may be expected to be ſerviceable; and then proceeds to an account of the particular bitters.

This method is of real uſe; but its uſe is limited to a ſmall part of the materia medica. There are many of the medicinal ſimples, in which we can diſtinguiſh no prevailing qualities of this kind; there are many in which different qualities are blended together; and many which, though ſimilar in theſe kinds of qualities, are very diſſimilar in their operations in the human body: thus, though gentian and aloes agree in having a bitter taſte, and ſugar and manna in being ſweet, their medicinal virtues are reſpectively very different. Accordingly the author is obliged in ſome caſes to depart from his general plan, and found the diviſion on the medicinal effects. He makes one claſs of purgatives and emetics, and another of vaporoſe inebriants and narcotics: this laſt claſs conſiſts of tobacco, alder flowers, ſaffron, opium, and poppy-ſeeds; ſubſtances certainly very diſcordant in all their qualities that relate to medicinal intentions.

In this article, inſtead of attempting a medicinal diſtribution of the ſimples, which we apprehend not to be practicable to any good purpoſe, we ſhall, after Dr. Lewis, adopt the alphabetical mode of arrangement, as poſſeſſing upon the whole a decided ſuperiority over every other. We ſhall however premiſe, from the ſame ingenious author, ſome general obſervations on certain claſſes of medicines, in Cartheuſer's manner; and thus preſerve the leſs exceptionable parts of his plan, with ſome amendments.

Art. I. Acids.

Claſs 1. *Vegetable*
- *native*; as ſorrel, wood-ſorrel, juice of lemon, oranges, barberries, and other fruits.
- *produced by fermentation*; as vinegar and tartar.

Claſs 2. *Mineral*: the acids of vitriol, nitre, and common ſalt.

The medical effect of acids, duly diluted, and given in proper doſes, are, to cool, quench thirſt, correct a tendency to putrefaction, and allay inordinate motions of the blood. By theſe qualities, in hot bilious temperaments and inflammatory diſorders, they frequently reſtrain immoderate hæmorrhages, and promote the natural ſecretions; in ſome kinds of fever they excite a copious diaphoreſis, where the warm medicines, called *alexipharmic*, tend rather to prevent this ſalutary diſcharge.

Vegetable acids, particularly the native juices of certain plants and fruits, have ſome degree of a ſaponaceous quality; by means of which they attenuate or diſſolve viſcid phlegm and deterge the veſſels, and thus prove ſerviceable in ſundry chronical diſorders. Inveterate ſcurvies have ſometimes yielded to their continued uſe, eſpecially when given in conjunction with medicines of the acrid or pungent kind: experience has ſhown, that the acrid antiſcorbutics have much better effects when thus managed than when exhibited by themſelves; hence in the *ſucci ſcorbutici* of our diſpenſatory, Seville orange juice is uſefully joined to that of the *cochlearia* and *naſturtium*.

The mineral acids inſtantly coagulate blood: the vegetable dilute it, even when inſpiſſated or thickened by heat; in which ſtate watery liquors will not mingle with it. Hence, in ſome fevers, where water runs off by the kidneys almoſt as pale and inſipid as it was drank, vegetable acids render the urine of the due colour and quality. The mineral acids (the ſpirit of nitre in particular) combined with vinous ſpirits, have a like effect.

Acids are prejudicial in cold, pale, phlegmatic habits, where the veſſels are lax, the circulation languid, bile deficient, and the power of digeſtion weak. In theſe caſes, an acid is often generated in the ſtomach, from milk and moſt vegetable foods; which, whilſt it continues in the firſt paſſages, occaſions uneaſineſs about the ſtomach, flatulencies, ſometimes griping pains of the bowels, and vomitings.

Art. II. Insipid Earths *capable of abſorbing* Acids.

Oyſter-ſhells,	Chalk,
Crabs claws and eyes ſo called,	Some marles,
Coral, red and white,	Lime-ſtones,
Pearls,	Marbles,
Bezoar,	Spars.

The virtues of theſe ſubſtances are, to abſorb or deſtroy acidities in the firſt paſſages, and conſequently to remove ſuch diſorders as proceed from that cauſe. The cordial, alexipharmic, antifebrile, and other like virtues attributed to theſe medicines, appear to have little foundation; or at beſt are only ſecondary ones. When united with the acid, they form a neutral ſaline compound, poſſeſſing ſome degree of an aperient and detergent quality, though too inconſiderable to be in general regarded.

The abſorbent earths were all ſtrangers to medicine in the earlier times: and their uſe does not ſeem to have been eſtabliſhed before the laſt century; when ſome practitioners, from an opinion that moſt kinds of diſeaſes proceeded from a preternatural acid, introduced a great variety of antacid bones, both of the earthy and ſaline kind, and very liberally exhibited them on almoſt every occaſion.

It is certain, that in children, and adults of a weak conſtitution, and whoſe food is chiefly of the vegetable aceſcent kind, ſundry diſorders are occaſioned by acidities: theſe readily diſcover themſelves by ſour eructations, the pale colour of the face, and in children by the ſour ſmell and green colour of the alvine fæces, which are ſometimes ſo manifeſtly acid as to raiſe a ſtrong effervescence with alkaline ſalts. In theſe caſes, and theſe only, the uſe of abſorbent earths is indicated.

If there are really no acid juices in the ventricle, theſe earths are apt to concrete with the mucous matter uſually lodged there, into hard indiſſoluble maſſes; which have ſome-

times been thrown up by vomit, or found in the ſtomach upon diſſection. Hence indigeſtion, loſs of appetite, nauſea, vomiting, obſtructions of the bowels, and other diſorders. Sometimes the ſtomach and inteſtines have been found lined with a cruſt, as it were, of theſe earthy bodies, which muſt not only have prevented the ſeparation of the gaſtric liquor, but likewiſe have cloſed the orifices of the lacteal veſſels, ſo as to obſtruct the paſſage of the chyle into the maſs of blood.

Some ſuppoſe the earthy powders capable (without the concurrence of any acid) of paſſing the lacteals along with the chyle: and allege, in ſupport of this opinion, that, when triturated with water, they are in part taken up and carried with it through a filter of paper; the filtrated liquor leaving, upon evaporation, a portion of whitiſh earthy matter. This experiment (allowing the conſequence to be juſtly drawn from it) is itſelf erroneous: the reſiduum proceeds from the earth naturally contained in the water, not from that employed in the experiment; for if pure diſtilled water be made uſe of, it will leave no reſiduum, though long triturated or digeſted with the earth.

All theſe bodies, particularly thoſe of the animal kind, contain, beſides their purely alkaline earth, a portion of glutinous matter. An inſtance of this we have in crabs-eyes, which if macerated in the weaker acids, or in the ſtronger ſufficiently diluted with water, the earthy part will be diſſolved, and the animal-glue remain in form of a ſoft tranſparent mucilage. The glutinous ſubſtance increaſes their tendency to concrete in the ſtomach; and thence thoſe which contain leaſt thereof ſhould be preferred to the others. The mineral earths contain the leaſt of this kind of matter, and ſome of them are very eaſy of ſolution; chalk, for inſtance, which may therefore be given with greater ſafety than the animal abſorbents. Theſe ſubſtances, diveſted of their conglutinating matter by means of fire, are reduced into acrimonious calces or limes, and thus become medicines of a different claſs.

The teeth, bones, hoofs, and horns of animals, conſiſt of the ſame principles with the animal abſorbents above-mentioned, but combined in different proportions: the quantity of gelatinous matter is ſo large, as to defend the earthy part from the action of weak acids; whilſt the earth, in its turn, protects the gluten from being eaſily diſſolved by watery liquors. Hence theſe bodies in their crude ſtate, though recommended as poſſeſſing ſingular virtues, are not found to have any virtue at all.

Experiments have been made for determining the degree of ſolubility, or comparative ſtrength of theſe earths; the principal of which are arranged in the two following tables, one taken from Langius, and the other from Homberg.

TABLE *of the quantity of Acid deſtroyed by different Abſorbents.*

Ten grains of			Drops of Spirit of Salt.
Some kinds of Limeſtones	deſtroyed the acidity of	160	
Oyſter ſhells		120	
Chalk		100	
Shells of Garden-ſnails		100	
Calcined Cray-fiſh		100	
Pearls		80	
Tooth of the Sea-horſe		80	
Volatile Salts		80	
Fixed Salts		60	
Coral, red and white		60	
Crabs-eyes		50	
Egg-ſhells		50	
Mother-of-Pearl		50	
Crabs-claws		40	
Jaw-bone of the Pike fiſh		30	

TABLE *of the quantity of Abſorbent Earths ſoluble in Acids.*

576 grains of Spirit of Salt diſſolved of	Crabs-eyes	216
	Mother-of-Pearl	144
	Pearls	128
	Oyſter-ſhells	156
	Hartſhorn	165
	Coral	186
	Oriental Bezoar	118
	Occidental Bezoar	123
	Quick Lime	199
	Slacked Lime	193
576 grains of Spirit of Nitre diſſolved of	Crabs-eyes	277
	Mother-of-Pearl	202
	Pearls	219
	Oyſter-ſhells	236
	Hartſhorn	234
	Coral	233
	Oriental Bezoar	108
	Occidental Bezoar	144
	Quick Lime	180
	Slacked Lime	216

Theſe experiments do not ſufficiently aſcertain the point intended by them: in the firſt ſett, the quantity of acid is too vague and indetermined; in the ſecond, we are not told whether the acid was perfectly ſaturated; and in both, the acids made uſe of were ſo very different from any that can be ſuppoſed ever to exiſt in the human body, that little can be concluded from them with regard to the medical effects of theſe abſorbents. Trial ſhould have been made with the mild vegetable acids, as the juices of certain fruits, ſour fermented liquors, or rather with ſour milk. Nevertheleſs theſe tables, though not ſo perfect as could be wiſhed, have their uſe in the hands of ſuch as can make proper allowances.

ART. III. EARTHS *not* DISSOLUBLE *in Acids or other Liquors.*

Theſe may be ranged in two claſſes.

Claſs 1. *Hard cryſtalline earths:* as the ruby, garnet, emerald, ſapphire, hyacinth, and other precious ſtones; cryſtal, flint, &c.

THESE kind of ſubſtances were introduced into medicine, and many fabulous virtues attributed to them by the ſuperſtition of the earlier ages. Some of them are ſtill preſerved in foreign pharmacopœias, but at length very juſtly expunged from ours, notwithſtanding what ſome late writers of repute ſpeak of their medical virtue. Theſe indiſſoluble hard bodies are not capable of producing any other effect, than by their rigid angular particles (which, though levigated with the utmoſt care, the microſcope ſtill diſcovers in them) to offend or wound the inteſtines. In levigation, they wear off ſo much from the hardeſt marble inſtruments, as will equal or exceed their own weight: from this circumſtance we may account for their having ſometimes appeared to act as abſorbents. Some of theſe ſtones, expoſed to a vehement fire, become in ſome meaſure friable; but nevertheleſs remain indiſſoluble. Moſt of the coloured ones by this treatment loſe their colour; and in this ſtate prove nearly of the ſame quality with common cryſtal; ſuch are, the ſapphire, emerald, amethyſt, and cornelian. Others melt into a blackiſh vitreous matter, from which a portion of iron is obtainable by proper fluxes; as the hyacinth and garnet. Geoffroy concludes from hence, that theſe ſtones really poſſeſs ſome medical virtues, depending upon their metallic part: but the quantity of metallic matter, ſufficient to give them a conſiderable tinct, is ſo exceedingly ſmall, and ſo incloſed in a ſtony matter not at all ſoluble by

any of the known menſtrua, as ſcarce to admit of any poſſibility of its acting in the human body.

Claſs 2. *Softer earths*; the talky, gypſeous, and argillaceous.

The tales and gypſums have rarely been uſed as medicines. Some of the former, from their unctuous ſoftneſs and ſilver hue, ſtand recommended externally as coſmetics; and ſome of the latter, on little better foundation, internally as aſtringents. But they have long been deſervedly rejected by the judicious practitioners. They ſeem to poſſeſs the ill qualities of the alkaline earth (concreting with the mucus of the ſtomach, &c.) without any of their good ones.

Several of the clays, boles, and terræ ſigillatæ, were highly celebrated by the ancients as aſtringents and alexipharmics, and ſome of them ſtill continue in eſteem; though it is certain they have no great claim to the virtues that have been attributed to them. Their real effects are, to give a greater degree of conſiſtency to the fluids in the firſt paſſages, and in ſome meaſure defend the ſolids from their acrimony.

Moſt of theſe bodies contain, beſides the tenacious indiſſoluble earth, which is their principal characteriſtic, (1.) A portion of an earth ſoluble in acids ſimilar to thoſe of the firſt ſection. (2.) Of acid, ſeparable by diſtillation in a ſtrong fire: this acid is always of the ſame nature with that obtained from vitriol, ſulphur, and alum. (3.) The coloured ones contain likewiſe ſmall quantities of iron, reducible, by inflammable fluxes, into its metallic form. In conſequence of the firſt of theſe ingredients, theſe earths may be looked upon in ſome meaſure as abſorbent: the acid appears to be united with a part of the abſorbent earth into a ſaline compound, approaching to an aluminous nature; whence they have ſome degree of aſtringency: whether they receive any peculiar virtue from the iron, is greatly to be doubted; ſince it is in a very crude ſtate, and in quantity extremely ſmall.

Theſe earths unite with water into a turbid liquor, ſlippery and ſmooth to the touch, and remain for ſome time ſuſpended; the ſand, grit, or other groſſer matters, which are often found naturally mingled with them, ſubſiding. They may be freed by means of acids from their alkaline earth; by coction in water, from their ſaline matter; and the coloured ones from their iron by digeſtion in aqua-regis, the only menſtruum we are acquainted with that will extract the ferrugineous matter of argillaceous and bolar earths. This purified, they have all nearly the ſame appearance and qualities. Expoſed to a ſtrong fire, they loſe their ſoft glutinous quality, and are reduced into hard maſſes, indiſſoluble as at firſt.

Art. IV. Glutinous *Vegetable and Animal Subſtances.*

Claſs 1. *Vegetable.*

Pure gums:	Vegetables abounding with mucilage:
Tragacanth,	Orchis root,
Seneca,	Althæa root,
The gums of cherry, plum, and other European trees.	Quince-ſeeds, &c.

Gums and mucilages are glutinous vegetable productions, of no particular taſte or ſmell, ſoluble in water, but not in vinous ſpirits or in oils. They differ from one another only in degree of tenacity; the more tenacious are called *gums*; thoſe which are leſs ſo, *mucilages*. The firſt naturally exude from certain trees and ſhrubs; the latter are extracted by art. Almoſt all vegetable ſubſtances contain ſome portion of theſe, which, after the reſinous part has been extracted by ſpirit, may be ſeparated from the remaining matter by means of water.

The general virtues of theſe kinds of ſubſtances are, to thicken the fluids, and defend the ſolids from them when grown ſharp or corroſive. Hence their uſe in a thin acrimonious ſtate of the juices, and where the natural mucus of the inteſtines is abraded.

Claſs 2. *Animal.*

Most animal ſubſtances (the fat excepted) contain a viſcous matter, in many reſpects ſimilar to the foregoing, and capable of being extracted by ſtrong coction in water.

Animal glues and gellies have the general qualities of the vegetable gums and mucilages; with this difference, that the former are more nutrimental, and apt to run into a putrid ſtate. Conſidered as the ſubjects of chemiſtry, the difference betwixt them is very great: thoſe of the animal kind are changed by fire into a volatile alkaline ſalt, and a fetid oil; the vegetable into an acid liquor, and a very ſmall portion of oily matter, conſiderably leſs fetid than the former.

Art. V. *Soft* unctuous *Subſtances.*

Claſs 1. *Inſipid vegetable oils; and ſubſtances abounding with them*; as almonds, and the kernels of moſt fruits; linſeed, and the medullary part of ſundry other ſeeds.

Claſs 2. *Animal fats*; as ſpermaceti.

Unctuous vegetables unite with water, by trituration, into a milky liquor; and give out their oil upon expreſſion. Theſe kinds of oils and animal fats diſſolve not in any menſtruum except alkaline ones; which change their quality, and reduce them into a ſoap, diſſoluble in water; but more perfectly in vinous ſpirits. From this compound, the oil may, by a ſkilful addition of acids, be recovered in a purer ſtate than before, and rendered ſoluble, like eſſential oils, in ſpirit of wine.

The medical virtues of theſe ſubſtances are, to obtund acrimonious humours, and to ſoften and relax the ſolids: hence their uſe internally, in tickling coughs, heat of urine, pains, and inflammations; and externally, in tenſion and rigidity of particular parts. The milky ſolutions, commonly called *emulſions*, though much leſs emollient than the oils themſelves or animal fats, have this advantage, that they may be given in acute or inflammatory diſtempers, without danger of the ill conſequences which the others might ſometimes produce: fats and oils, kept in a degree of heat no greater than that of the human body, ſoon become rancid and acrimonious; whilſt emulſions tend rather to grow ſour.

Art. VI. Astringents.

Galls,	Balauſtines,
Tormentil-root,	Terra Japonica,
Biſtort-root,	Acacia, &c.

Astringent ſubſtances are diſtinguiſhed by a rough auſtere taſte; and changing ſolutions of iron, eſpecially thoſe made in the vitriolic acid, of a dark purple or black colour.

Aſtringents yield their virtues by infuſion both to water and vinous ſpirits, generally in greateſt perfection to the former. Oils extract nothing from them; nor do they give over any of their virtue in diſtillation: nevertheleſs their aſtringency is conſiderably abated by evaporating decoctions of them to the conſiſtence of an extract, and totally deſtroyed by long keeping.

The medical effects of theſe kinds of ſubſtances are, to conſtringe the fibres, and incraſſate or lightly thicken the juices. Their more experienced uſe is in diſorders proceeding from a debility or flaccid ſtate of the ſolids; in hæmorrhages, from a thinneſs of the blood, laxity or rupture of the veſſels: in preternatural diſcharges of other kinds, after the offending matter has been duly corrected or evacuated; and in external relaxations.

In ſome caſes, they produce the effects of aperients; the veſ-

ſels, conſtringed and ſtrengthened by them, being enabled to protrude the circulating juices with greater force.

A good deal of caution is requiſite in the uſe of theſe medicines, eſpecially thoſe of the more powerful kind. In plethoric habits, inveterate obſtructions, critical evacuations, and in all kinds of fluxes in general before the morbific matter has been expelled, or where there is any ſtricture or ſpaſmodic contraction of the veſſels, aſtringents prove eminently hurtful. Where critical dyſenteries or diarrhœas are reſtrained by ſtyptics, the acrimonious matter, now confined in the inteſtines, corrodes or enflames them, and ſometimes occaſions a gangrene of the parts.

Art. VII. Sweets.

Sugar	Raiſins,
Honey,	Liquorice, &c.

The vegetable ſweets are a very numerous tribe; almoſt every plant that has been examined, diſcovering in ſome of its parts a ſaccharine juice. The bottoms of flowers, and moſt kinds of ſeeds and grain, when they begin to vegetate, are remarkably ſweet.

Vegetable ſweets are extracted both by water and vinous ſpirits, moſt readily by the firſt, but in greateſt perfection by the latter. Nothing of their taſte ariſes in diſtillation with either of theſe liquors: nevertheleſs, by long boiling with water they become ſomewhat leſs agreeable; but are not much injured by being treated in the ſame manner with rectified ſpirit.

The purer ſweets, as ſugar, promote the union of diſtilled oils with watery liquors, and prevent the ſeparation of the butyraceous part from milk: from this quality, they are ſuppoſed to unite the unctuous part of the food with the animal juices. Hence ſome have concluded, that they increaſe fat: others, that they have a contrary effect, by preventing the ſeparation of the unctuous matter which forms the fat from the blood: and others, that they render the juices thicker and more ſluggiſh, retard the circulation and cuticular excretion, and thus bring on a variety of diſorders. But ſweets have not been found to produce any of theſe effects in any remarkable degree: common experience ſhows, that their moderate, and even liberal, uſe is at leaſt innocent; that they reconcile, not only to the palate, but to the ſtomach alſo, ſubſtances of themſelves diſguſtful to both; and thus render ſalutary what would otherwiſe be injurious to the body.

The unctuous and mucilaginous ſweets, as the impure ſugars, liquorice, &c. have a conſiderable degree of emollient and lubricating virtue. Thoſe accompanied with a manifeſt acid, as in the juices of moſt ſweet fruits, are remarkably relaxing; and if taken immoderately, occaſion diarrhœas and dyſenteries, which ſometimes have proved fatal.

Art. VIII. Acrids.

Acrids are ſubſtances of a penetrating pungency. Applied to the ſkin, they inflame or exulcerate it: chewed, they occaſion a copious diſcharge of ſaliva: and ſnuffed up the noſe, they provoke ſneezing.

Theſe ſubſtances, conſidered as the ſubjects of pharmacy, may be divided into three claſſes,

Yielding their acrimony
1. In diſtillation with water: as horſe-radiſh, muſtard, ſcurvy-graſs, &c.
2. By infuſion only: as the greater celandine, pyrethrum, &c.
3. Neither to infuſion, nor diſtillation: as arum and dracunculus.

The general effects of acrid medicines are, to ſtimulate the veſſels, and diſſolve tenacious juices. In cold leucophlegmatic habits, ſtagnations of the fluids, and where the contractile power of the ſolids is weak, they prove powerful expectorants, deobſtruents, diuretics, and emmenagogues; and if the patient is kept warm, ſudorifics. In hot bilious conſtitutions, plethoric habits, inflammatory diſtempers, where there is already a degree of irritation, where the juices are too thin or acrimonious, or the viſcera unſound, theſe ſtimulating medicines prove highly prejudicial, and never fail to aggravate the diſeaſe.

Certain acrid ſubſtances have been lately recommended in dry convulſive aſthmas: of the efficacy of the ſquill in particular, for the cure of this diſorder, ſeveral inſtances are related in the *Commercium Literarium* of Norimberg for the years 1737 and 1739. Cartheuſer thinks, that not the aſthma itſelf, but a particular effect of it, was removed by this medicine. He obſerves, that in all aſthmas the free circulation of the blood through the pulmonary veſſels is impeded; and hence, during every paroxyſm, the lungs are in a kind of œdematous ſtate; that if this œdema, becoming habitual, remains after the fit is over, it is either perpetually occaſioning freſh ones, or gives riſe to a dropſy of the breaſt: that acrid medicines, by removing the œdema, remove what was originally an effect of the aſthma, and in time a cauſe of its aggravation.

Art. IX. Aromatics.

Aromatics are ſubſtances of a warm pungent taſte, and a more or leſs fragrant ſmell. Some of the ſpices are purely aromatic, as cubebs, pepper, cloves; ſome ſubſtances have a ſweetneſs mixed with the aromatic matter, as angelica-root, aniſeed, fennel-ſeed; ſome an aſtringency, as cinnamon; ſome a ſtrong mucilage, as caſſia lignea; ſome a bitterneſs, as orange-peel. The aromatic matter itſelf, contained in different ſubjects, differs alſo not a little in its pharmaceutic properties. It is extracted from all by rectified ſpirit of wine; from ſome in great part, from others ſcarcely at all, by water. The aromatic matter of ſome ſubjects, as of lemon-peel, riſes wholly in diſtillation both with ſpirit and water; that of others, as cinnamon, riſes wholly with water, but ſcarcely at all with ſpirit; while that of others, as pepper, is in part left behind after the diſtillation of water itſelf from the ſpice.

With regard to the general virtues of aromatics, they warm the ſtomach, and by degrees the whole habit; raiſe the pulſe; and quicken the circulation. In cold languid caſes, phlegmatic habits, and a weak flaccid ſtate of the ſolids, they ſupport the vis vitæ, and promote the ſalutary ſecretions. In hot bilious temperaments, plethoric habits, inflammatory indiſpoſitions, dryneſs and ſtrictures of the fibres, they are generally hurtful.

Art. X. Bitters.

Gentian root,	Leſſer centaury,
Hops,	Carduus, &c.

Bitters for the moſt part yield their virtue both to watery and ſpirituous menſtrua; ſome more perfectly to one, and others to the other. None of the ſubſtances of this claſs give over anything conſiderable of their taſte in diſtillation, either to water or to ſpirit; their bitterneſs remaining entire, and frequently improved, in the extracts. Such as are accompanied with flavour, as wormwood, may by this proceſs be reduced into ſimple flavourleſs bitters.

Theſe ſubſtances participate of the virtues of aſtringents and aromatics. Their general effects are, to conſtringe the fibres of the ſtomach and inteſtines, to warm the habit, attenuate the bile and juices in the firſt paſſages, and promote the natural evacuations, particularly of ſweat and urine. In weakneſs of the ſtomach, loſs of appetite, indigeſtion, and the like diſorders, proceeding from a laxity of the ſolids, or cold flug-

gish indiſpoſition of the juices, theſe kinds of medicines do great ſervice. Where the fibres are already too tenſe and rigid, where there is any immoderate heat or inflammation, bitters very ſenſibly increaſe the diſtemper; and, if their uſe is continued, communicate it to the kidneys, hence the urine becomes high-coloured, ſmall in quantity, and at length ſuppreſſed; a dropſy ſoon ſucceeding. If the kidneys were before ſo lax as to remain now uninjured, yet the other viſcera become gradually more and more rigid, and a tabes is at length brought on.

Bitter ſubſtances deſtroy inſects, and prevent putrefaction. Hence they are recommended as anthelmintic, and externally as antiſeptics.

ART. XI. EMETICS *and* CATHARTICS.

Hellebore,	Colocynth,
Julip,	Scammony,
Ipecacuanha,	Gamboge, &c.

THESE ſubſtances conſiſt of a reſinous part, in which the purgative or emetic quality reſides: and a gummy ſaline one, which acts chiefly as a diuretic. The firſt is extracted or diſſolved by vinous ſpirits; the latter by water. Nothing ariſes in diſtillation from either.

The acrid reſins, exhibited by themſelves, tenaciouſly adhere to the coats of the inteſtines, by their ſtimulating power irritate and inflame them, and thus produce ſundry violent diſorders. Hoffman relates, that he has ſometimes obſerved convulſions, and a paralyſis of both ſides, from their uſe.

Theſe inconveniences may be avoided, by previouſly triturating them with ſubſtances capable of dividing their tenacious texture, and preventing their adheſion; by this means they become mild and ſafe, operate without diſturbance, and at the ſame time more effectually anſwer the purpoſes intended by them.

Some have endeavoured to correct the ill quality of the reſinous purgatives, by the addition of acids and aromatic oils. Acids weaken their power, but have no other effect than what a diminution of the doſe would equally anſwer. The pungent eſſential oils may ſerve to warm the ſtomach, make the medicine ſit eaſier, and thus prevent the nauſea which ſometimes happens; but as ſoon as the reſin begins to exert itſelf in the inteſtines, theſe oils, inſtead of correcting, increaſe its virulence; being themſelves apt to occaſion the inconveniences which they are here intended to prevent, an irritation and inflammation of the bowels. Alkaline ſalts or ſoaps have a better effect; as they diſpoſe the reſin to ſolution, and promote its operation.

The medicines of this claſs ſeem to act by liquefying the juices, and ſtimulating the coats of the ſtomach and inteſtines. If the irritation is ſtrong and ſudden, their action is quick and upwards: if ſlower, downwards. Cathartics given in a liquid form, or in very ſenſible habits, often prove emetic; and emetics, where mucus abounds, cathartic. They operate more violently in robuſt conſtitutions than in thoſe of a contrary temperament; the veſſels being in the former more tenſe and rigid, and conſequently leſs capable of bearing an equal degree of irritation.

The action of theſe medicines is extended beyond the primæ viæ: This appears evident from the increaſe of the pulſe which always accompanies their operation; and from the common obſervation of children being purged by the milk, if the nurſe has taken a cathartic. Some of them, particularly hellebore, are ſaid to purge, if only applied externally in iſſue.—Purgatives, even of the more powerful kind, exhibited in ſuitable ſmall doſes, in conjunction with the milder aperients, may be introduced into the habit, ſo as to prove notable deobſtruents, diuretics, and diaphoretics, without acting ſenſibly by ſtool.

A CATALOGUE *of the* SIMPLES *uſed in the* MATERIA MEDICA, *exhibiting at one view their* TECHNICAL NAMES, ENGLISH NAMES, PARTS USED IN MEDICINE, VIRTUES, *and the different* PREPARATIONS FROM THEM.—*A particular account of the different articles of this liſt is given in the courſe of the alphabet, chiefly under the Linnæan names: and the method of making the preparations from them are ſhewn under the article* PHARMACY. *The notes ſubjoined at the bottom of the following pages are intended to ſupply ſome particulars relating to a few of the detached articles already paſt.*

TECHNICAL NAMES.	ENGLISH NAMES.	PARTS USED IN MEDICINE.	VIRTUES.	PREPARATIONS FROM THEM.
Abies ruber (*Pinus abies*, Lin.)	The fir-tree.	The wood, tops, and cones.	Diuretic and diaphoretic.	A decoction.
Abrotanum fœmina (*Santolin chamæcypar.* Lin.)	Lavender cotton.	The leaves.	Stimulant, detergent, and anthelmintic.	Decoction, and ointment for cutaneous eruptions.
Abrotanum mas (*Artemiſia abrotanum*, Lin.)	Southernwood.	The leaves.	Stimulant, detergent, aperient, and ſudoriſic.	Decoction and tincture; alſo lotion and ointment for cutaneous eruptions.
Abſinthium maritimum (*Artemiſia maritima*, Lin.)	Sea wormwood.	The tops.	Stomachic.	An oil, extract, conſerve, and ſeveral diſtilled tincture-waters. They alſo enter the common fomentation and green oil.
Abſinthium vulgare (*Artemiſia abſinthium*, Lin.)	Common wormwood.	The leaves and flowering tops.	Stomachic.	
Acacia Germanica (*prunus ſpinoſa*, Lin.)	The ſloe.	Inſpiſſated juice.	Aſtringent.	
Acacia vera (*Mimoſa nilotica*, Lin.)	Acacia.	Inſpiſſated juice.	Aſtringent.	
Acetoſa (*Rumex acetoſ.* Lin.	Sorrel.	Leaves.	Aſtringent and antiſcorbutic.	An eſſential ſalt for taking out ſpots in clothes. A decoction.
Acetoſella (*Oxalis acetoſel.* Lin.)	Wood ſorrel.	The leaves.	Aſtringent and antiſcorbutic.	A conſerve.

TECHNICAL NAMES.	ENGLISH NAMES.	PARTS USED IN MEDICINE.	VIRTUES.	PREPARATIONS FROM THEM.
Acetum.	Vinegar.		Cordial, refrigerant, ſudorific, and antiſeptic.	A diſtilled ſpirit.
Aconitum (*A. napellus*, Lin.)	Wolf's-bane.	The herb and leaves.	Narcotic.	Tincture.
Acorus. See *Calamus arom.* infra.				
Adianthum verum (*Adianth. cupill. Ven.* Lin.)	Maiden-hair.	The leaves.	Attenuating and aperient.	Decoction and ſyrup; its virtues beſt obtained from an infuſion of the herb ſweetened with ſugar and liquorice, and drank as tea.
Aër dephlogiſticus.	Dephlogiſticated air.		Suppoſed to be antiſeptic and corroborative.	
Aër mephiticus.	Fixed air.		Antiſeptic and lithontriptic.	
Aër nitroſus.	Nitrous air.		Very antiſeptic.	
Æs. See *Cuprum.*	Braſs. See *Copper.*			
Agaricus, (*Boletus pini laricis*, Lin.)	Agaric.		Cathartic.	An aqueous extract, but now much diſuſed
Agaricus chirurgorum (*Boletus igniarius*, Lin.)	Female agaric, or agaric of the oak, touchwood, or ſpunk.		Styptic.	Pieces applied externally.
Agnus caſtus (*Vitex agnus caſtus*, Lin.)	The chaſte tree.	The ſeeds.	Antaphrodiſiac.	
Agrimonia (*A. Eupator.* Lin.)	Agrimony.	The leaves.	Attenuant and tonic.	Digeſted in whey, it forms a diet-drink uſed by ſome in the ſpring.
Albumen ovi.	White of an egg.		Diſcutient.	
Alchemilla (*A. vulgaris*, Lin.)	Ladies-mantle.	The leaves.	Aſtringent.	
Alkekengi, (*Phyſalis alkakengi*, Lin.)	Winter-cherry.	The fruit.	Aperient and diuretic.	Dried and powdered. Inſpiſſated juice.
Alliaria (*Eryſimum allaria*, Lin.)	Sauce-alone, or Jack by-the-hedge.	The leaves.	Sudorific and deobſtruent.	
Allium (*A. ſativum*, Lin.)	Garlic.	The roots.	Stimulant, attenuant, diſcutient, and diuretic.	A ſyrup and oxymel, ointment and poultice.
Alnus (*Betula alnus*, Lin.)	Alder.	Leaves and bark.	Aſtringent.	Decoction. The leaves chopt and heated, efficacious for diſperſing milk in the breaſts.
Aloes (*Aloe perfoliata*, Lin.)	Aloes.	Inſpiſſated juice.	Cathartic.	Ingredient in ſeveral tinctures and pills.
Alſine (*A. med.*) Lin.)	Chickweed.	The leaves.	Refrigerant.	
Althæa (*A. officinalis*, Lin.)	Marſhmallow.	The leaf and root.	Emollient.	A ſyrup and ointment.
Alumen.	Alum.	The whole.	Strongly aſtringent.	A ſtyptic powder, ſtyptic water, whey, &c.
Ambragriſea.	Ambergriſe.	The whole.	A high cordial.	A tincture or eſſence.
Ammi vulgaris.	Biſhop's weed.	The leaves.	Stimulant.	An ingredient in the theriaca.
Amomum verum.	True amomum.	The ſeeds.	Aromatic.	An ingredient in the theriaca.
Amomum vulgare. (*Siſon*, Lin.)	Baſtard ſtone-parſley.	The ſeeds.	Carminative and diuretic.	
Ammoniacum. See *Gummi.*				
Amygdala (*Am. com.* Lin.)	Sweet and bitter almonds.	The fruit.	Relaxing.	Expreſſed oil and emulſion.
Amylum.	Starch.		Aſtringent.	
Anacardium occidentale, (Lin.)	Caſhew-tree.	The nuts.	Corroſive.	Oil outſide, but the kernels uſed as almonds; the gum inſtead of gum arabic.

TECHNICAL NAMES.	ENGLISH NAMES.	PARTS USED IN MEDICINE.	VIRTUES.	PREPARATIONS FROM THEM.
Anagallis (*Arvenſis*, Lin.)	Pimpernel.	The leaves.	Sudorific and nervine.	Extract, or inſpiſſated juice.
Ananas (*Bromelia ananas*, Lin.)	The pine-apple.	The fruit.	Refrigerant.	
Anchuſa (*A. tinctoria*, Lin.)	Alkanet.	The root.	Only uſed for its colour.	
Anethum (*A. graveolens*, Lin.)	Dill.	The ſeeds.	Carminative.	Diſtilled oil, water, and ſpirituous extract.
Angelica (*A. Archangelica et ſylveſtris*, Lin.)	Angelica.	The roots, ſtalks, leaves, and ſeeds.	Aromatic.	Several compound waters.
Anguſturæ cortex *,				
Aniſum (*Pimpinella aniſum*, Lin.)	Aniſe.	The ſeed.	Aromatic and tonic.	An eſſential oil, a ſpirituous compound water, &c.
Antimonium.	Antimony.		Diaphoretic, cathartic, emetic, or cauſtic.	A number of chemical preparations. See CHEMISTRY-*Index*, KERMES *Mineral*, and REGULUS *of Antimony*.
Aparine (*Gallium aparine*, Lin.)	Gooſegraſs, or clivers.	The leaves.	Aperient.	
Apium (*A. graveol.* Lin.)	Smallage.	The roots, leaves, and ſeeds.	Carminative.	Diet drinks.
Aqua marina.	Sea-water.		Cathartic and alterative.	
Aquæ minerales.	Mineral waters.		Tonic and alterative.	
Aquæ ſulphureæ.	Sulphureous waters.		Alterative and anthelmintic.	
Argentina (*Potentil. argentin.* Lin.)	Silverweed.	The leaves.	Corroborant.	
Argentum vivum.	Quickſilver.		A moſt powerful alterant.	Several chemical preparations; ſee CHEMISTRY *Index*. An ingredient in ſeveral other officinal preparations.
Ariſtolochia (*A. clematitis*, Lin.)	Birthwort.	The roots.	Attenuating, ſtimulant, and detergent.	
Armeniaca (*Prunus Armeniaca*, Lin.)	The plum-tree.	The fruit and gum.	The fruit refrigerant, and the gum demulcent.	
Arnica (*A. montana*, Lin.)	German leopard's bane.	The herb, flowers, and roots.	Antiſpaſmodic; emetic, cathartic.	A warm infuſion.
Arſenicum †.	Arſenic.		Corroſive.	

* The Anguſtura bark was firſt imported from the Weſt Indies in 1788; but it is a native of Africa. Mr. Bruce, who had been cured of a dyſentery in Abyſſinia by the bark of a plant called there *Wooginos*, brought the ſeeds from that country, and the plant is now cultivated in Kew garden and other places under the name of *Brucea antidyſenteria*, or *ferruginea*. He ſuppoſed the bark of this was the ſame with that of the Anguſtura; but Dr. Duncan, in the Medical Commentaries for 1790, ſays that they are totally different when compared together. For an account of the Anguſtura bark, ſee JESUIT'S *Bark*.

† This pernicious mineral has ſome time ago been introduced into medicine as a probable remedy for cancers; but Mr. Juſtamond, who publiſhed a treatiſe on this ſubject, informs us, that even the moſt guarded uſe of it externally, while it produces the happieſt effects in healing cancerous ulcers, yet occaſions ſuch diſagreeable ſymptoms of the paralytic kind, that it cannot be perſiſted in. See his works in 4to. publiſhed by Mr. Houlſton. The lateſt trials in London are likewiſe ſaid to confirm this account; notwithſtanding which, however, the internal uſe of it has ſince gained ground in a variety of diſorders, particularly in intermitting fevers, which are ſaid to be readily cured by it ſometimes after the bark and all other remedies had failed. A ſolution of the mineral is given by drops, from one-ſixteenth to a ſixth part of a grain for a doſe, largely diluted in a warm aqueous liquid. Dr. Aikin recommends oil and milk as a certain remedy againſt this deſtructive poiſon. He quotes from Hoffman an inſtance where ſeveral perſons of diſtinction had taſted food mixed with arſenic inſtead of ſugar. All of them were ſeized with anxiety at the breaſt, pain at the ſtomach, tremor of the lips, and retchings. Milk and oil were given in great plenty, and they continued violently vomiting for half a day. Some vomited no leſs than 100 times; but all of them recovered. Some inſtances of a ſimilar kind have come within the Doctor's own knowledge. Sage in his Mineralogy relates, that the regulus is much leſs dangerous than the calx or glaſs: he ſays that on giving half an ounce to a cat, the animal only grew meagre for ſome time, but afterwards became fat again. He ſays that acids, particularly vinegar, are the antidotes to this poiſon; and that oils and

TECHNICAL NAMES.	ENGLISH NAMES.	PARTS USED IN MEDICINE.	VIRTUES.	PREPARATIONS FROM THEM.
Artemiſia *(A. vulgaris,* Lin.	Mugwort.	The leaves.	Antiſpaſmodic.	Infuſion.
Arum *(A. maculatum,* Lin.)	Wake-robin.	The root.	Stimulant.	A compound powder and conſerve *.
Aſafetida. See *Gummi,* infra.				
Aſarum *(A. Europæum,* Lin.)	Aſarabacca.	The leaves.	Errhine, cathartic, and emetic.	A compound powder †.
Aſparagus *(A. officinalis,* Lin.)	Aſparagus.	The roots.	Suppoſed diuretic, but uncertain.	
Aſperula.	Woodruff.	The flowers.	Attenuant and aperient.	
Aſphodelus, *(A. fiſtuloſus,* Lin.)	Aſphodel, or king's ſpear.	The roots.	Emollient and ſuppurative.	
Atriplex *(Chenopodium vulvar.* Lin.)	Stinking orach.	The leaves.	Antiſpaſmodic.	A ſpirituous tincture, decoction, or conſerve, recommended by Tournefort and others.
Avena ſativa *(Lin.)*	Oats.	The grain.	Emollient.	Decoction.
Aura electrica.	Electricity.		A violent ſtimulant.	
Aurantium *(Citrus aurant.* Lin.)	The orange.	The leaves, fruit, and flowers.	Cordial, ſtomachic, and refrigerant.	An eſſential oil, a diſtilled water, and a conſerve.
Auricula Judæ, *(Tremell. verruc.* Lin.)	Jews-ears.	The whole.	Purgative, or aſtringent; uncertain.	
Auripigmentum.	Orpiment.		Corroſive, but leſs ſo than arſenic.	
Axungia porcina.	Hog's lard.		Emollient.	
Axungia viperina.	Viper's fat.			
Balauſtia *(Punica granat.* Lin.)	Balauſtine, or double flowered pomegranate tree.	The flowers.	Aſtringent.	Ingredient in a powder.
Balſamita *(Tanacetum balſaminum* Lin.)	Coſtmary.	The leaves.	Aromatic, antihyſteric.	Diſtilled water and ſpirituous tincture.
Balſamum Canadenſe *(Pinus balſamea,* Lin.)	Balſam of Canada.	The roſin.	Diuretic and tonic.	
Balſamum Copayvæ *(Copaifera officinalis,* Lin.)	Balſam of Copivi.	The roſin.	Diuretic and tonic.	An empyreumatic oil, and an ingredient in ſome tinctures ‡.

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emulſions do not ſo effectually obtund this poiſon as acids do. Of this he has had experience in brutes. He adds, that the regulus is not ſoluble in water, and that the ſounders are more afraid of fumes of lead than arſenic.

* Dr. Aikin informs us, that the inſupportable pungency on the tongue, which has hitherto prevented it from being uſed in a freſh ſtate ſo as to exert its full virtues, is effectually covered by unctuous and gummy materials. The freſh root beaten into a ſmooth maſs, with the addition of a little teſtaceous powder, which promotes the diviſion of it, may be either mixed with about an equal quantity of powdered gum arabic, and three or four times as much conſerve, ſo as to make them into an electuary; or rubbed with a thick mixture of mucilage of gum arabic and ſpermaceti, gradually adding any ſuitable watery liquors, and a little ſyrup in order to form an emulſion: two parts of the root, two of gum, and one of ſpermaceti, make an emulſion, which ſcarce impreſſes any degree of pungency upon the tongue, though kept long in the mouth. In theſe forms our author has given the freſh root from ten grains to more than a ſcruple, three or four times a day: it generally occaſioned a ſlight ſenſation of warmth, firſt about the ſtomach, and then in the remoter parts; manifeſtly promoted perſpiration, and frequently produced a plentiful ſweat. Several obſtinate rheumatic pains have been removed by the uſe of this preparation, which our author therefore recommends to further trial.

† The leaves of this plant are by ſome ſuppoſed to be more powerful than the roots as emetics and cathartics, but they are milder as errhines. Geoffroy relates, that a ſingle doſe of the errhine, of which this root is an ingredient, has occaſioned a diſcharge for three days; and that he has known a palſy of the mouth and tongue cured by the ſame means. He recommends it in ſtubborn diſorders of the head proceeding from viſcid matters, in palſies, and lethargic diſtempers. During its operation the patient muſt carefully avoid cold; which is apt to produce puſtules, inflammations, ſwellings of the face, and ſometimes worſe ſymptoms than even theſe. The empirical herb-ſnuffs have the leaves of aſarum for their baſis, but ſometimes mixed with ingredients of a more dangerous nature.

‡ Balſam of Copivi has been employed empirically in hæmorrhoidal caſes; and Dr. Cullen informs us, that he has known it give relief in ſuch caſes, in doſes from 20 to 40 drops once or twice a day, mixed with powdered ſugar. Fuller recommends it in conſumptions; but his practice is cenſured by Dr. Fothergill, in the 4th volume of London Medical Obſervations.

TECHNICAL NAMES.	ENGLISH NAMES.	PARTS USED IN MEDICINE.	VIRTUES.	PREPARATIONS FROM THEM.
Balſamum Gileadenſe (*Amyris Gileadenſis*, Lin.)	Opobalſum, or balm of Gilead.	The roſin.	Said to be a moſt extraordinary vulnerary.	
Balſamum Peruvianum (*Myroxylon peruiferum*, Lin.)	Balſam of Peru.	The roſin.	A fine warm aromatic.	An ingredient in many tinctures, and ſome ointments.
Balſamum Tolutanum (*Toluifera balſaminum*, Lin.)	Balſam of Tolu.	The roſin.	Aromatic and corroborant.	An ingredient in ſeveral tinctures, elixirs, and a kind of pectoral pills.
Bardana major, (*Arctium lappa*, Lin.)	Burdock.	The roots and ſeeds.	Aperient, diuretic, and ſudorific.	Decoction.
Barytes *.				
Beccabunga (*Veronica beccabunga*, Lin.)	Brooklime.	The herb.	Attenuating, and antiſcorbutic.	
Bechen album, (*Centaurea bechen*, Lin.)		The root.	Stimulant.	
Bechen rubrum, (*Statice limon.* Lin.)		The root.	Stimulant.	
Belladonna (*Atropa belladonna*, Lin.)	Deadly nightſhade.	The juice.	Narcotic.	An extract of the juice, decoction, infuſion, powders.
Bellis minor, (*Bell. peren.* Lin.)	Common daiſy.	The leaves.	Attenuant.	
Benzoe, (*Terminalia benzoin*, Lin.)	Benzoin.	The roſin.	Pectoral.	Ingredient in the paregoric elixir.
Berberis (*Berber. vulgar* Lin.)	Barberry.	The bark and fruit.	Aſtringent.	A jelly.
Beta, (*B vulgaris*, Lin.)	The beet.	The root and leaves.	Cathartic and errhine.	
Betonica (*B. officinalis*, Lin.)	Betony.	The leaves and flowers.	Corroborant.	
Betula (*B. alba*, Lin.)	The birch-tree.	The bark and ſap.	Antiſcorbutic and diuretic.	
Bezoar.	Bezoar-ſtone.		Many virtues falſely aſcribed to it; now found to be only an abſorbent.	
Bilis animalis.	The gall or bile of animals.		Cathartic.	
Biſtorta (*Polygonum biſtorta*, Lin.)	Biſtort or ſnake-wort.	The roots.	Powerfully aſtringent.	An ingredient in a powder.
Boli.	Boles.		Aſtringent and ſlightly abſorbent.	Ingredients in ſeveral powders.
Bonus Henricus, (*Chenopodium bonus Hen.* Lin.)	Engliſh mercury, all-good, or good Henry.	The leaves.	Laxative.	
Borax.	Tincal, or borax.	The whole.	Diuretic and emmenagogue.	An ingredient in a powder, and a ſalt prepared from it. See CHEMISTRY-*Index*.

* *Barytes*. The ſolution of the aërated barytes, or terra ponderoſa, in ſpirit of ſalt, has been found capable of producing powerful effects on the human ſyſtem. Several trials of it were made in the year 1789, by Dr. Crawford, in St. Thomas's hoſpital; and it was found to be very efficacious in ſcrophulous complaints.—In ſome caſes of ſwelled glands, foul ulcers, enlarged joints, and general cachexy, ſingular relief was given by the muriated barytes, either alone, or joined with mercurials, antimonials, and the bark. The medicine in a few caſes appeared to augment the cuticular ſecretion; in moſt it occaſioned an uncommon flow of urine, and almoſt univerſally improved the appetite and general health of the body. Few ſtomachs, however, could bear more than from ſix to ten drops of a ſaturated ſolution, nor did a continued uſe of the medicine reconcile the ſtomach to it, but rather the contrary. Sometimes it produced a vertigo, which probably aroſe from its naufeating quality. Dr. Crawford is of opinion, that this ſolution, when injudiciouſly managed, is capable of producing deleterious effects, by diſordering the nervous ſyſtem, and bringing on violent vomiting and purging. From ſome experiments made upon dogs, it appears that a large doſe would prove fatal.

TECHNICAL NAMES.	ENGLISH NAMES.	PARTS USED IN MEDICINE.	VIRTUES.	PREPARATIONS FROM THEM.
Branca urſina, (*Acanthus mollis*, Lin.)	Bear's-breech.	The root.	Emollient.	
Braſſica, (*B. oleracea*, Lin.)	Cabbage.	The leaves.	Refrigerant and laxative.	
Braſſica marina, (*Convolvulus ſoldanella*, Lin.)	Sea-coleworts, or ſoldanella.	The leaves.	A ſtrong cathartic.	Now rejected from practice.
Brucea antidyſenterica. See note *, *ſupra*.				
Bryonia (*B. alba*, Lin.)	White briony.	The root.	Diſcutient and violently cathartic.	
Burſa paſtoris, (*Thlaſpi burſa p.* Lin.)	Shepherd's purſe.	The leaves.	Aſtringent but very doubtful.	
Cacao (*Theobroma cacao*, Lin.)	Chocolate tree.	The fruit.	Analeptic.	Chocolate.
Cajeput (*Maleleuca leucadendron*, Lin.)	Cajeput.	The fruit.	Stimulant, healing, carminative.	Diſtilled oil.
Calaminaris lapis.	Calamine ſtone.		Deſiccative, healing.	An ingredient in collyria, epulotic cerate, &c.
Calamintha (*Meliſſa calamintha*, Lin.)	Calamint.	The leaves.	Aromatic and ſtimulant.	
Calamus aromaticus (*Acorus calamus*, Lin.)	Sweet-flag.	The roots.	Aromatic and ſtomachic.	
Calendula (*C. officinalis*, Lin.)	Garden marigold.	The flowers.	Attenuating and ſudorific, but very doubtful.	
Calx viva.	Quicklime.		A violent corroſive, and powerful alterant and abſorbent.	A medicated water.
Camphor (*Laurus camphora*, Lin.)	Camphire tree.	The concreted eſſential oil.	Refrigerant and diaphoretic, ſtimulant, antiſpaſmodic.	A ſolution in rectified ſpirit, in expreſſed and eſſential oils Ingredient in many other compoſitions.
Canella alba (Lin.)	White cinnamon.	The bark.	Aromatic and ſtimulating.	An ingredient in ſeveral tinctures.
Cannabis (*C. ſativa*, Lin.)	Hemp.	The ſeeds.	Aperient and refrigerant, but doubtful.	Decoctions and infuſions.
Cantharis (*Meloe veſicatorius*, Lin.)	Spaniſh fly.		Violently ſtimulating and veſicatory.	A ſpirituous tincture, a plaſter, ointment, &c.
Caparis (*C. ſpinoſa*, Lin.)	Caper buſh.	The bark of the root and flower-buds.	Aperient and ſtomachic.	Pickled.
Cardamines (*C. pratenſis*, Lin.)	Cardamine.	The flowers.	Antiſpaſmodic.	Powder.
Cardamomum majus (*Amom. cardam.* Lin.)	Greater cardamom.	The ſeeds.	Aromatic and ſtimulant.	A ſpirituous water and tincture. Ingredient alſo in ſeveral officinal compoſitions.
Cardamomum minus (*Amom. repens*, Lin.)	Leſſer cardamom.	The ſeeds.	Aromatic and ſtimulant.	
Cardiaca (*Leonurus cardiaca*, Lin.)	Mother-wort.	The leaves.	Antiſpaſmodic.	
Carduus benedictus (*Centaurea benedicta*, Lin.)	Bleſſed-thiſtle.	The leaves and ſeed.	Stomachic.	An ingredient in a ſtomachic tincture. Infuſions.
Carica (*Ficus carica*, Lin.)	The fig.	The dried fruit.	Emollient, ſuppurative.	Ingredient in the pectoral decoction and lenitive electuary.

TECHNICAL NAMES.	ENGLISH NAMES.	PARTS USED IN MEDICINE.	VIRTUES.	PREPARATIONS FROM THEM.
Carlina (*C. acaul.* Lin.)	Carline-thiſtle.	The root.	Diaphoretic.	
Carpobalſam (*Amyris Gileadenſis*, Lin.)	Carpobalſam.	The fruit.	Aromatic.	In ſubſtance applied warm as a cataplaſm.
Carthamus (*C. tinctorius*, Lin.)	Baſtard ſaffron.	The ſeeds.	Cathartic.	
Carvi (*Carum carvi*, Lin.)	Caraway.	The ſeeds.	Aromatic.	An eſſential oil, a ſpirituous water. Ingredient alſo in ſome officinal compoſitions.
Caryophylla rubra (*Dianthus caryoph.* Lin.)	Clove july-flower.	The flowers.	Cardiac and alexipharmac.	A ſyrup.
Caryophyllata, (*Geum urban.* Lin.)	Avens, or herb benet.	The root.	Aromatic.	An eſſential oil.
Caryophyllum (*C. aromaticus*, Lin.)	The clove-tree.	The flower-cups.	Strongly aromatic.	An eſſential oil. Ingredient alſo in many officinal compoſitions.
Caſcarilla (*Croton caſcar*, Lin.) *Groton eleutheria*, Swartz Prodr.	Caſcarilla.	The bark.	Aromatic and ſtimulant.	Infuſions.
Caſſia fiſtularis (*C. fiſtula*, Lin.)	Caſſia.	The fruit.	Purgative.	An ingredient in two electuaries.
Caſſia lignea (*Laurus caſſia*, Lin.)	Caſſia.	The bark and flower-buds.	Aromatic.	The baſis of a diſtilled water.
Caſſumunar.	Caſſumar.	The root.	Stomachic and carminative.	
Caſtoreum (*Caſtor fiber*, Lin.)	Caſtor.		Nervine and antiſpaſmodic.	A ſimple water; a ſpirituous water; a tincture. Ingredient in ſeveral officinal compoſitions.
Catechu (*Mimoſa catechu*, Lin.)	Catechu, *vulgo* Japan earth.		Aſtringent.	A tincture, troches, and confection. and an ingredient in ſeveral officinal compoſitions.
Celeri (*Apium graveolens*, Lin.)	Celery.	The leaves.	Laxative.	
Centaurium majus (*Centaurea centaurium*, Lin.)	Greater centaury.	The root.	Aſtringent, aperient, and vulnerary.	
Centaurium minus (*Gentiana centaur.* Lin.)	Leſſer centaury.	The tops.	Stomachic.	Tincture and infuſion.
Cepa (*Allium cepa*, Lin.)	The onion.	The root.	Attenuating and diuretic.	
Cera alba.	White wax.		Emollient.	Ingredient in many plaſters and ointments.
Cera flava.	Yellow wax.		Emollient.	Ingredient in almoſt all ointments.
Ceraſus (*Prunus ceraſus*, Lin.)	The cherry tree.	The fruit and gum.	Refrigerant; the gum partaking of the properties of gum arabic.	
Cerefolium (*Sandix cerefol.* Lin.)	Chervil.	The juice.	Aperient and diuretic.	
Ceterach (*Aſplen. ceterach.* Lin.)	Spleenwort.	The leaves.	Diuretic *.	

* M. Morand relates, that theſe leaves have lately been diſcovered to have an admirable diuretic virtue; that they were uſed with great ſucceſs by Count d'Auteuil, a Spaniſh naval commander, for the gravel, with which he was violently tormented; and ſince that time they have come greatly into uſe at Paris, Verdun, and Grenoble. From obſervations made in thoſe places it appears, that they carry off ſand, cleanſe the kidneys, and mitigate pains in the urinary paſſages; that the method of uſing them is to drink infuſions of the leaves in the morning as tea, adding ſuch other medicines as may be judged proper.

TECHNICAL NAMES.	ENGLISH NAMES.	PARTS USED IN MEDICINE.	VIRTUES.	PREPARATIONS FROM THEM.
Cevadilla (*Veratrum album*, Lin ?)	Indian cauſtic barley.	The ſeeds.	Virulently cauſtic*.	
Chemædrys (*Teucrium chamædr.* Lin.)	Germander.	The leaves and tops, with the ſeed.	Sudorific, diuretic, &c.	
Chamæmelum (*Anthemis nobilis*, Lin.)	Camomile.	The ſingle flowers.	Stomachic, carminative, and emollient.	An eſſential oil, a ſimple water, an extract, a decoction.
Chamæpithys (*Teucrium chamæpit.* Lin.)	Ground-pine.	The leaves.	Aperient and vulnerary.	
Cheiri, ſeu Leucojum luteum (*Cheiranth. cheiri*, Lin.)	Wall-flower.	The flower.	Aperient, cordial, and attenuant.	
Chelæ cancrorum.	Crab's claws.		Abſorbent.	Levigated.
Chelidonium majus, (Lin.)	Common celandine.	The leaves and roots.	Stimulating, diuretic, and ſudorific.	Infuſion. Dried root powdered.
Chelidonium minus (*Ranunculus ficaria*, Lin.)	Pilewort.	The leaves and root.	Emollient.	
China, (*Smilax China*, Lin.)	China.	The root.	Diaphoretic and diuretic.	
Cicer (*C. arietin.* Lin.)	Red chikes, or chick peas.	The ſeeds.	Lithontriptic and diuretic, but very doubtful.	
Cichorium (*C. intyb.* Lin.)	Wild ſuccory.	The roots and leaves.	Laxative and antiſcorbutic.	
Cicuta major (*Conium maculat.* Lin.)	Hemlock †.	The leaves and ſeeds.	Reſolvent and alterant.	Inſpiſſated juice of the leaves, and an extract from the ſeeds.

* Theſe ſeeds appear to be the ſtrongeſt of all vegetable cauſtics. Monardes relates, that in putrid verminous ulcers and gangrenes, they have the ſame effects as corroſive ſublimate, or the actual cautery; and that the way of uſing them is to ſprinkle a little of powdered ſeed upon the part; or, for the greater ſafety, to dilute it with watery liquors, and apply lint dipped in the mixture. In the *Amœnitates Academicæ* of Linnæus, they are ſaid to be the moſt powerful of all medicines for deſtroying cutaneous inſects in children.

† It is ſuppoſed that the juice of this plant was the poiſon ſo much uſed among the Athenians for putting criminals to death; but from ſome late experiments this ſeems to be doubtful; or at leaſt that the remedy is very eaſy. Mr. Haram, apothecary at Chartres, informs us, that a large ſpoonful of the juice given to a cat had no ſenſible effect; a ſecond produced a viſible *embarras* on the region of the reins: in a little time the animal ſtaggered, but did not fall. A quarter of an hour after, ſhe was found ſtretched out motionleſs, with her paws rigid. Half a drachm of theriaca, with two large ſpoonfuls of wine, were given without effect: but no ſooner was a large ſpoonful of lemon-juice ſwallowed, than ſhe got up as if nothing had happened, and continued afterwards in good health. Other authors likewiſe inform us, that vinegar is an antidote againſt the poiſonous effects of this plant.

With regard to its medical virtues, Dr. Monro, who has ſeen it tried in a great number of caſes, informs us, that he never ſaw it cure a confirmed cancer, whether ulcerated or not; that in a few caſes of ulcerated cancers it mended the diſcharge, and changed it from a thin ichor to an appearance of laudable pus; but, notwithſtanding this favourable appearance, the diſtemper at laſt terminated fatally.—In ſcrophulous caſes, ſome few ſmall tumours were thought to be diſcuſſed by it; but large hard ſwellings were never removed by it, though the remedy was continued for weeks and months. The diſcharge from ſcrophulous ſores of the extremities, however, was often mended by it; and in many caſes, it was found to be of more ſervice when joined with the bark than when given alone: the action of the bark and mercury was thought to be rendered more powerful by it. In the chincough it did not produce any remarkable effects. In ſome few inſtances, he imagined that it hurt the health of the patients; and in one or two, that it haſtened death. In this laſt caſe, indeed, the uſe of the cicuta had been laid aſide for ſome time, and the patients ſunk ſo gradually, that our author was in doubt what might have been the cauſe of their death.

The roots of hemlock have been ſuppoſed to be more active than the leaves, both when taken internally and when outwardly applied. Dr. Storck relates, that on being cut, it yields a bitter acrid milk, of which a drop or two applied to the tip of the tongue occaſioned a rigidity, pain, and ſwelling of the part, ſo as to deprive him of the power of ſpeech. Theſe ſymptoms, however, diſappeared on waſhing the part with citron juice. When dried, it loſes its virulence; ſo that Dr. Storck ſays, he has taken a grain or two of the powder without injury. Other authors give inſtances where 20 and 30 grains have been given with good effect in ſchirroſities of the liver, quartan agues, on the approach of a fit, and even in acute fevers. Dr. Aikin informs us, that the freſh root ſeems not to be at all times of equal virulence; and that he has ſeen it chewed freely without any other effect than that ſweetiſhneſs obſervable in parſley roots or carrots. There are likewiſe inſtances, where the cicuta roots have been taken to the quantity of ſome drachms, or even ounces, without any bad conſeqnence.

The ſeeds have been recommended as demulcent, paregoric, and antiphrodiſiac; but little more (according to Dr. Aikin)

TECHNICAL NAMES.	ENGLISH NAMES.	PARTS USED IN MEDICINE.	VIRTUES.	PREPARATIONS FROM THEM.
Cinara (*Cynara scolymus*, Lin.)	Artichoke.	The leaves.	Diuretic *.	
Cinnamomum (*Laurus cinnam.* Lin.)	The cinnamon tree.	The bark.	Aromatic and corroborant.	An eſſential oil, a ſimple and ſpirituous diſtilled water, and an ingredient in a great number of compoſitions.
Citrullus (*Cucurbita citrullus*, Lin.)	Citruls.	The ſeeds.	Refrigerant.	
Coccinella (*Coccus cacti*, Lin.)	Cochineal.		Sudorific, but chiefly uſed for colouring.	
Cocculus Indicus, (*Meniſperm. coccul.* Lin.)	Indian berry.	The fruit.	Narcotic.	
Cochlearia (*C. officinalis*, Lin.)	Scurvy-graſs.	The leaves.	Stimulating and attenuant.	A conſerve and ſpirit. An ingredient in ſome other officinal preparations.
Coffea (*C. Arabica*, Lin.)	The coffee-tree.	The fruit.	Stomachic and corroborant.	A decoction.
Colchicum (*C. autumnale*, Lin.)	Meadow ſaffron.	The root.	Diuretic.	A ſyrup and oxymel.
Colocynthis (*Cucumis colocynthis*, Lin.)	Coloquintida, or bitter-apple.	The medullary part of the dried fruit.	Violently cathartic.	An ingredient in ſome cathartic pills and extracts.
Columbo (*Ignatia amara*, Lin.)	Columbo, or Colomba.	The root.	A moſt excellent antiſeptic and ſtomachic.	A vinous tincture.
Coneſſi (*Nerium antidyſentericum*, Lin.)	Coneſſi.	The bark.	Antiſeptic and tonic †.	
Conſolida major, (*Symphitum officin.* Lin.)	Comfrey.	The root.	Emollient.	
Contrayerva (*Dorſtenia contrayerva*, Lin.)	Contrayerva.	The root.	Aromatic and diaphoretic.	Spirituous tincture, extract, powder.
Convallaria (*C. polygonatum*, Lin.)	Solomon's ſeal.	The root.	Suppurative.	Poultice, decoction in milk recommended in ſome caſes of hemorrhagy.
Corallina (*Sertularia*, Lin.)	Coralline.		Abſorbent.	
Coriandrum (*C. ſativum*, Lin.)	Coriander.	The ſeeds.	Carminative and ſtomachic.	Formerly an ingredient in ſome officinal compoſitions.
Cornu cervi (*Cervus elephas*, Lin.)	Hartſhorn.		Emollient and nutritious.	Shavings, a jelly, a volatile alkaline ſalt and ſpirit, and an empyreumatic oil.

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is yet known about them, but that they are innocent to ſome birds. Mr. Ray ſays, that he found the crop of a thruſh full of them, and that at a ſeaſon when the corn was in full growth.

In the firſt volume of the Medical Commentaries, an extract prepared from hemlock-ſeeds is preferred to that made from the leaves; and in the laſt Edinburgh Pharmacopœia, an extract of this kind is ordered as an officinal.

* Dr. Aikin informs us, that the expreſſed juice of the leaves has ſometimes proved ſucceſsful in dropſies, when other remedies had failed. For this purpoſe it is not depurated, but only freed by paſſing through a ſtrainer from the groſſer feculencies, and mixed with an equal quantity of white wine; three or four ſpoonfuls to be taken every morning and evening.—The following decoction (as we are informed by Dr. Monro) was long kept a ſecret by a perſon at Andover, and is ſaid to have carried off the water from ſeveral people labouring under a dropſy. Take of artichoke leaves and ſtalks three handfuls; of bruiſed juniper-berries one quart; of ſcraped horſe-radiſh one handful; of green fir-tops two handfuls; of bruiſed white muſtard-ſeed two table-ſpoonfuls; mix the whole, and boil them in two gallons of water to one, and ſtrain the whole through a cloth. Half a pint to be taken by a grown perſon morning and evening, adding a little ſyrup or ſugar to make it agreeable.

† This bark is reckoned a ſpecific in diarrhœas; the fine powder being made uſe of in an electuary formed with ſyrup of oranges, and given to the quantity of half a drachm or more four times a day, after a vomit has been given. The firſt day it is taken, the number of ſtools is generally increaſed, without any increaſe of the griping; the ſecond, the colour of the ſtools is meliorated; and, on the third or fourth, the conſiſtence approaches to the natural, when it makes a cure. It ſeldom fails in curing a recent diarrhœa, proceeding from irregularities in diet without fever; and it is frequently of ſervice in habitual diarrhœas.

TECHNICAL NAMES.	ENGLISH NAMES.	PARTS USED IN MEDICINE.	VIRTUES.	PREPARATIONS FROM THEM.
Coſtus (*C. Arab.* Lin.)	Coſtus.	The root.	Attenuant and diuretic.	
Craſſula (*Sedum telephium*, Lin.)	Leſſer orpine.	The leaves.	Emollient and aſtringent.	
Creta alba	White chalk.		Abſorbent.	
Crithmum (*C. maritimum*, Lin.)	Samphire.	The leaves.	Aperient, ſtomachic, and diuretic.	
Crocus (*C. ſativus offic.* Lin.)	Saffron.	The chives, or fleſhy capillaments growing at the end of the flower.	Aromatic and cordial.	A ſpirituous tincture; a ſyrup; and an ingredient in ſeveral officinal compoſitions.
Croton. See *Caſcarilla*, ſupra.				
Cubebæ (*Piper cubeba*, Lin.)	Cubebs.	The fruit.	Aromatic and ſtimulant.	An ingredient in ſeveral officinal compoſitions.
Cucumis hortenſis (*C. ſativus*, Lin.)	The garden cucumber.	The ſeeds.	Refrigerant.	
Cucumis agreſtis (*Momordica elaterium*, Lin.)	Wild cucumber.	The fruit.	Violently cathartic.	The juice inſpiſſated.
Cucurbita (*C. pepo*, Lin.)	The gourd and pompion.	The ſeeds.	Refrigerating.	An expreſſed oil.
Cuminum (*C. cyminum*, Lin.)	Cummin.	The ſeed.	Aromatic, ſtimulant.	An eſſential oil by diſtillation; and giving name to a plaſter and cataplaſm.
Cupreſſus.	The cypreſs.	The fruit.	A ſtrong aſtringent.	
Cuprum.	Copper.		A violent emetic, diuretic, and alterative.	Calcined, and producing ſalts by combination with ſeveral acids, and with volatile alkali. See CHEMISTRY-*Index*.
Curcuma (*C. longa*, Lin.)	Turmeric.	The root.	Aromatic, aperient, and emmenagogue.	
Curſuta (*Gentiana purpurea*, Lin.)		The root.	Stomachic.	
Cydonium (*Pirus cydonia*, Lin.)	The quince.	The fruit and ſeeds.	Stomachic and corroborative.	A ſyrup and jelly of the fruit, and mucilage of the ſeeds.
Cyminum. See *Cuminum*, ſupra.				
Cynogloſſus (*C. officinalis*, Lin.)	Hound's tongue.	The root.	Narcotic, but doubtful.	
Cynoſbatum (*Roſa canina*, Lin.)	The wild briar, dog-roſe, or hip-tree.	The fruit and flowers.	Refrigerant and antiſcorbutic.	A diſtilled water and conſerve.
Cyperus (*C. longus*, Lin.)	Long cyperus.	The root.	Aromatic and carminative.	
Dactylus (*Phœnix dactylif.* Lin.)	The date-tree.	The fruit.	Emollient and ſlightly aſtringent.	
Daucus Creticus (*Athamanta Creteniſis*, Lin.)	Candy carrot.	The ſeeds.	Aromatic.	Ingredient in mithridate and theriaca.
Daucus ſativus (*D. carota*, Lin.)	The garden carrot.	The roots.	Powerfully antiſeptic.	A poultice from them for cancers, and a marmalade.
Daucus ſilveſtris (*D. carota*, Lin.)	Wild carrot.	The ſeeds.	Aromatic.	
Dens leonis (*Leontodon taraxacum*, Lin.)	Dandelion.	The root and herb.	Attenuant, but doubtful.	
Dictamnus Creticus (*Origanum dictamnus*, Lin.)	Dittany of Crete.	The leaves.	Aromatic.	An eſſential oil; and ingredient in ſeveral officinal powders.
Dictamnus albus (Lin.)	Baſtard dittany.	The root.	Alexipharmac, tonic, and anthelmintic.	
Digitalis (*D. purpurea*, Lin.)	Fox-glove.	The leaves.	Emetic, cathartic, and diuretic.	The leaves in powder or infuſion, uſed in dropſies.
Dolichos (*D. pruriens*, Lin.)	Couhage, or cowitch.	The hairy matter of the pods.	Anthelmintic.	

TECHNICAL NAMES.	ENGLISH NAMES.	PARTS USED IN MEDICINE.	VIRTUES.	PREPARATIONS FROM THEM.
Doronicum. See *Arnica.*				
Dulcamara (*Solanum dulcamara*, Lin.)	Bitter-ſweet, or woody night-ſhade.	The herb and root.	Diaphoretic, attenuant, and cathartic.	Watery infuſions.
Ebulus (*Sambucus ebulus*, Lin.)	Dwarf-alder, or Danewort.	The root, bark, leaves, and fruit.	Strongly cathartic.	A rob from the berries.
Elaterium. See *Cucumis.*				
Elatine (*Veronica officinalis*, Lin.)	Fluellin, or female ſpeedwell.	The leaves.	Diuretic and attenuant.	Gives name to one of the officinal honeys.
Elecampane. See *Enula.*				
Elemi (*Amyris elemifera*, Lin.)	Gum elemi.		Aromatic.	Gives name to an ointment.
Eleutheria. See *Caſcarilla.*				
Endivia (*Cichoreum endivia*, Lin.)	Endive.	The leaves and roots.	Aperient and refrigerant.	
Enula (*Inula helleniun*, Lin.)	Elecampane.	The root.	Expectorant, ſtomachic, attenuating, and tonic.	Spirituous and watery extracts. A confection.
Eruca (*Siſymbrium amphibium*, Lin.)	Rocket.	The ſeeds.	Stimulant.	
Eryngium (*E. maritim.* Lin.)	Eryngo, or ſea-holly.	The root.	Aperient and diuretic.	
Eryſimum (*E. officinale*, Lin.)	Hedge-muſtard.	The recent plant.	Attenuant and diuretic.	
Eupatorium canabinum, (Lin.)	Hemp-agrimony, water-agrimony, or water-hemp.	The leaves.	Attenuant, corroborant, and antiſcorbutic.	
Euphorbium (*Euphorbia officinalis*, Lin.)	Euphorbium.		Sternutatory.	Powder.
Faba Indica, ſeu Sancti Ignatii, (*Ignatia amara*, Lin.)	St. Ignatius's bean.	The ſeeds; (the root, the columbo.)	Antiſpaſmodic.	
Faba vicia (*Vicia faba*, Lin.)	The garden-bean.	The ſeeds and flowers.	Nutritive and coſmetic.	A diſtilled water from the flowers.
Fagopyrum (*Polyg. fagopyr.* Lin.)	Snakeweed.	The ſeeds.	Refrigerant.	
Farina tritici vel avenæ.	Bran.		Diſcutient.	
Ferrum.	Iron.		Corroborative and alterant.	Infuſions in wine; the metal reduced to a calx by ruſt, or by fire, and ſome ſalts produced from it by combinations with different acids. See CHEMISTRY-*Index.*
Ficus. See *Carica.*				
Filipendula (*Spiræa filipend.* Lin.)	Common dropwort.	The root.	Aſtringent and corroborant.	
Filix (*Polypodium filix mas*, Lin.)	The male fern.	The leaves and root.	Anthelmintic and deobſtruent.	Powder.
Flammula Jovis (*Clematis flammula*, Lin.)	Upright virgin's-bower.	The leaves and flowers.	Very acrid.	Powder for ſprinkling on cancerous and venereal ulcers; infuſion and extract for internal uſe, in waſtings, &c. from lues venerea.
Fœniculum dulce et vulgare (*Anethum fœnic.* Lin.)	Sweet and common fennel.	The ſeeds, roots, and leaves.	Aromatic, ſtimulant, and carminative.	A ſimple water; and an ingredient in one or two compoſitions.
Fœniculum aquaticum (*Phellandrium aquat.* Lin.)	Waterwort.	The leaves and ſeeds.	Corroborant.	

TECHNICAL NAMES.	ENGLISH NAMES.	PARTS USED IN MEDICINE.	VIRTUES.	PREPARATIONS FROM THEM.
Fœnum Græcum (*Trigonella fœnum-græcum*, Lin.)	Fenugreek.	The ſeeds.	Emollient.	Chiefly uſed in cataplaſms, fomentations, emollient glyſters, &c.
Formica (*F. rufa*, Lin.)	The ant.	The whole inſect.	Stimulant.	An oil and acid ſpirit.
Fragaria (*F. veſca*, Lin.)	The ſtrawberry buſh.	The leaves and fruit.	Aſtringent, corroborant, and refrigerant.	
Frangula (*Alnus nigra*, Lin.)	Black alder.	The bark.	Violently cathartic.	
Fraxinella (*Dictamnus albus*, Lin.)	White or baſtard dittany.	The root.	Diaphoretic.	
Fraxinus (*F. excelſior*, Lin.)	The aſh-tree.	The bark and ſeeds.	Aſtringent and ſtimulant.	
Fuligo ligni ſplendens	Shining woodſoot.		Antiſpaſmodic.	A ſpirituous tincture.
Fumaria (*F. officinalis*, Lin.)	Fumitory.	The leaves.	Stimulating, attenuant, and antiſcorbutic.	
Fungus melitenſis (*Cynomorium coccin.* Lin.)		The ſtems and tops.	Tonic and aſtringent.	Decoction and tincture.
Galanga minor (*Kempferia Galangal*, Lin.)	Galangal.	The root.	Stomachic.	
Galbanum (*Bubon galbanum*, Lin.)	Galbanum.	The gum.	Antihyſteric.	An ingredient in ſeveral officinal compoſitions.
Galega (*G. officinalis*, Lin.)	Goat's rue.	The herb.	Diaphoretic, but very doubtful.	
Gallæ (*ex Querc. cerr.* Lin.)	Galls.		Aſtringent *.	
Gallium luteum (*G. verum*, Lin.)	Yellow ladies bedſtraw, or cheeſerennet.	The tops.	Aſtringent.	
Gambogia. See *Gummi gambogia*, infra.				
Geniſta (*Spartium ſcoparium*, Lin.)	Broom.	The leaves, flowers, and ſeeds.	Diuretic and cathartic.	
Gentiana (*G. lutea*, Lin.)	Common gentian.	The root.	Stomachic and ſtimulant.	A ſpirituous tincture, and an ingredient in many officinal compoſitions.
Geoffræa (*G. inermis*, Lin.)	Cabbage-bark, or worm-bark tree.	The bark.	Anthelmintic and purgative.	Powder, decoction, ſyrup, extract.
Geranium Robertianum (Lin.)	Herb Robert.	The leaves.	Aſtringent, but very doubtful.	
Ginſeng (*Panax quinquefol.* Lin.	Ginſeng.	The root.	Stimulant and corroborant.	
Gladiolum luteum (*Iris pſeudacorus*, Lin.)	Yellow water-flag, baſtard acorus, or water flower-de-luce.	The roots.	Strongly cathartic.	
Glycyrrhiza (*G. glabra*, Lin.)	Liquorice.	The root.	Emollient and pectoral.	An extract and powder. An ingredient in many officinal compoſitions.
Gramen caninum (*Triticum repens*, Lin.)	Quick-graſs.	The roots.	Aperient.	
Grana paradiſi (*Amomum gr. par.* (Lin.)	Grains of paradiſe.	The ſeeds.	Aromatic and ſtimulant.	

* Dr. Cullen informs us, that an ointment compoſed of one part of powdered galls and eight of hogs-lard is a common remedy for the hæmorrhoids, and has been found efficacious.

TECHNICAL NAMES.	ENGLISH NAMES.	PARTS USED IN MEDICINE.	VIRTUES.	PREPARATIONS FROM THEM.
Granatum (*Punica granatum*, Lin.)	The pomegranate.	The fruit and flowers.	Refrigerant and aſtringent.	
Gratiola (*G. officinalis*, Lin.)	Hedge-hyſſop.	The herb.	Emetic and cathartic.	
Guajacum (*G. officinale*, Lin.)	Lignum vitæ, or guajacum.	The wood and bark.	Aperient, ſtimulant, and corroborative.	An extract, two tinctures, and a gummy reſin. An ingredient in many officinal preparations.
Gummi arabicum (*Mimoſa nilotica*, Lin.)	Gum-arabic.		Aſtringent and mucilaginous.	An ingredient in a great number of officinal compoſitions.
Gum. ammoniacum (*Ferula meoides*, Lin.?)	Gum-ammoniac.		Aperient, antiſpaſmodic, and emollient.	A ſolution. An ingredient in ſeveral pectoral compoſitions.
Gum. aſafœtida (*Ferula aſaf.* Lin.)	Aſafœtida.	The concrete juice.	Antihyſteric and anthelmintic.	Tinctures.
Gum. bdellium.	Bdellium.		Sudorific, diuretic, and emollient.	
Gum. benzoin (*Terminalia benzoin*, Lin.) *Styrax benzöe*, Lond. Ph. Tranſ. N° 197.	Benzoin.		Coſmetic.	An ingredient in ſeveral anodyne compoſitions.
Gum. elami (*Amyris elemifera*, Lin.)	Elemi.		Aromatic.	An eſſential oil, and gives name to ointment.
Gum. galbanum, (*Bubon galb.* Lin.)	Galbanum.		Antiſpaſmodic.	An ingredient in many antihyſteric medicines.
Gum. gambogia (*Gambogia gutta*, Lin. *Stalagmites gambogioides*, Murray.)	Gamboge.		Emetic and cathartic.	Gives name to a certain kind of pills.
Gum. kino.	Kino.		Aſtringent.	A tincture.
Gum. labdanum (*Ciſtus ladanifera*, Lin.)	Labdanum.		Stomachic.	An ingredient in the ſtomachic pills and plaſters.
Gum. lacca (*Coccus lacca*, Lin. habitans in *Ficu religioſa*, in *Mimoſa cineraria*, et aliis.)	Gum lac.		Aſtringent.	A tincture.
Gum. maſtic. (*Piſtachia lentiſcus*, Lin.)	Maſtich.		Corroborant.	
Gum. myrrha.	Myrrh.		Antiſpaſmodic and corroborant.	A tincture, and an ingredient in many officinal compoſitions.
Gummi olibanum, (*Juniperus Lycia*, Lin.)	Olibanum.		Aſtringent, but uncertain.	An ingredient in ſome powders, and other officinal compoſitions.
Gummi opoponax (*Paſtinaca opoponax*, Lin.)	Opoponax.		Attenuant and ſtimulant.	An ingredient in ſome officinal compoſitions.
Gum. ſanguis draconis. Vid. *Sanguis*, infra.				
Gum. Senegal (*Mimoſa Seneg.* Lin.)			Aſtringent and mucilaginous.	
Gum. ſtyrax. See *Styrax*, infra.				
Gum. thus. See *Thus*, infra.				
Gum. tragacanth (*Aſtragalus trag.* Lin.)	Gum tragacanth, commonly gum dragon.		Aſtringent and corroborant.	
Hæmatites.	Blood-ſtone.		Aſtringent and corroborative.	

TECHNICAL NAMES.	ENGLISH NAMES.	PARTS USED IN MEDICINE.	VIRTUES.	PREPARATIONS FROM THEM.
Hedera arborea (*Hedera helix*, Lin.)	Ivy.	The leaves, berries, and reſin.	Diaphoretic.	
Hedera terreſtris, (*Glechoma hederacea*, Lin.)	Ground-ivy.	The leaves.	Aperient and corroborant.	
Helenium. See *Enula*, ſupra.				
Helleboraſter (*fœtidus*, Lin.)	Bear's foot.	The leaves.	Emetic, purgative, and anthelmintic.	Syrup.
Helleborus albus, (*Veratrum alb.* Lin.)	White hellebore.	The root.	Moſt violently emetic and errhine.	A tincture and honey, formerly.
Helleborus niger (*Lin.*)	Black hellebore, or Melampodium.	The root.	A powerful alterative and emmenagogue.	A tincture and extract.
Hepatica nobilis (*Anemone hepatic.* Lin.)	Noble liverwort.	The leaves.	Cooling and corroborant.	
Hermodactylus, (*Iris tuberoſa*, Lin.)	Hermodactyl.	The root.	Purgative, but doubtful.	
Herniaria (*H. glabra*, Lin.)	Rupture-wort.	The leaves.	Aſtringent.	
Hippocaſtanum (*Æſcul. hippocaſt.* Lin.)	Horſe-cheſnut.	The bark and fruit.	Corroborant and errhine.	
Hordeum (*H. diſtichon*, Lin.)	Barley.		Refrigerant.	A decoction.
Horminum (*Salvia horminum*, Lin.)	Garden-clary.	The leaves and ſeeds.	Corroborative.	
Hydrargyrus. See *Argentum vivum*, ſupra.				
Hydrolapathum (*Rumex aquaticus*, Lin.)	Great water-dock.	The leaves and roots.	Alterant and laxative.	
Hyoſcyamus (*H. niger*, Lin.)	The common wild or black hen-bane.	The leaves and ſeeds.	Narcotic.	Cataplaſm, plaſter, powder, ointment.
Hypericum (*H. perforatum*, Lin.)	St. John's wort.	The leaves, flowers, and ſeeds.	Diuretic, ſudorific, and alterant.	Gives name to a coloured oil.
Hypociſtis (*Cytiſus hypociſt.* Lin.)	Hypociſtis.	The juice.	Aſtringent.	Juice inſpiſſated.
Hyſſopus (*H. officinalis*, Lin.	Hyſſop.	The leaves.	Aromatic and pectoral.	A diſtilled water.
Jalappa (*Convolvulus jalappa*, Lin.)	Jalap.	The root.	Cathartic.	An extract, a ſimple tincture, a reſin, and powder.
Japonica terra. See *Catechu*, ſupra.				
Imperatoria (*I. oſtruthium*, Lin.)	Maſter-wort.	The root.	Aromatic.	
Indian root. See *Radix Indica*, infra.				
Ipecacuanha (*Pſychatria emetica*, Lin.)	Ipecacuanha.	The root *.	Emetic and cathartic.	A vinous tincture, and a powder.

* A root has been ſometimes imported, under the name of white ipecacuanha (*viola ipecacuanha*, Lin.), which has little or nothing of the virtues of the true kind. More dangerous abuſes, however, have been practiſed by the ſubſtitution or mixture of the roots of a kind of *apocynum*, which have been found to operate with great violence both upwards and downwards, ſo as to prove fatal in ſome caſes. They may, however, eaſily be diſtinguiſhed by their colour, which is a deep reddiſh yellow, while the true ipecacuanha is pale-coloured or greyiſh: the poiſonous roots are likewiſe larger, the fiſſures more diſtant, and the intermediate ſpaces ſmoother, than in the true ipecacuanha. This root is found to increaſe the purgative virtue of jalap remarkably. Dr. Aikin informs us, that 15 grains of jalap, with two or three of ipecacuanha, purge more than twice the quantity of jalap by itſelf.

TECHNICAL NAMES.	ENGLISH NAMES.	PARTS USED IN MEDICINE.	VIRTUES.	PREPARATIONS FROM THEM.
Iris Florentina, (*Lin.*)	Florentine iris.	The root.	Aromatic and ſtimulant.	An ingredient in ſeveral pectoral medicines.
Iris paluſtris. See *Gladiolum*, ſupra.				
Juglans (*J. regia*, Lin.)	The walnut-tree.	The fruit.	The kernel emollient, the ſhell aſtringent.	
Jujuba, (*Rhamnus zizyph.* Lin.)	Jujubes.	The fruit.	Emollient and balſamic.	
Juncus odoratus. See *Calamus*, ſupra.				
Juniperus (*J. communis*, Lin.)	Juniper.	The berries, wood, and reſin.	Carminative and ſtomachic.	An eſſential oil, and ſpirituous water. Ingredient in ſeveral officinal compoſitions.
Kermes (*Coccus querc. ilic.* Lin.)	Kermes.		Aſtringent and corroborant.	A confection.
Kino. See *Gum Kino*, ſupra.				
Lac.	Milk.		Analeptic and corroborant.	A ſaccharine ſalt.
Lacca. See *Gum Lacca*, ſupra.				
Lactuca, (*L. ſativa*, Lin.)	Garden lettuce.	The leaves and ſeeds.	Suppoſed narcotic.	
Lactuca virоſa, (*Lin.*)	Wild lettuce.	Juice.	Laxative, diuretic, and diaphoretic.	An extract.
Ladanum (*Ciſtus creticus*, Lin.)	Ladanum.	The gum-reſin.		Ingredient in the ſtomachic plaſter.
Lamium album (*Lin.*)	White archangel, or dead-nettle.	The leaves and flowers.	Suppoſed corroborant.	
Lavendula (*L. Spica*, Lin.)	Greater, or broad-leaved lavender.	The flowers.	An excellent cordial and aromatic.	An eſſential oil, a ſimple and compound ſpirit, and a conſerve. An ingredient in ſome officinal preparations.
Laurus (*L. nobilis*, Lin.)	The bay-tree.	The leaves and berries.	Carminative and antiſpaſmodic.	An expreſſed oil. An ingredient in different compoſitions.
Lentiſcus (*Piſtacia lentiſcus*, Lin.)	The lentiſc or maſtich tree.	The wood.	Aſtringent, tonic, and diuretic.	
Lepidium, (*L. latifol.* Lin.)	Common broad dittander, pepperwort, or poor man's pepper.	The leaves.	Antiſcorbutic and diuretic.	
Leviſticum (*Ligueſticum leviſticum*, Lin.)	Lovage.	The root and ſeed.	Aromatic.	Ingredients in ſome compound waters.
Lichen cinereus terreſtris (*L. caninus*, Lin.)	Aſh-coloured ground liverwort.	The whole.	Recommended by Dr. Mead as a ſpecific againſt the bite of a mad dog, but without foundation.	Principal ingredient in the *pulvis antilyſſus*.
Lichen iſlandicus (*Lin.*)	Eatable liverwort.	The herb.	Nouriſhing, antiſeptic, and laxative.	

" Of late (ſays Dr. Monro) a notion has prevailed, that the keeping up a naufea by means of ſmall doſes of ipecacuanha, or of watery ſolution of emetic tartar, was of great ſervice in promoting the cure of fevers, as well as of fluxes, from a belief that they affected the nervous ſyſtem, and were capable of exciting the action of the extreme veſſels, and of increaſing the ſecretions by the ſkin, and of the internal organs. Hitherto I have not found this method to anſwer my expectations; and I have always obſerved, that ſuch a doſe of an emetic as emptied the ſtomach freely, and gave a ſhake to the whole frame, had a much better effect than thoſe frequently repeated ſmall doſes, which kept the patient in a diſagreeable uneaſy ſituation for hours together; and I am perſuaded, that no practitioner of experience, who has attended large hoſpitals, where he has had an opportunity of trying and ſeeing the effects of different medicines, will ever recommend this naufeating method for general practice in fevers, though it may be of uſe in ſome particular caſes."

TECHNICAL NAMES.	ENGLISH NAMES.	PARTS USED IN MEDICINE.	VIRTUES.	PREPARATIONS FROM THEM.
Lignum campechenſe (*Hæmatoxylum campech.* Lin.)	Logwood.	The wood.	Aſtringent.	An extract.
Lignum rhodium, (*Geniſta canarienſis*, Lin.)	Roſe-wood.	The wood.	Cordial.	An eſſential oil.
Liguſticum. See *Leviſticum*, ſupra.				
Lilium convallium, (*Conval. maial.* Lin.)	Lily of the valley.	The root and flowers.	Cephalic and nervine.	
Lilium album, (*L. candidum*, Lin.)	White lily.	The root.	Emollient.	Poultice.
Limon, (*Citrus medica*, Lin.)	The lemon-tree.	The fruit.	Aromatic, antiſcorbutic, and cordial.	An eſſential oil; an ingredient in ſeveral compoſitions.
Linaria (*Antirrhinum linaria*, Lin.)	Toad-flax.	The leaves.	Diuretic and cathartic, but doubtful.	
Lingua cervina (*Aſplenium ſcolopend.* Lin.)	Hart's tongue.	The leaves.	Aperient.	
Linum catharticum (*Euphorbia lathyrus*, Lin.)	Purging flax.	The leaves.	Cathartic.	Infuſion in whey. Dried powder.
Linum ſativum (*L. uſitatiſſimum*, Lin.)	Flax.	The ſeed.	Emollient.	An expreſſed oil. Cataplaſm.
Liquida ambra (*Acer negundo*, Lin.)	Sweet gum, or ſtorax tree.	The reſinous juice.	Aromatic and cordial.	
Lithoſpermum (*L. officinale*, Lin.)	Gromwell.	The ſeeds.	Reſolvent; lithontriptic.	
Lobelia (*L. ſiphilitica*, Lin.)	Blue cardinal flower.	The root *.	Alterant and detergent.	Decoction.
Lujula, or Wood ſorrel. See *Acetoſella*, ſupra.				
Lumbrici et limaces terreſtres.	Earth worms and ſnails.		Aperient and analeptic.	Decoction in milk.
Lupinus (*L. albus*, Lin.)	White lupines.	The ſeeds.	Anthelmintic.	
Lupulus (*Humul. lup.* Lin.)	Hops.	The looſe leafy heads which grow upon the tops of the ſtalks.	Diuretic and ſtomachic.	
Lycoperdon (*L. boviſta*, Lin.)	Puff-ball, or duſty muſhroom.	The whole.	Styptic.	
Macis. See *Nux moſchata*, infra.				
Majorana (*Origanum majorana*, Lin.)	Sweet marjoram.	The leaves and flowers.	Aromatic and errhine.	An eſſential oil.
Malabathrum (*Laurus caſſia*, Lin.)	Indian leaf.		Aromatic.	An ingredient in mithridate and theriaca.

* This root was long a famous ſecret among the North American Indians for curing the venereal diſeaſe. The ſecret was purchaſed by Sir William Johnſon, and has been publiſhed in the writings of Bartram, Kalm, &c. The following method of uſing it is, by Dr. Aikin, recommended as the beſt: "A decoction is made of an handful of the roots in three meaſures of water. Of this half a meaſure is taken in the morning faſting, and repeated in the evening; and the doſe is gradually increaſed till its purgative effect becomes too violent, when the medicine is for a time to be intermitted, and then renewed till a perfect cure is effected. One doſe daily is ſufficient during the latter part of the treatment; and the regimen, during the whole proceſs, is to be equally ſtrict with that obſerved in a courſe of mercurial ſalivation. From the third day, the ulcers are to be well waſhed twice daily with the decoction; and it is ſaid, that when they are very deep and foul, the Indians ſprinkle them with powder of the internal bark of the ſpruce tree. By this method we are aſſured that inveterate venereal complaints are cured without the aid of mercury."

TECHNICAL NAMES.	ENGLISH NAMES.	PARTS USED IN MEDICINE.	VIRTUES.	PREPARATIONS FROM THEM.
Malva (*M. ſilveſtris*, Lin.)	The mallow.	The leaves and flowers.	Emollient.	Ingredient in the decoction for glyſters; uſed alſo in cataplaſms and fomentations: formerly there was a conſerve of the flowers.
Malus (*Pyrus malus*, Lin.)	The apple-tree.	The fruit.	Refrigerant and laxative.	
Mandragora (*Atropa Mandrag.* Lin.)	The mandrake.	The leaves.	Narcotic.	
Manna (*Fraxinus ornus*, Lin.)	The manna aſh.	The concreted juice.	Laxative.	Gives name to an officinal lohoch, and enters ſeveral other compoſitions.
Marrubium, (*M. vulgare*, Lin.)	White horehound.	The leaves.	Stomachic and aperient.	An ingredient in theriaca *.
Marum Syriacum, (*Teucrium mar.* Lin.)	Syrian herb maſtich.	The leaves.	Aromatic and errhine.	An ingredient in ſome cephalic ſnuffs.
Maſtiche. See *Gum maſtic*, ſupra.				
Matricaria (*M. parthenium*, Lin.)	Feverfew.	The leaves and flowers.	Aperient and antiſpaſmodic.	
Mechoacanna, (*Convolvulus mechoac.* Lin.)	White jalap, or Mechoacan.	The root.	Cathartic.	
Mel.	Honey.		Aperient and detergent.	
Melampodium. See *Helleborus niger*, ſupra.				
Melilotus (*Trifolium melilot.* Lin.)	Melilot.	The leaves and flowers.	Emollient and carminative.	Gives name to a plaſter.
Meliſſa (*M. officin.* Lin.)	Balm.	The leaves.	Aromatic.	An eſſential oil and an infuſion.
Melo (*Cucumis melo*, Lin.)	The melon.	The ſeeds.	Refrigerant and emollient.	
Mentha criſpa (*Lin.*)	Daniſh or German curled mint.	The herb.	Aromatic and cordial.	A diſtilled water, eſſential oil, and eſſence. An ingredient in ſeveral officinal preparations.
Mentha vulgaris, (*M. viridis*, Lin.)	Spearmint.	The herb.	Aromatic and cordial.	A diſtilled water, an eſſential oil, a ſpirit and eſſence. An ingredient in ſeveral officinal preparations.
Mentha piperitis (*M. piperita*, Lin.)	Peppermint.	The herb.	Aromatic and cordial.	A diſtilled water, eſſential oil, and eſſence. An ingredient in ſeveral officinal preparations.
Mercurialis (*M. annua*, Lin.)	French mercury.	The leaves.	Emollient and laxative.	A ſyrup.
Meum (*Æthuſa meum*, Lin.)	Spignel.	The root.	Aromatic and carminative.	
Mezereon (*Daphne mezereum*, Lin.)	Mezereon, or ſpurge olive.	The bark of the root.	Violently cathartic.	Decoction and powder.
Millefolium (*Achillea millefol.* Lin.)	Millefoil, or yarrow.	The leaves and flowers.	Mildly aſtringent and aromatic.	An eſſential oil.
Millepedæ (*Oniſcus aſellus*, Lin.)	Wood-lice, hog-lice, or ſlaters.		Diuretic.	The inſects dried and powdered; an infuſion in wine; alſo an ingredient in ſome other officinal preparations.
Minium. See *Plumbum*, infra.				
Morſus diaboli (*Scabioſa ſuccisa*, Lin.)	Devil's bit.	The leaves and roots.	Diaphoretic.	
Morus nigra (*Lin.*)	The mulberry-tree.	The fruit and bark of the roots.	Refrigerant, aſtringent, and anthelmintic.	A ſyrup from the juice of the fruit.

* The juices of horehound and plantain mixed are remedies of great repute in America againſt the bite of the rattleſnake. They are given by ſpoonfuls at ſhort intervals; while at the ſame time the wounded part is covered with a cataplaſm of the ſame herbs bruiſed. The good effects are ſaid to be ſpeedy, and the recovery of the patient complete and certain.

TECHNICAL NAMES.	ENGLISH NAMES.	PARTS USED IN MEDICINE.	VIRTUES.	PREPARATIONS FROM THEM.
Moſchus (*M. moſchiferus*, Lin.)	Muſk.		Diaphoretic and antiſpaſmodic.	A julep.
Myriſtica. See *Nux moſchata*, infra.				
Myrobalani (*Prunus myrobalanus*, Lin.)	Myrobalans.	The fruit.	Purgative.	
Myrrha. See *Gum. myrrha*, ſupra.				
Myrrhia (*Siſon Canadenſe*, Lin.)	Sweet cicely.	The leaves and ſeeds.	Diuretic.	
Myrtillus (*Vaccinium myrtil.* Lin.)	Whortle-berry.	The leaves and berries.	Aſtringent.	
Myrtus (*M. communis*, Lin.)	The myrtle.	The berries.	Aſtringent.	
Napus (*Braſſica napus*, Lin.)	Sweet navew, or navew gentle.	The ſeeds.	Aromatic.	An ingredient in the theriaca.
Nardus Indica (*Andrapogon nardus*, Lin.)	Indian nard.	The roots.	Stomachic and carminative.	Ingredient in the mithridate and theriaca.
Naſturtium aquaticum (*Siſymbrium naſturtium*, Lin.)	Water creſſes.	The leaves and juice.	Aperient and antiſcorbutic.	An ingredient in the ſucci ſcorbutici.
Naſturtium hortenſe (*Lepidium ſativum*, Lin.)	Garden creſſes.	The leaves and ſeeds.	Aperient and antiſcorbutic, but much weaker than the former.	
Nepeta (*N. cataria*, Lin.)	Nep, or catmint.	The leaves.	Aromatic and cordial.	
Nephriticum lignum (*Guilandina moringa*, Lin.)	Nephritic wood.	The wood in ſubſtance.	Diuretic, but uncertain.	
Nicotiana (*Nicotiana tabacum*, Lin.)	Tobacco.	The leaves.	Violently emetic, cathartic, and narcotic.	An extract recommended by Stahl and other German phyſicians.
Nigella (*Nigella ſativa*, Lin.)	Fennel-flower.	The ſeeds.	Aperient and diuretic, but uncertain.	
Nitrum.	Nitre or ſalt-petre.		Diaphoretic, diuretic, and refrigerant.	An acid ſpirit and fixed alkaline ſalt, an aqueous decoction or ſolution, troches. An ingredient in many other officinal preparations.
Nummularia (*Lyſimachia nummularia*, Lin.)	Moneywort, or herb two-pence.	The leaves.	Antiſcorbutic.	
Nux moſchata (*Myriſtica aromatica*, Lin. *Myriſtica moſchata*, Act. Holm.)	The nutmeg-tree.	The fruit, and covering called *mace*.	An excellent aromatic, cordial, and ſtomachic.	An expreſſed oil, falſely called *oil of mace*; an eſſential oil; a ſimple water; a ſpirituous water; an ingredient in many officinal compoſitions.
Nux piſtachia (*Piſtachia vera*, Lin.)	The piſtachia-tree.	The fruit.	Emollient and anaſeptic.	
Nux vomica (*Strychnos nux vom.* Lin.)	Nux vomica.	The fruit.	Narcotic.	
Nymphæa alba (*Lin.*)	White water-lily.	The roots and flowers.	Aſtringent and corroborative.	
Ochra	Yellow ochre.		Aſtringent, but very weak.	
Oenanthe (*Oe. crocata*, Lin.)	Hemlock dropwort.	Leaves and root.	A virulent poiſon:	But the juice of the root, or the infuſion of the leaf, has been recommended in chronic eruptions. The latter has been alſo found uſeful as an emmenagogue.
Olibanum. See *Gum olibanum*, ſupra.				

TECHNICAL NAMES.	ENGLISH NAMES.	PARTS USED IN MEDICINE.	VIRTUES.	PREPARATIONS FROM THEM.
Oliva (*Olea Europæa*, Lin.)	The olive-tree.	The fruit.	Emollient.	An expreſſed oil uſed in almoſt all ointments, plaſters, &c.
Ononis (*O. ſpinoſa*, Lin.)	Reſt-harrow, cammock, or pettywhin.	The root.	Aperient and diuretic.	
Opium (*Papaver orientale*, Lin.)	The Aſiatic poppy.	The inſpiſſated juice.	A moſt excellent anodyne and cordial when properly applied, but a very fatal poiſon if taken in too great quantity.	Purified by ſtraining, called the *Thebaic extract*; a vinous and ſpirituous tincture, called *liquid laudanum*. Alſo a capital ingredient in many officinal preparations.
Opopanax. See *Gum opopanax*, ſupra.				
Origanum (*O. vulg.* Lin.)	Wild marjoram.	The leaves.	Aromatic.	An eſſential oil.
Oryza (*O. ſativa*, Lin.)	Rice.	The grain.	Emollient and refrigerant.	
Oxylapathum (*Rumex acutus*, Lin.)	Sharp-pointed dock.	The roots and leaves.	Alterant and laxative.	
Pæonia (*P. officinalis*, Lin.)	Male and female peony.	The roots, flowers, and ſeeds.	Emollient and antiſpaſmodic.	Ingredients in ſome anti-epileptic powders.
Palma (*Cocos butyracea*, Lin.)	The palm-tree.	The kernels of the fruit.	Emollient and anodyne.	An expreſſed oil uſed in ſtomachic plaſters.
Palma Chriſti. See *Ricinus*, infra.				
Papaver album (*P. ſomniferum*, Lin.)	The white poppy.	The heads.	Anodyne.	A ſyrup.
Papaver erraticum (*P. rhœas*, Lin.)	Red poppy, or cornroſe.	The flowers.	Valued chiefly for the colour they communicate.	A ſyrup.
Paralyſis (*Primula veris offic.* Lin.)	Cowſlip.	The flowers.	Corroborant and antiſpaſmodic.	A ſyrup.
Pareira brava (*Ciſſampelos pareira*, Lin.)	Pareira brava.	The root.	Attenuant, diuretic, and lithontriptic.	
Parietaria (*P. officinalis*, Lin.)	Pellitory of the wall.	The leaves.	Emollient and diuretic.	Ingredient in a nephritic decoction.
Paſtinaca (*P. ſativa*, Lin.)	Garden parſnip.	The roots and ſeeds.	Emollient and aromatic.	
Paſtinaca ſilveſtris (*Lin.*)	Wild parſnip.	The ſeeds.	Aromatic.	
Pentaphyllum (*Potentilla reptans*, Lin.)	Cinqueſoil.	The root.	Aſtringent.	
Perſicaria urens (*Polygonum hydropiper*, Lin.)	Bitter arſmart, lake-weed, or water pepper.	The leaves.	Diuretic and detergent when externally applied.	
Perſicaria mitis (*Polygonum perſic.* Lin.)	Spotted arſmart.	The leaves.	Antiſeptic and aſtringent.	
Perſica (*Amygdalus perſica*, Lin.)	The peach-tree.	The leaves, flowers, and fruit.	Laxative, anthelmintic, and refrigerant.	
Peruvianus cortex (*Cinchona officinalis*, Lin.)	The quinquina, or Jeſuit's-bark-tree.	The bark.	A moſt excellent corroborative.	An extract, a reſin, a ſpirituous tincture, a compound tincture, a tincture in volatile ſpirit; alſo an ingredient in the ſtomachic tincture.
Petaſites (*Tuſſilago petaſites*, Lin.)	Butterbur.	The root.	Aromatic, aperient, and deobſtruent.	
Petroleum.	Rock oil.		Anodyne and corroborative when applied externally.	

TECHNICAL NAMES.	ENGLISH NAMES.	PARTS USED IN MEDICINE.	VIRTUES.	PREPARATIONS FROM THEM.
Petroleum Barbadenſe (*Bitumen petroleum*, Lin.)	Barbadoes tar.		Diſcutient, ſudorific, and corroborative.	
Petroſelinum (*Apium petroſelinum*, Lin.)	Common parſley.	The roots, leaves, and ſeeds.	Aperient and ſomewhat aromatic.	The ſeeds an ingredient in an electuary.
Peucedanum (*P. officinale*, Lin.)	Hog's fennel, or ſulphur-wort.	The root.	Aperient, ſtimulating, and errhine.	
Pimenta (*Myrtus pimenta*, Lin.)	Pimento, Jamaica pepper, or all-ſpice.	The berry.	Aromatic and ſtimulant.	The baſis of a diſtilled water, a ſpirit, and an eſſential oil.
Pimpinella ſanguiſorba (*Sanguiſorba officinalis*, Lin.)	The greater wild burnet.	The leaves.	Aſtringent.	
Pimpinella ſaxifraga (*Lin.*)	Burnet ſaxifrage.	The root, leaves, and ſeeds.	Diaphoretic, diuretic, and antiſcorbutic.	
Pinus ſylveſtris (*Lin.*)	The pine-tree.	The kernels of its fruit or cones, and reſin.	The kernels emollient; for the reſin ſee *Terebinthina*, infra.	
Piper longum (*Lin.*)	Long pepper.		Highly aromatic and ſtimulant.	
Piper nigrum (*Lin.*)	Black pepper.			
Piper Jamaicenſe. See *Pimenta*, ſupra.				
Piper Indicum (*Capſicum annuum*, Lin.)	Guinea pepper.			A powder called *Cayenne pepper*.
Pix liquida (*Pinus ſylveſtris*, Lin.)	Tar.		Attenuant and ſtimulating.	An infuſion in water, and an ingredient in a kind of pectoral pills.
Pix Burgundica (*Pinus abies*, Lin.)	Burgundy pitch.		A warm adheſive reſinous ſubſtance.	Ingredient in ſeveral plaſters, ointments, and cerates.
Plantago latifolia, (*P. major*, Lin.)	Common broad-leaved plantain.	The leaves.	Aſtringent.	
Plumbum.	Lead.		Aſtringent and refrigerating, but very dangerous.	Several chemical preparations. See CHEMISTRY-*Index*. A tincture and extract, or ſolution in vegetable acids; alſo an ingredient in ſeveral ointments, &c.
Polium montanum (*Teucrium polium*, Lin.)	Poley-mountain.	The tops.	Aromatic.	Ingredient in the mithridate and theriaca.
Polygala amara (*Lin.*)	Milkwort.	The root.	Purgative.	
Polygala ſenega (*Lin.*)	Rattleſnake root.	The roots.	Stimulating, attenuant, and diuretic.	
Polypodium (*P. vulgare*, Lin.)	Polypody.	The root.	Laxative.	
Populus nigra, (*Lin.*)	Black poplar.	The buds.	Aromatic.	Uſed only in an ointment, but capable of being applied to better purpoſes.
Porrum (*Allium porrum*, Lin.)	The leek.	The root.	A ſtimulating diuretic.	
Portulaca (*P. oleracea*, Lin.)	Purſlane.	The ſeeds.	Refrigerant.	
Primula veris (*Lin.*)	Primroſe.	The herb and root.	Aromatic and ſtomachic.	An infuſion and diſtilled ſpirit.
Prunella (*P. vulgaris*, Lin.)	Self-heal.	The leaves.	Attenuant and detergent.	

TECHNICAL NAMES.	ENGLISH NAMES.	PARTS USED IN MEDICINE.	VIRTUES.	PREPARATIONS FROM THEM.
Pruna Gallica (*Prunus domeſtica*, Lin.)	French or common prunes.	The fruit.	Cooling and aperient.	
Prunus ſylveſtris. See *Acacia Germanica*, ſupra.				
Pſyllium (*Plantago pſyll.* Lin.)	Fleawort.	The ſeeds.	Emollient and laxative.	
Ptarmica (*Achillea ptarmica*, Lin.)	Sneezewort, or baſtard pellitory.	The root.	Errhine and ſtimulating.	
Pulegium (*Mentha puleg.* Lin.)	Pennyroyal.	The flower.	A warm aromatic.	A ſimple water, a ſpirituous water, an eſſential oil; and an ingredient in ſome other officinal compoſitions.
Pulmonaria maculoſa (*P. officinalis*, Lin.)	Spotted lung-wort, or ſage of Jeruſalem.	The leaves.	Said to be aperient and analeptic.	
Pulſatilla nigricans (*Anemone pratenſ.* Lin.)	Meadow anemone.	The herb and flower.	Emetic, diuretic, and cathartic.	An extract and diſtilled water, uſed in venereal complaints, and certain diſorders of the eye.
Pyrethrum (*Anthemis pyrethr.* Lin.)	Pellitory of Spain.	The root.	Promotes the ſalival flux.	
Quaſſia (*Q. ſimaruba*, Lin.)	Simarouba.	The bark.	Antiſeptic; uſeful in dyſentery.	See *Ed. Phil. Tranſ.* vol. ii.
Quaſſia (*Q. amara*, Lin.)	Quaſſy.	The wood.	Stomachic and tonic.	An extract.
Quercus (*Q. robur*, Lin.)	Oak-tree.	The bark.	Strongly aſtringent.	
Quercus marina (*Fucus veſiculoſus*, Lin.)	Sea-wrack or Sea-oak.	The herb.	Aſtringent and detergent.	A powder of the burnt herb.
Radix Indica Lopeziana (*Gaub. Adverſ.*)	Indian or Lopez root.		Aſtringent.	
Raphanus ruſticanus (*Cochlearia armoracea*, Lin.)	Horſe-radiſh.	The root.	Stimulating and attenuant.	A compound water.
Rhabarbarum (*Rheum palmat.* Lin.)	Rhubarb.	The root.	Cathartic and ſtomachic.	Toaſted; a watery infuſion; vinous and ſpirituous tinctures; and an ingredient in ſeveral officinal compoſitions.
Rhamnus catharticus. See *Spina cervina*, infra.				
Rhapontícum (*Rheum rhapon.* Lin.)	Rhapontic.	The roots.	Laxative.	
Rhododendron chryſanthemum, *Lin.*)	Rhododendron.	The herb.	Powerfully ſedative.	Decoction and powder; lately found ſerviceable in the gout and rheumatiſm.
Ribes nigrum (*Lin.*)	The black-currant buſh.	The fruit.	Refrigerant and detergent.	A jelly.
Ribes rubrum, (*Lin.*)	The red-currant buſh.	The fruit.	Ditto.	
Ricinus, (*R. communis*, Lin.)	Palma Chriſti.	The ſeed.	Laxative, anthelmintic.	Expreſſed oil.
Roſa damaſcena (*R. centafolia*, Lin.)	Damaſk roſe.	The flower.	Aromatic and gently laxative.	A diſtilled water and ſyrup.
Roſa rubra (*R. Gallica*, Lin.)	The red roſe.	The flower.	Aſtringent and corroborative.	A conſerve, honey, tincture, troches, vinegar, and ſyrup. An ingredient in ſeveral officinal compoſitions.
Roſmarinus hortenſis (*R. officinalis*, Lin.)	Roſemary.	The tops and flowers.	A fine aromatic and cordial.	An eſſential oil; a diſtilled ſpirit called *Hungary water*. An ingredient in many cordial and antiſpaſmodic medicines.
Rubia tinctorum, (*Lin.*)	Madder.	The root.	Aperient and detergent.	

TECHNICAL NAMES.	ENGLISH NAMES.	PARTS USED IN MEDICINE.	VIRTUES.	PREPARATIONS FROM THEM.
Rubus idæus, (*Lin.*)	The raſp-berry buſh.	The fruit.	Refrigerant.	A ſyrup.
Rubus niger (*R. fruticoſ.* Lin.)	The bramble.	The leaves.	Aſtringent.	
Ruſcus (*R. aculeatus*, Lin.)	Butcher's-broom, or knee-holly.	The root.	Aperient.	Ingredient in diet-drinks.
Ruta (*R. gravcolens*, Lin.)	Broad-leaved rue.	The leaves and ſeeds.	Powerfully ſtimulating, attenuating, and detergent.	An extract; and an ingredient in ſeveral compoſitions.
Sabadilla. See *Cevadilla*, ſupra.				
Sabina (*Juniperus ſabina*, Lin.)	Savin.	The leaves or tops.	A ſtimulating aperient.	An eſſential oil; a watery extract; and an ingredient in ſeveral officinal compoſitions.
Saccharum (*Arundo ſaccharifera*; Lin.) purificatum et non purificatum.	Sugar refined and brown.		Emollient and laxative.	
Saccharum cantum, album et rubrum.	Sugar-candy, white and brown.			
Sagapenum (*Ferula orientalis*, Lin.)	Gum ſagapenum.		Aperient and deobſtruent.	An ingredient in ſeveral antiſpaſmodic medicines.
Sal alkali vegetabile.	Vegetable alkaline ſalt or pearl-aſhes.		Aperient, diuretic, and cauſtic.	The baſis of a great number of neutral ſalts.
Sal alkali minerale.	Mineral alkali, ſalt of ſoda, or baſis of ſea-ſalt.		Ditto.	Ditto.
Sal ammoniac. See *Ammoniac.*				
Sal catharticus amarus.	Epſom ſalt.		Cathartic.	Magneſia.
Sal commune.	Common ſalt.		In ſmall doſes ſtimulant, in large ones cathartic.	
Salicaria (*Lythrum Salicar.* Lin.)	Purple looſe-ſtrife.	The herb.	Aſtringent.	
Salix (*S. fragilis*, Lin.)	The crack-willow.	The bark.	Corroborant.	
Salvia (*S. officinalis*, Lin.)	Common ſage.	The leaves.	Moderately ſtimulating and aſtringent.	Infuſions.
Sambucus (*S. nigra*, Lin.)	Common black-berried alder.	The leaves, bark, flowers, and berries.	Cathartic, aromatic, and aperient.	A rob for internal uſe from the berries, and an ointment and oil from the flowers and bark; the flowers are alſo ingredients in ſome compound waters.
Sanguis draconis, (*Calamus rotang, Dracena draco, Pterocarpus draco*, &c. Lin.)	Dragon's-blood.		Aſtringent.	An ingredient in ſome officinal compoſitions.
Sanicula (*S. Europæa*, Lin.)	Sanicle.	The leaves.	Suppoſed to be corroborant.	
Santalum citrinum, (*S. album.* Lin.)	Yellow ſanders.	The wood.	Greatly recommended by Hoffman as a reſtorative.	Eſſential oil; extract.
Santalum rubrum (*Pterocarpus ſantolinus*, Lin.)	Red ſanders.	The wood.	Uſed only for its colour.	
Santonicum (*Artemiſia ſantonica*,	Worm-ſeed.		Anthelmintic.	

TECHNICAL NAMES.	ENGLISH NAMES.	PARTS USED IN MEDICINE.	VIRTUES.	PREPARATIONS FROM THEM.
Sapo durus.	Hard Spaniſh ſoap.		Reſolvent and ſtimulating.	The firſt gives name to a plaſter, liniment, balſam, and pills; the ſecond is an ingredient in the milder cauſtic; and the third in an anodyne plaſter.
Sapo mollis.	Common ſoft ſoap.			
Sapo niger.	Black ſoap.			
Saponaria (*S. officinalis*, Lin.)	Soapwort or bruiſewort.	The herb and root.	Aperient, corroborant, and ſudorific.	Tincture; extract.
Sarcocolla (*Penæa ſarcoc.* Lin.)	Gum ſarcocol.		Suppoſed a vulnerary.	Ingredient in the pulvis ē ceruſſa.
Sarſaparilla (*Smilax ſarſap.* Lin.)	Sarſaparilla.	The root.	Alterant and diaphoretic.	Infuſions and extract.
Saſſafras (*Laurus ſaſſafras*, Lin.)	Saſſafras.	The root.	Alterant, aperient, and corroborant.	An eſſential oil; an ingredient in ſome officinal preparations.
Satureia (*S. hortenſis*, Lin.)	Summer ſavory.	The leaves.	A very pungent warm aromatic.	
Satyrion mas (*Orchis maſcula*, Lin.)	Orchis.	The root.	Coagulant and corroborative.	Salep ſuppoſed to be a preparation from a root of this kind.
Saxifraga alba (*S. granulata*, Lin.)	White-flowered ſaxifrage.	The roots and leaves.	Suppoſed to be aperient, diuretic, and lithontriptic, but without juſt foundation.	
Saxifraga vulgaris, (*Peucedanum ſilaus*, Lin.)	Meadow ſaxifrage.	The leaves and ſeeds.		
Scabioſa (*S. arvenſis*, Lin.)	Scabious.	The leaves.	Aperient, ſudorific, and expectorant.	
Scammonium (*Convolvulus ſcam.* Lin.)	Scammony.	Roots.	Strongly cathartic.	Gives name to a powder, and is an ingredient in ſome officinal preparations.
Scilla (*S. maritima*, Lin.)	The ſquill, or ſea-onion.	The root.	Powerfully diuretic, ſtimulant, and expectorant.	A ſyrup, vinegar, oxymel, pills; the root dried, baked, and made into troches.
Scolopendrium. See *Lingua cervina*, ſupra.				
Scordium (*Teucrium ſcordium*, Lin.)	Water germander.	The leaves.	Deobſtruent, diuretic, and ſudorific, but doubtful.	An ingredient in mithridate, theriaca, and ſeveral other preparations.
Scorzonera (*S. biſpanica*, Lin.)	Viper's graſs.	The root.	Cordial and ſtimulant, but doubtful.	
Scrophularia (*S. nodoſa*, Lin.)	Fig-wort.	The leaves and roots.	Suppoſed corroborant, but doubtful.	
Sebeſten (*Cordia myxa*, Lin.)	Sebeſten plum.		Emollient.	
Sedum acre (*Lin.*)	Wall ſtone-crop, or wall pepper.	The freſh plant.	Strongly purgative, emetic, and diuretic.	
Sedum majus (*S. album*, in.)	Greater houſeleek.	The leaves.	Refrigerant.	
Seneka. See *Polygala ſeneka*, ſupra.				
Senna (*Caſſia ſenna*, Lin.)	Senna.	The leaves.	Cathartic.	Infuſion, ſpirituous tinctures, compound powders, and an electuary.
Serpentaria Virginiana (*Ariſtoloc ia ſerpentar.* Lin.)	Virginian ſnake-weed.	The root.	A warm diaphoretic and diuretic.	A ſpirituous tincture; and an ingredient in a number of tinctures.
Serpyllum (*Thymus ſerpil* Lin.)	Mother of thyme.	The herb.	Aromatic.	
Seſelis vulgaris, (*Tordylium officin.* Lin.)	Common hartwort.	The ſeeds.	Agreeable aromatics, but neglected. *Lewis.*	
Seſelis maſſilienſis (*Seſeli elatum*, Lin.)	Hartwort of Marſeilles.	The ſeeds.		

TECHNICAL NAMES.	ENGLISH NAMES.	PARTS USED IN MEDICINE.	VIRTUES.	PREPARATIONS FROM THEM.
Sigillum Salomonis *(Convallaria polygon.* Lin.)	Solomon's ſeal.	The root.	Probably emollient.	
Simarouba. See *Quaſſia ſimarouba*, ſupra.				
Sinapi *(Sinapis alba & nigra*, Lin.)	Muſtard.	The ſeeds, black and white.	Strongly pungent and ſtimulant.	An expreſſed oil.
Sium *(S. nodiflorum*, Lin.)	Creeping ſkerrit, or water parſnip.	The herb.	The juice ſerviceable in ſome cutaneous diſorders.	
Solanum *(S. nigr.* Lin.)	Nightſhade.	The leaves.	Powerfully evacuant.	
Spermaceti *(Phyſeter macrocephalus*, Lin.)	Spermaceti.		A mild emollient.	Gives name to a lohoch.
Spigelia (*S. Marilandica*, Lin.)	Indian pink.	The root.	Anthelmintic.	
Spina cervina, *(Rhamnus catharticus*, Lin.)	Buckthorn.	The berries.	Strongly cathartic.	A ſyrup.
Spiritus vinoſi.	Vinous ſpirits.		Cordial and ſtimulant.	Uſed as menſtruums for tinctures, &c. in almoſt every preparation of that kind.
Spongia *(S. officinal.* Lin.)	Sponge.		Uſed as a tent for dilating ulcers, &c.	Burnt, recommended in ſcrophulous affections.
Stannum.	Tin.		Anthelmintic.	Powdered.
Staphiſagria *(Delphinium ſtaphiſagria*, Lin.)	Staveſacre.	The ſeeds.	A violent cathartic taken internally. Its external application deſtroys lice and other inſects.	
Stoechas *(Lavendula ſtoechas*, Lin.)	Arabian ſtoechas, or French lavender.	The flowers.	Aromatic.	An ingredient in mithridate and theriaca.
Stramonium *(Daturaſtramon*, Lin.)	Thorn-apple.	The herb.	Narcotic.	An extract.
Styrax calamita *(S. officinalis*, Lin.)	Storax.		Aromatic, ſtimulant, and nervine.	Ingredient in ſome tinctures and pills.
Styrax liquida *(Liquidamber ſtyraciflua*, Lin.)	Liquid ſtorax.			Ingredient in a mercurial plaſter.
Suber *(Quercus ſub.* Lin.)	The cork-tree.	The bark.	Aſtringent.	
Succinum.	Amber.		Aſtringent and corroborant.	A tincture, balſam, eſſential oil, and an ingredient in ſeveral officinal preparations.
Sulphur.	Sulphur, and flowers of ſulphur.		Laxative, diaphoretic, and alterant.	Solutions in different kinds of oils called *balſams*, and an ingredient in ſome ointments.
Sumach *(Rhus coriaria*, Lin.)	Common ſumach.	The leaves and ſeeds.	Aſtringent.	
Tacamahac *(Populus balſamifera*, Lin.)	Tacamahac-tree.	The reſin.	Diſcutient, emollient, and ſuppurative.	An ingredient in ſeveral plaſters.
Tamarindus *(T. Indica*, Lin.)	Tamarinds.	The fruit.	Refrigerant and laxative.	Ingredients in ſome laxative electuaries.
Tamariſcus *(Tamarix Gallica*, Lin.)	The tamariſk-tree.	The leaves and bark.	Aſtringent.	
Tanacetum *(T. vulgare*, Lin.)	Tanſy.	The leaves, flowers, and ſeeds.	Stimulating, antiſpaſmodic, and anthelmintic.	
Taraxacum *(Leontodon tarax.* Lin.)	Dandelion.	The leaves and root.	Attenuating and reſolvent.	A diſtilled ſpirit, recommended by profeſſor Delius in aſthmatic and hydropic affections.

TECHNICAL NAMES.	ENGLISH NAMES.	PARTS USED IN MEDICINE.	VIRTUES.	PREPARATIONS FROM THEM.
Tartarum.	Tartar.		Refrigerant and cathartic.	Purified from its earthy parts, and called *cream of tartar*, the baſis of ſome uſeful purging ſalts. An alkali is alſo prepared from it by fire.
Terebinthina Veneta (*Pinus lariv*, Lin.)	Venice turpentine.		Warm ſtimulating diuretics and aperients.	
Terebinthina Argentoratenſis.	Strafburgh turpentine.			
Terebinthina Chia.	Chian, or Cyprus turpentine.			
Terebinthina communis.	Common turpentine.		Uſed chiefly in external applications.	An eſſential oil. The reſiduum forms the *reſina alba & nigra*, or white and black roſin of the ſhops, uſed in almoſt every ointment.
Terra Japonica. See *Catechu*, ſupra.				
Thapſus barbatus (*Verbaſcum thapſus*, Lin.)	Great white mullein.	The leaves and flowers.	Analeptic.	A ſpirituous extract from the flowers.
Thea bohea et viridis (*Lin.*)	Bohea and green tea.	The leaves.	Cordial, diuretic, and diaphoretic.	An infuſion.
Thlaſpi (*T. arvenſe*, Lin.)	Treacle, or mithridate muſtard.	The ſeeds.	Aromatic and ſtimulant.	Ingredient in theriaca.
Thus vulgare.	Common frankincenſe.		Suppoſed corroborative.	Ingredient in ſome warm plaſters.
Thymus citratus.	Lemon thyme.	The leaves.	An agreeable aromatic.	A diſtilled water and eſſential oil.
Thymus vulgaris.	Common thyme.	The leaves.	An agreeable aromatic.	A diſtilled water and eſſential oil.
Tilia (*T. Europæa*, Lin.)	The lime or linden tree.	The flowers.	Antiſpaſmodic.	Infuſion.
Tithymalus (*Euphorbia lathyrus*, Lin.)	The ſpurge.	The juice of the root.	Violently cathartic.	
Tormentilla (*T. erecta*, Lin.)	Tormentil, or ſeptfoil.	The root.	Aſtringent.	An ingredient in ſeveral officinal compoſitions.
Trichomanes (*Aſplenium trich* Lin.)	Maidenhair.	The herb.	Pectoral.	Decoction and ſyrup.
Trifolium paludoſum (*Menyanthes trifoliata*, Lin.)	Marſh trefoil, or buck bean.	The leaves.	Laxative and alterant.	
Triticum (*T. hybernum*, Lin.)	Wheat.	The grain and flour.	Nutritive and glutinous.	Starch.
Turpethum (*Convolvulus turpethum*, Lin.)	Turbith.	The root.	Violently cathartic.	An extract.
Tuſſilago (*T. farfara*, Lin.)	Coltsfoot.	The leaves and flowers.	Emollient and mucilaginous.	An ingredient in pectoral decoctions.
Tutia.	Tutty.		Ophthalmic.	Ingredient in ſeveral ointments, and collyria.
Valeriana ſylveſtris (*Val. officinalis*, Lin.)	Wild valerian.	The root.	Antiſpaſmodic.	A tincture in proof ſpirit, and in volatile ſpirit; alſo an ingredient in ſeveral cephalic and anti-epileptic medicines.
Veratrum. See *Helleborus albus*, ſupra.				
Verbaſcum. See *Thapſus*, ſupra.				
Veronica mas (*V. officinalis*, Lin.)	Male ſpeedwell.	The leaves.	Aperient and pectoral.	Infuſions.
Vinum.	Wine.		Cordial and corroborant.	A menſtruum for a great number of medicinal ſubſtances.
Viola (*V. odorat.* Lin.)	The ſingle March violet.	The flowers.	Laxative.	A ſyrup.

TECHNICAL NAMES.	ENGLISH NAMES.	PARTS USED IN MEDICINE.	VIRTUES.	PREPARATIONS FROM THEM.
Vipera *(Coluber berus,* Lin.)	The viper.	The flesh and fat.	Restorative and emollient.	A vinous tincture; an ingredient in theriaca.
Vitis vinifera, *(Lin.)*	The vine.	The leaves, sap, flowers, and fruit.	Astringent, diuretic, aromatic and pectoral.	Wine. The dried fruit or raisins are ingredients in some pectoral and stomachic medicines.
Ulmus *(U. campestris,* Lin.)	The elm-tree.	The inner bark.	Astringent.	A decoction recommended by Dr. Lettsom in obstinate cutaneous eruptions.
Winteranus cortex *(Wintera aromatica,* Lin.)	Winter's bark.		Aromatic.	
Urtica *(U. dioica,* Lin.)	The nettle.	The herb.	Rubefacient.	
Uva ursi *(Arbutus uva ursi,* Lin.)	Whortle-berry.	The leaves.	Astringent and lithontriptic.	
Zedoaria (*Kæmpferia rotunda,* Lin.)	Zedoary.	The root.	Stomachic and corroborant.	An extract with proof spirit.
Zincum.	Zinc.		Supposed to be a good antiepileptic.	The metal reduced to a calx by fire. Calamine and tutty are a kind of ores of this metal. These last are the basis of two officinal ointments. A salt produced by its combination with the vitriolic acid. See CHEMISTRY-*Index*.
Zinziber *(Amomum zinzib.* Lin.)	Ginger.	The root.	Aromatic.	A syrup. Also an ingredient in several officinal compositions.

General TITLES *including several* SIMPLES.

The five opening roots: Smallage, Asparagus, Fennel, Parsley, Butchers broom.

The five emollient herbs: Marshmallows, Mallows, Mercury, Pellitory of the wall, Violets.

The four cordial flowers: Borage, Bugloss, Roses, Violets.

The four greater hot seeds: Anise, Caraway, Cummin, Fennel.

The four lesser hot seeds: Bishopseed, Stone parsley, Smallage, Wild carrot.

The four greater cold seeds: Water melons, Cucumbers, Gourds, Melons.

The four lesser cold seeds: Succory, Endive, Lettuce, Purslane.

The four capillary herbs: Maidenhair, English maidenhair, Wall rue, Ceterach.

The four carminative flowers: Camomile, Feverfew, Dill, Melilot.

The simples of each of the above classes have been often employed together under their respective general appellations. This practice has entirely ceased amongst us; and accordingly these denominations are now expunged both from the London and Edinburgh pharmacopœias, and they are now retained in very few of the foreign ones. But as these articles are frequently mentioned under their general titles by writers of eminence, it was imagined that the above enumeration of them might be of some use.

GENERAL RULES *for the Collection and Preservation of* SIMPLES.

ROOTS.

Annual roots are to be taken up before they shoot out stalks or flowers: Biennial ones, chiefly in the autumn of the same year in which the seeds were sown: The perennial, when the leaves fall off, and therefore generally in the autumn. Being washed clean from dirt, and freed from the rotten and decayed fibres, they are to be hung up in a warm, shady, airy place, till sufficiently dried. The thicker roots require to be slit longitudinally, or cut transversely into thin slices Such roots as lose their virtues by exsiccation, or are desired to be preserved in a fresh state, for the greater conveniency of their use in certain forms, are to be kept buried in dry sand.

There are two seasons in which the biennial and perennial roots are reckoned the most vigorous, the autumn and spring; or rather the time when the stalks or leaves have fallen off, and that in which the vegetation is just to begin again, or soon after it has begun; which times are found to differ considerably in different plants.

The college of Edinburgh, in the two first editions of their pharmacopœia, directed them to be dug in the spring, after

the leaves were formed; in the third edition the autumn was preferred. The generality of roots appear, indeed, to be moſt efficacious in the ſpring; but as at this time they are alſo the moſt juicy, and conſequently ſhrivel much in drying, and are rather more difficultly preſerved, it is commonly thought moſt adviſable to take them up in autumn. No rule, however, can be given, that ſhall obtain univerſally: arum root is taken even in the middle of ſummer, without ſuſpicion of its being leſs active than at other ſeaſons; while angelica root is inert during the ſummer, in compariſon of what it was in the autumn, ſpring, or winter.

Herbs and Leaves.

Herbs are to be gathered when the leaves have come to their full growth, before the flowers unfold; but of ſome plants the flowery tops are preferred. They are to be dried in the ſame manner as roots.

For the gathering of leaves there cannot perhaps be any univerſal rule, any more than for roots; for though moſt herbs appear to be in their greateſt vigour about the time of their flowering, or a little before, there are ſome in which the medicinal parts are more abundant at an earlier period.

Thus mallow and marſhmallow leaves are moſt mucilaginous when young, and by the time of flowering approach more to a woody nature. A difference of the ſame kind is more remarkable in the leaves of certain trees and ſhrubs: the young buds, or rudiments of the leaves, of the black poplar tree, have a ſtrong fragrant ſmell, approaching to that of ſtorax; but by the time that the leaves have come to their full growth, their fragrance is exhauſted.

Herbs are directed by moſt of the pharmaceutic writers to be dried in the ſhade; a rule which appears to be very juſt, though it has ſometimes been miſunderſtood. They are not to be excluded from the ſun's *heat*, but from the ſtrong action of the ſolar *light*; by which laſt their colours are more liable to be altered or deſtroyed than thoſe of roots. Slow drying of them in a cool place is far from being of any advantage: both their colours and virtues are preſerved in greateſt perfection when they are dried haſtily by the heat of common fire, as great as that which the ſun can impart: the juicy ones, in particular, require to be dried by heat, being otherwiſe ſubject to turn black. Odoriferous herbs, dried by fire till they become friable, diſcover indeed, in this arid ſtate, very little ſmell; not that the odorous matter is diſſipated, but on account of its not being communicated from the perfectly dry ſubject to dry air; for as ſoon as a watery vehicle is ſupplied, whether by infuſing the plant in water, or by expoſing it for a little time to a moiſt air, the odorous parts begin to be extracted by virtue of the aqueous moiſture, and diſcover themſelves in their full force.

Of the uſe of heat in the drying of plants, we have an inſtance in the treatment of tea among the Chineſe. According to the accounts of travellers, the leaves, as ſoon as gathered, are brought into an apartment furniſhed with a number of little furnaces or ſtoves, each of which is covered with a clean ſmooth iron plate; the leaves are ſpread on the plates, and kept rolling with the hands till they begin to curl up about the edges; they are then immediately ſwept off on tables, on which one perſon continues to roll them, while another fans them, that they may cool haſtily: this proceſs is repeated two or three times, or oftener, according as the leaves are diſpoſed to unbend on ſtanding.

Exsiccation of Herbs and Flowers.

Herbs and flowers are to be dried by the gentle heat of a ſtove or common fire, and only in that quantity at a time by which the exſiccation may be very ſoon finiſhed. By this means their ſtrength is beſt preſerved; and this is indicated in proportion as they retain their native colour.

But the leaves of hemlock, and ſome other herbs replete with a ſubtile volatile matter, are to be powdered immediately after the exſiccation, and preſerved in glaſs veſſels well ſhut.

Flowers.

Flowers are to be gathered when moderately expanded, on a clear dry day, before noon. Red roſes are taken before they open, and the white heels clipped off and thrown away.

The quick drying above recommended for the leaves of plants, is more particularly proper for flowers; in moſt of which both the colour and ſmell are more periſhable than in leaves, and more ſubject to be impaired by ſlow exſiccation. Of the flowers which come freſh into the apothecaries' hands, the only ones employed dry in the London pharmacopœia are red roſes; and theſe, in all the compoſitions in which they are uſed in a dry ſtate, are expreſsly ordered to be dried haſtily. One of the moſt valuable aromatics of European growth, ſaffron, is part of a flower, dried on paper on a kind of kiln, with a heat ſufficient to make it ſweat, taking care only not to endanger the ſcorching of it.

It may here be obſerved, that the virtues of flowers are confined to different parts of the flower in different plants. Saffron is a ſingular production, growing at the end of the ſtyle or piſtil. The active part of camomile flowers is the yellow diſk or button in the middle; that of lilies, roſes, clove-july-flowers, violets, and many others, the petala or flower-leaves: while roſemary has little virtue in any of theſe parts, the fragrance admired in the flowers of this plant reſiding chiefly in the cups.

Seeds and Fruits.

Seeds ſhould be collected when ripe and beginning to grow dry, before they fall off ſpontaneouſly. Fruits are alſo to be gathered when ripe, unleſs otherwiſe ordered.

Of the fruits whoſe collection comes under the notice of the apothecary, there are few which are uſed in an unripe ſtate; the principal is the ſloe, whoſe virtue as a mild aſtringent is much diminiſhed by maturation. The fruit of the orange tree, raiſed in our gardens or green-houſes, is ſometimes gathered in a ſtate of much greater immaturity, ſoon after it is formed on the tree, before it has acquired its acid juice; at this time it proves an elegant aromatic bitter, nearly reſembling what are called *Curaſſao oranges*, which appear to be no other than the ſame fruit gathered at the ſame period in a warmer climate.

The rule for collecting ſeeds is more general than any of the others, all the officinal ſeeds being in their greateſt perfection at the time of their maturity. As ſeeds contain little watery moiſture, they require no other warmth for drying them than that of the temperate air in autumn; ſuch as abound with a groſs expreſſible oil, as thoſe commonly called the *cold ſeeds*, ſhould never be expoſed to any conſiderable heat; for this would haſten the rancidity which, however carefully kept, they are very liable to contract. Seeds are beſt preſerved in their natural huſks or coverings, which ſhould be ſeparated only at the time of uſing; the huſk, or cortical part, ſerving to defend the ſeed from being injured by the air.

Woods and Barks.

The moſt proper ſeaſon for the felling of woods, or ſhaving off their barks, is generally the winter.

No woods of our own growth are now retained by the London or Edinburgh colleges. The only two which had formerly a place in the catalogues of ſimples were the juniper and the box; the firſt of which is never kept in the ſhops, or employed in practice; the other may be procured from the turner; and it is indifferent at what ſeaſon it has been cut down, being at all times ſufficiently fit for the only uſe to

which it was applied, the yielding an empyreumatic oil by diſtillation in a ſtrong fire.

It may be doubted whether barks are not generally more replete with medicinal matter in ſummer and ſpring than in winter. The barks of many trees are in ſummer ſo much loaded with reſin and gum as to burſt ſpontaneouſly, and diſcharge the redundant quantity. It is ſaid that the bark of the oak anſwers beſt for the tanners at the time of the riſing of the ſap in ſpring: and as its uſe in tanning depends on the ſame aſtringent quality for which it is uſed in medicine, it ſhould ſeem to be alſo fitteſt for medicinal purpoſes in the ſpring. It may be obſerved likewiſe, that it is in this laſt ſeaſon that barks in general are moſt conveniently peeled off.

Animal Substances.

Animal ſubſtances are to be choſen in their moſt perfect ſtate unleſs they be ordered otherwiſe.

Whatever virtues theſe bodies may have, they are ſuppoſed to be beſt when they have attained to their common full growth.

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MATERIAL, denotes ſomething compoſed of *matter*. In which ſenſe the word ſtands oppoſed to *immaterial*. See Matter and Metaphysics.

MATERIALISTS, a ſect in the ancient church, compoſed of perſons who, being prepoſſeſſed with that maxim in the ancient philoſophy, *Ex nihilo nihil fit*, "Out of nothing nothing can ariſe," had recourſe to an internal matter, on which they ſuppoſed God wrought in the creation; inſtead of admitting God alone as the ſole cauſe of the exiſtence of all things. Tertullian vigorouſly oppoſes the doctrine of the materialiſts, in his treatiſe againſt Hermogenes, who was one of their number.

Materialiſts is alſo a name given to thoſe who maintain that the ſoul of man is material; or that the principle of perception and thought is not a ſubſtance diſtinct from the body, but the reſult of corporeal organization: See Metaphysics. There are others, called by this name, who have maintained that there is nothing but matter in the univerſe; and that the Deity himſelf is material. See Spinosism.

MATHAM (Jaques), an engraver of conſiderable eminence, was born at Haerlem in 1571, and after the death of his father, Henry Goltzius, a celebrated painter and engraver, married his mother. From his father-in-law he learned the art of engraving. He went to Italy to complete his ſtudies from the works of the greateſt maſters; and in that country he engraved a conſiderable number of plates. At his return, he worked under the eye of Goltzius, and produced many very valuable prints. Following the example of his father-in-law, he worked entirely with the graver, in a clear, free ſtyle; and though he never equalled him in point of taſte or correctneſs of drawing, eſpecially when confined to the naked parts of the human figure, moſt of his prints are greatly eſteemed.

MATHEMATICS, the ſcience of quantity; or a ſcience that conſiders magnitudes either as computable or meaſurable. The word in its original, *μαθησις*, ſignifies *diſcipline*, or *ſcience* in the general; and ſeems to have been applied to the doctrine of quantity, either by way of eminence, or becauſe, this having the ſtart of all other ſciences, the reſt took their common name therefrom. See Science.

For the origin of the mathematics, Joſephus dates it before the flood, and makes the ſons of Seth obſervers of the courſe and order of the heavenly bodies: he adds, that, to perpetuate their diſcoveries, and ſecure them from the injuries either of a deluge or a conflagration, they had them engraven on two pillars, the one of ſtone, the other of brick; the former of which he ſays was ſtanding in Syria in his days. See Astronomy.

The firſt who cultivated mathematics after the flood were the Aſſyrians and Chaldeans; from whom, the ſame Joſephus adds, they were carried by Abraham to the Egyptians; who proved ſuch notable proficients, that Ariſtotle makes no ſcruple to fix the firſt riſe of mathematics among them. From Egypt, 584 years before Chriſt, they paſſed into Greece through the

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hands of Thales; who having learned geometry of the Egyptian prieſts, taught it in his own country. After Thales, comes Pythagoras; who, among other mathematical arts, paid a particular regard to arithmetic; fetching the greateſt part of his philoſophy from numbers: he was the firſt, as Laertius tells us, who abſtracted geometry from matter; and to him we owe the doctrine of incommenſurable magnitude, and the five regular bodies, beſides the firſt principles of muſic and aſtronomy. Pythagoras was ſeconded by Anaxagoras, Œnopides, Briſo, Antipho, and Hippocrates of Scio; who all applied themſelves particularly to the quadrature of the circle, the duplicature of the cube, &c. but the laſt with moſt ſucceſs: this laſt is alſo mentioned by Proclus, as the firſt who compiled elements of mathematics.

Democritus excelled in mathematics as well as phyſics; though none of his works in either kind are extant, the deſtruction of which ſome authors lay at Ariſtotle's door. The next in order is Plato, who not only improved geometry, but introduced it into phyſics, and ſo laid the foundation of a ſolid philoſophy. Out of his ſchool proceeded a crowd of mathematicians. Proclus mentions 13 of note; among whom was Leodamus, who improved the analyſis firſt invented by Plato; Theætetus, who wrote elements; and Archiates, who has the credit of being the firſt who applied mathematics to uſe in life. Theſe were ſucceeded by Neocles and Theon, the laſt of whom contributed to the elements. Eudoxus excelled in arithmetic and geometry, and was the firſt founder of a ſyſtem of aſtronomy. Menechmus invented the conic ſections, and Theudius and Hermotimus improved the elements.

For Ariſtotle, his works are ſo ſtored with mathematics, that Blancanus compiled a whole book of them: out of his ſchool came Eudemus and Theophraſtus; the firſt of whom wrote of numbers, geometry, and inviſible lines; the latter, a mathematical hiſtory. To Ariſteus, Iſidorus, and Hypſicles, we owe the books of ſolids; which, with the other books of elements, were improved, collected, and methodiſed by Euclid, who died 284 years before Chriſt.

An hundred years after Euclid, came Eratoſthenes and Archimedes. Cotemporary with the latter was Conon, a geometrician and aſtronomer. Soon after came Apollonius Pergæus; whoſe conics are ſtill extant. To him are likewiſe aſcribed the 14th and 15th books of Euclid, which are ſaid to have been contracted by Hypſicles. Hipparchus and Menelaus wrote on the ſubtenſes in a circle, the latter alſo on ſpherical triangles: Theodoſius's three books of ſpherics are ſtill extant. And all theſe, Menelaus excepted, lived before Chriſt.

A. D. 70. Ptolemy of Alexandria was born; the prince of aſtronomers, and no mean geometrician: he was ſucceeded by the philoſopher Plutarch, of whom we have ſtill extant ſome mathematical problems. After him came Eutocius, who commented on Archimedes, and occaſionally mentions

the inventions of Philo, Diocles, Nicomedes, Sporus, and Heron, on the duplicature of the cube. To Cteſebes of Alexandria we owe our pumps; and Geminus, who came ſoon after, is preferred by Proclus to Euclid himſelf.

Diophantus of Alexandria was a great maſter of numbers, and the firſt inventor of algebra: among others of the ancients, Nicomachus is celebrated for his arithmetical, geometrical, and muſical works; Serenus, for his books on the ſections of the cylinder; Proclus, for his comments on Euclid; and Theon has the credit, among ſome, of being author of the books of elements aſcribed to Euclid. The laſt to be named among the ancients, is Pappus of Alexandria, who flouriſhed A. D. 400, and is celebrated for his books of mathematical collections ſtill extant.

Mathematics are commonly diſtinguiſhed into *pure* and *ſpeculative*, which conſider quantity abſtractedly; and *mixed*, which treat of magnitude as ſubſiſting in material bodies, and conſequently are interwoven everywhere with phyſical conſiderations.

Mixed mathematics are very comprehenſive; ſince to them may be referred aſtronomy, optics, geography, hydroſtatics, mechanics, fortification, navigation, &c. See the articles ASTRONOMY, OPTICS, &c.

Pure mathematics have one peculiar advantage, that they occaſion no diſputes among wrangling diſputants, as in other branches of knowledge; and the reaſon is, becauſe the definitions of the terms are premiſed, and every body that reads a propoſition has the ſame idea of every part of it. Hence it is eaſy to put an end to all mathematical controverſies, by ſhowing either that our adverſary has not ſtuck to his definitions, or has not laid down true premiſes, or elſe that he has drawn falſe concluſions from true principles; and in caſe we are able to do neither of theſe, we muſt acknowledge the truth of what he has proved.

It is true that in mixed mathematics, where we reaſon mathematically upon phyſical ſubjects, we cannot give ſuch juſt definitions as the geometricians: we muſt therefore reſt content with deſcriptions; and they will be of the ſame uſe as definitions, provided we are conſiſtent with ourſelves, and always mean the ſame thing by thoſe terms we have once explained.

Dr. Barrow gives a moſt elegant deſcription of the excellence and uſefulneſs of mathematical knowledge, in his inaugural oration, upon being appointed profeſſor of mathematics at Cambridge.

The mathematics, he obſerves, effectually exerciſe, not vainly delude, nor vexatiouſly torment, ſtudious minds with obſcure ſubtilties; but plainly demonſtrate every thing within their reach, draw certain concluſions, inſtruct by profitable rules, and unfold pleaſant queſtions. Theſe diſciplines likewiſe enure and corroborate the mind to a conſtant diligence in ſtudy; they wholly deliver us from a credulous ſimplicity, moſt ſtrongly fortify us againſt the vanity of ſcepticiſm, effectually reſtrain us from a raſh preſumption, moſt eaſily incline us to a due aſſent, and perfectly ſubject us to the government of right reaſon. While the mind is abſtracted and elevated from ſenſible matter, diſtinctly views pure forms, conceives the beauty of ideas, and inveſtigates the harmony of proportions; the manners themſelves are ſenſibly corrected and improved, the affections compoſed and rectified, the fancy calmed and ſettled, and the underſtanding raiſed and excited to more divine contemplations.

MATHEMATICAL, any thing belonging to the ſcience of mathematics.

MATHEMATICAL *Inſtruments*, ſuch inſtruments as are uſually employed by mathematicians, as compaſſes, ſcales, quadrants, &c.

Machine for dividing MATHEMATICAL *Inſtruments*. See RAMSDEN's *Machine*.

MATHER (DR. COTTON), an eminent American divine, born at Boſton in New England in the year 1663. He was educated in Harward college, and in 1684 became miniſter of Boſton; in the diligent diſcharge of which office he ſpent his life, and promoted ſeveral excellent ſocieties for the public good: particularly one for ſuppreſſing diſorders, one for reforming manners, and a ſociety of peace-makers, whoſe profeſſed buſineſs it was to compoſe differences and prevent lawſuits. His reputation was not confined to his own country; for in 1710 the univerſity of Glaſgow ſent him a diploma for the degree of doctor in divinity, and in 1714 the Royal Society of London choſe him one of their fellows. He died in 1728; and is ſaid to have publiſhed in his life-time 382 pieces, including ſingle ſermons, eſſays, &c. yet ſeveral were of a larger ſize, among which was *Magnalia Chriſti Americana*, or an Eccleſiaſtical Hiſtory of New-England, from its firſt planting in 1620 to 1698, folio. But the moſt remarkable of all his works was that in which, like Glanville, he defended the doctrine of witchcraft. We ſhall content ourſelves with giving the title at large, which is as follows: "The Wonders of the Inviſible World; being an account of the trials of ſeveral witches lately executed in New-England, and of ſeveral remarkable curioſities therein occurring. Together with, 1. Obſervations on the nature, the number, and the operations of the devils. 2. A ſhort narrative of a late outrage committed by a knot of witches in Swedeland; very much reſembling and ſo far explaining that under which New-England has laboured. 3. Some counſels directing a due improvement of the terrible things lately done by the unuſual and amazing range of evil ſpirits in New-England. 4. A brief diſcourſe upon the temptations which are the more ordinary devices of Satan. By Cotton Mather: publiſhed by the ſpecial command of his excellency the governor of the province of Maſſachuſet's Bay in New-England." Printed firſt at Boſton in New-England, and reprinted at London in 1693, 4to.

MATLOCK, a town or village of Derbyſhire, near Wirkſworth, ſituated on the very edge of the Derwent; noted for its bath, the water of which is milk-warm; and remarkable for the huge rocks in its environs, particularly thoſe called the *Torr*, on the eaſt ſide of the Derwent, over againſt it, which ſeem to be piled one upon another. It is an extenſive ſtraggling village, built in a very romantic ſtyle, on the ſteep ſide of a mountain, riſing irregularly from the bottom to nearly the ſummit. Near the bath are ſeveral ſmall houſes, whoſe ſituation is on the little natural horizontal parts of the mountain, a few yards above the road, and in ſome places the roofs of ſome almoſt touch the floors of others. There are excellent accommodations for company who reſort to the bath; and the poorer inhabitants are ſupported by the ſale of petrifactions, cryſtals, &c. and notwithſtanding the rockineſs of the ſoil, the cliffs produce an immenſe number of trees, whoſe foliage adds greatly to the beauty of the place.

MATRASS, CUCURBIT, or BOLT-HEAD, among chemiſts. See CHEMISTRY.

MATRICARIA, FEVERFEW, in botany: a genus of the polygamia ſuperflua order, belonging to the ſyngeneſia claſs of plants; and in the natural method ranking under the 49th order, *Compoſitæ*. The receptacle is naked; there is no pappus; the calyx hemiſpherical and imbricated, with the marginal leaflets ſolid, and ſomething ſharp. There are five ſpecies, but the only remarkable one is the parenthium or common feverfew. This hath very fibrous cluſtering roots, crowned with numerous compound leaves, upright ſtalks branching on every ſide two or three feet high; garniſhed with compound

plain leaves of ſeven oval folioles, cut into many parts; and all the branches terminated by many compound radiated white flowers having a yellow diſk. There are varieties with double flowers, with ſemi-double flowers, with double fiſtular flowers, with a fiſtular diſc and plain radius, with ſhort-rayed flowers, with rayleſs flowers, with rayleſs ſulphur-coloured heads, and with finely curled leaves.—All theſe varieties flower abundantly in June, each flower being compoſed of numerous hermaphrodite and female florets; the former compoſe the diſk, the latter the radius or border, and which, in the double and fiſtulous kinds, are very ornamental in gardens, but of a diſagreeable odour; and are all ſucceeded by plenty of ſeed in autumn, by which they are eaſily propagated, as well as by parting the roots and cuttings. This plant has received a moſt extraordinary character in hyſteric and other affections of the nerves, as well as for being a carminative or warm ſtimulating bitter. Dr. Lewis, however, thinks it inferior to camomile; with which he ſays it agrees in all its ſenſible qualities, only being ſomewhat weaker.

MATRICE, or MATRIX. See MATRIX.

MATRICE, or matrix, in dyeing, is applied to the five ſimple colours, whence all the reſt are derived or compoſed. Theſe are, the black, white, blue, red, and yellow or root-colour.

MATRICE, or matrices, uſed by the letter founders, are thoſe little pieces of copper or braſs, at one end whereof are engraven, dent-wiſe, or *en creux*, the ſeveral characters uſed in the compoſing of books. Each character, virgula, and even each point in a diſcourſe, has its ſeveral matrix; and of conſequence, its ſeveral puncheon to ſtrike it. They are the engravers on metal that cut or grave the matrices. When types are to be caſt, the matrice is faſtened to the end of a mould, ſo diſpoſed as that when the metal is poured on it, it may fall into the creux or cavity of the matrice, and take the figure and impreſſion thereof. See *Letter*-FOUNDERY.

MATRICES, uſed in coining, are pieces of ſteel in form of dyes, whereon are engraven the ſeveral figures, arms, characters, legends, &c. wherewith the ſpecies are to be ſtamped. The engraving is performed with ſeveral puncheons, which being formed in relievo, or prominent, when ſtruck on the metal, make an indented impreſſion, which the French call *en creux*.

MATRICULA, a regiſter kept of the admiſſion of officers and perſons entered into any body or ſociety whereof a liſt is made. Hence thoſe who are admitted into our univerſities are ſaid to be matriculated. Among eccleſiaſtical authors, we find mention made of two kinds of matriculæ; the one containing a liſt of the eccleſiaſtics called *matricula clericorum*; the other of the poor ſubſiſted at the expence of the church, called *matricula pauperum*.

MATRICULA was alſo applied to a kind of alms-houſe, where the poor were provided for. It had certain revenues appropriated to it, and was uſually built near the church; whence the name was alſo frequently given to the church itſelf.

MATRIMONY. See MARRIAGE.

MATRIX, in anatomy, the womb, or that part of the female of any kind, wherein the fœtus is conceived and nouriſhed till the time of its delivery. See ANATOMY.

MATRIX is alſo applied to places proper for the generation of vegetables, minerals, and metals. Thus the earth is the matrix wherein ſeeds ſprout; and marcaſites are by many conſidered as the matrices of metals. The matrix of ores is the earthy and ſtony ſubſtances in which theſe metallic matters are inveloped: theſe are very various, frequently ſpar, quartz, fluors, or horn blend.

MATRON, an elderly married woman.

Jury of MATRONS. When a widow feigns herſelf with child in order to exclude the next heir, and a ſuppoſititious birth is ſuſpected to be intended, then, upon the writ *de ventre inſpiciendo*, a jury of women is to be impanelled to try the queſtion whether the woman is with child or not. So, if a woman is convicted of a capital offence, and, being condemned to ſuffer death, pleads in ſtay of execution, that ſhe is pregnant, a jury of matrons is impanelled to enquire into the truth of the allegation; and if they find it true, the convict is reſpited till after her delivery.

MATRONA (anc. geog.), a river ſeparating Gallia Celtica from the Belgica (Ceſar). Now the Marne, which, riſing in Champaign near Langres, runs north-weſt, and then weſt, and paſſing by Meaux falls into the Seine at Charenton, two leagues to the eaſt of Paris.

MATRONALIA, a Roman feſtival inſtituted by Romulus, and celebrated on the kalends of March, in honour of Mars. It was kept by matrons in particular, and bachelors were entirely excluded from any ſhare in the ſolemnity. The men during this feaſt ſent preſents to the women, for which a return was made by them at the Saturnalia: and the women gave the ſame indulgence to their ſervants now which the men gave to theirs at the feaſt of Saturn, ſerving them at table, and treating them as ſuperiors.

MATROSSES, a name heretofore given to ſoldiers in the artillery, who are next to the gunners, and aſſiſt them in loading, firing, and ſponging the great guns. They are now, however, called ſecond gunners. They carry firelocks, and march along with the ſtore-waggons, both as a guard, and to give their aſſiſtance in caſe a waggon ſhould break down.

MATSYS (QUINTIN), a painter of hiſtory and portraits, was born at Antwerp in 1460, and for ſeveral years followed the trade of a blackſmith or farrier, at leaſt till he was in his 20th year. Authors vary in their accounts of the cauſe of his quitting his firſt occupation, and attaching himſelf to the art of painting. Some affirm, that the firſt unfolding of his genius was occaſioned by the ſight of a print which accidentally was ſhown to him by a friend, who came to pay him a viſit while he was in a declining ſtate of health, from the labour of his former employment, and that by his copying the print with ſome degree of ſucceſs, he was animated with a deſire to learn the art of painting. Others ſay, he fell in love with a young woman of great beauty, the daughter of a painter, and they allege that love alone wrought the miracle, as he could have no proſpect of obtaining her except by a diſtinguiſhed merit in the profeſſion of painting: for which reaſon he applied himſelf with inceſſant labour to ſtudy and practiſe the art, till he became ſo eminent as to be entitled to demand her in marriage, and he ſucceeded. Whatever truth may be in either of theſe accounts, it is certain that he appeared to have an uncommon genius: his manner was ſingular, not reſembling the manner of any other maſter, and his pictures were ſtrongly coloured and carefully finiſhed, but yet they have ſomewhat dry and hard. By many competent judges it was believed, when they obſerved the ſtrength of expreſſion in ſome of his compoſitions, that if he had ſtudied in Italy to acquire ſome knowledge of the antiques, and the great maſters of the Roman ſchool, he would have proved one of the moſt eminent painters of the Low Countries. But he only imitated ordinary life; and ſeemed more inclined, or at leaſt more qualified, to imitate the defects than the beauties of nature. Some hiſtorical compoſitions of this maſter deſerve commendation; particularly a deſcent from the croſs, which is in the cathedral at Antwerp; and it is juſtly admired for the ſpirit, ſkill, and delicacy of the whole. But the moſt remarkable and beſt known picture of Matſys, is that of the two miſers in the gallery at Windſor.

He died in 1520. He had a ſon, John, who painted in the ſame ſtyle and manner, but not with a reputation equal to his father; though many of his pictures are ſold to unſkilful purchaſers for the paintings of Quintin. His moſt frequent ſubject was the repreſentation of miſers counting their gold, or bankers examining and weighing it.

MATT, in a ſhip, is a name given to rope-yarn, junk, &c. beat flat and interwoven; uſed in order to preſerve the yards from galling or rubbing in hoiſting or lowering them.

MATTER, in common language, is a word of the ſame import with *body*, and denotes that which is tangible, viſible, and extended; but, among philoſophers, it ſignifies that ſubſtance of which all bodies are compoſed; and in this ſenſe it is ſynonymous with the word ELEMENT. It is only by the ſenſes that we have any communication with the external world; but the immediate objects of ſenſe philoſophers have in general agreed to term *qualities*, which they conceive as inhering in ſomething which is called their *ſubject* or *ſubſtratum*. It is this ſubſtratum of ſenſible qualities which, in the language of philoſophy, is denominated *matter*; ſo that *matter* is *not* that which we immediately ſee or handle, but the *concealed ſubject* or *ſupport* of viſible and tangible qualities. What the moderns term *qualities*, was by Ariſtotle and his followers called *form*; but ſo far as the two doctrines are intelligible, there appears to be no eſſential difference between them. From the moderns we learn that body conſiſts of *matter* and *qualities*; and the Peripatetics taught the ſame thing, when they ſaid that body is compoſed of *matter* and *form*. How philoſophers were led to analyſe body into matter and form, or, to uſe modern language, into matter and qualities; what kind of exiſtence they attribute to each; and whether *matter* muſt be conceived as ſelf-exiſtent or created—are queſtions which ſhall be conſidered afterwards. (See METAPHYSICS.) It is ſufficient here to have defined the term.

MATTHEW, or *Goſpel of St.* MATTHEW, a canonical book of the New Teſtament. St. Matthew wrote his Goſpel in Judæa, at the requeſt of thoſe he had converted; and it is thought he began in the year 41, eight years after Chriſt's reſurrection. It was written, according to the teſtimony of all the ancients, in the Hebrew or Syriac language; but the Greek verſion, which now paſſes for the original, is as old as the apoſtolical times.

St. MATTHEW *the Evangeliſt's Day*, a feſtival of the Chriſtian church, obſerved on September 21ſt.

St. MATTHEW, the ſon of Alpheus, was alſo called *Levi*. He was of Jewiſh original, as both his names diſcover, and probably a Galilean. Before his call to the apoſtolate he was a publican or toll-gatherer to the Romans; an office of bad repute among the Jews, on account of the covetouſneſs and exaction of thoſe who managed it: St. Matthew's office particularly conſiſting in gathering the cuſtoms of all merchandize that came by the ſea of Galilee, and the tribute that paſſengers were to pay who went by water. And here it was that Matthew ſat at the receipt of cuſtom when our Saviour called him to be a diſciple. It is probable that, living at Capernaum, the place of Chriſt's uſual reſidence, he might have ſome knowledge of him before he was called. Matthew immediately expreſſed his ſatisfaction in being called to this high dignity, by entertaining our Saviour and his diſciples at a great dinner at his own houſe, whither he invited all his friends, eſpecially thoſe of his own profeſſion, hoping, probably, that they might be influenced by the company and converſation of Chriſt. St. Matthew continued with the reſt of the apoſtles till after our Lord's aſcenſion. For the firſt eight years afterwards he preached in Judæa. Then he betook himſelf to propagating the goſpel among the Gentiles, and choſe Ethiopia as the ſcene of his apoſtolical miniſtry; where it is ſaid he ſuffered martyrdom, but by what kind of death is altogether uncertain. It is pretended, but without any foundation, that Hyrtacus, king of Ethiopia, deſiring to marry Iphigenia, the daughter of his brother and predeceſſor Æglippus, and the apoſtle having repreſented to him that he could not lawfully do it, the enraged prince ordered his head immediately to be cut off. Baronius tells us, the body of St. Matthew was tranſported from Ethiopia to Bithynia, and from thence was carried to Salernum in the kingdom of Naples, in the year 954, where it was found in 1080, and where duke Robert built a church bearing his name.

St. MATTHEW, a town of Spain, in the kingdom of Arragon, ſeated on a pleaſant plain, and in a very fertile country, watered with many ſprings. W. lon. 0. 15. N. lat. 40. 22.

MATTHEW *of Paris* See PARIS.

MATTHEW *of Weſtminſter*, a Benedictine monk and accompliſhed ſcholar, who wrote a hiſtory from the beginning of the world to the end of the reign of Edward I. under the title of *Flores Hiſtoriarum*; which was afterwards continued by other hands. He died in 1380.

St. MATTHIAS, an apoſtle, was choſen inſtead of Judas. He preached in Judæa and part of Ethiopia, and ſuffered martyrdom. See the *Acts of the Apoſtles*, chap. 1. There was a goſpel publiſhed under Matthias's name, but rejected as ſpurious; as likewiſe ſome traditions, which met with the ſame fate.

St. MATTHIAS's *Day*; a feſtival of the Chriſtian church, obſerved on the 24th of February. St. Matthias was an apoſtle of Jeſus Chriſt, but not of the number of the 12 choſen by Chriſt himſelf. He obtained this high honour upon a vacancy made in the college of the apoſtles by the treaſon and death of Judas Iſcariot. The choice fell upon Matthias by lot; his competitor being Joſeph called *Barſabas*, and ſurnamed *Juſtus*. Matthias was qualified for the apoſtleſhip, by having been a conſtant attendant upon our Saviour all the time of his miniſtry. He was, probably, one of the 70 diſciples. After our Lord's reſurrection, he preached the goſpel firſt in Judæa. Afterwards it is probable he travelled eaſtwards, his reſidence being principally near the irruption of the river Apſarus and the haven Hyſſus. The barbarous people treated him with great rudeneſs and inhumanity; and, after many labours and ſufferings in converting great numbers to Chriſtianity, he obtained the crown of martyrdom; but by what kind of death, is uncertain.—They pretend to ſhow the relics of St. Matthias at Rome; and the famous abbey of St. Matthias near Treves boaſts of the ſame advantage; but doubtleſs both without any foundation. There was a goſpel aſcribed to St. Matthias; but it was univerſally rejected as ſpurious.

MATTIACÆ AQUÆ, or MATTIACI FONTES, (anc. geog.), now Wiſbaden, oppoſite to Mentz, in the Weteravia. E. lon. 8. N. lat. 50. 6.

MATTIACUM, or MATTIUM, (anc. geog.), a town of the Mattiaci, a branch of the Catti in Germany. Now Marpurg in Heſſe. E. lon. 8. 40. N. lat. 50. 40.

MATTINS, the firſt canonical hour, or the firſt part of the daily ſervice in the Romiſh church.

MATTHIOLUS (PETER ANDREW), an eminent phyſician in the 16th century, born at Sienna, was well ſkilled in the Greek and Latin tongues. He wrote learned commentaries on Dioſcorides, and other works which are eſteemed; and died in 1577.

MATURANTS, in ſurgery, applications which promote the ſuppuration of tumours.

MATY (MATTHEW), M. D. an eminent phyſician and polite writer, was born in Holland in the year 1718. He was the ſon of a clergyman, and was originally intended for the church; but, in conſequence of ſome mortifications his father met with from the ſynod, on account of ſome particular ſenti-

ments he entertained about the doctrine of the Trinity, turned his thoughts to phyſic. He took his degree of M. D. at Leyden; and in 1740 came to ſettle in England, his father having determined to quit Holland for ever. In order to make himſelf known, in 1749 he began to publiſh in French an account of the productions of the Engliſh preſs, printed at the Hague under the name of the *Journal Britannique*. This journal, which continues to hold its rank among the beſt of thoſe which have appeared ſince the time of Bayle, anſwered the chief end he intended by it, and introduced him to the acquaintance of ſome of the moſt reſpectable literary characters of the country he had made his own. It was to their active and uninterrupted friendſhip he owed the places he afterwards poſſeſſed. In 1758 he was choſen fellow; and in 1765, on the reſignation of Dr. Birch, who died a few months after, and made him his executor, ſecretary to the royal ſociety. He had been appointed one of the under librarians of the Britiſh Muſeum at its firſt inſtitution in 1753, and became principal librarian at the death of Dr. Knight in 1772. Uſeful in all theſe poſts, he promiſed to be eminently ſo in the laſt, when he was ſeized with a languiſhing diſorder, which in 1776 put an end to a life which had been uniformly devoted to the purſuit of ſcience and the offices of humanity. He was an early and active advocate for inoculation; and when there was a doubt entertained that one might have the ſmall-pox this way a ſecond time, he tried it upon himſelf unknown to his family. He was a member of the medical club (with the Drs. Parſons, Templeman, Fothergill, Watſon, and others), which met every fortnight in St. Paul's church-yard. He was twice married, viz. the firſt time to Mrs. Elizabeth Boiſragon, and the ſecond to Mrs. Mary Deners. He left a ſon and three daughters. He had nearly finiſhed the Memoirs of the Earl of Cheſterfield, which were completed by his ſon-in-law Mr. Juſtamond, and prefixed to that nobleman's Miſcellaneous Works, 1777, 2 vols. 4to.

MATY (Paul Henry), M. A. F. R. S. ſon of the former, was educated at Weſtminſter, and Trinity college Cambridge, and had their travelling fellowſhip for three years. He was afterwards chaplain to lord Stormont at Paris in 17.., and ſoon after vacated his next fellowſhip by marrying one of the three daughters of Joſeph Clark, eſq. ſiſter of the late captain Charles Clark (who ſucceeded to the command on the death of captain Cook). On his father's death in 17-6, he ſucceeded to the office of one of the under librarians of the Britiſh Muſeum, and was afterwards preferred to a ſuperior department, having the care of the antiquities, for which he was eminently well qualified. In 1776 he alſo ſucceeded his father in the office of ſecretary to the royal ſociety. On the diſputes reſpecting the reinſtatement of Dr. Hutton in the department of ſecretary for foreign correſpondence, 1784, Mr. Maty took a warm and diſtinguiſhed part, and reſigned the office of ſecretary; after which he undertook to aſſiſt gentlemen or ladies in perfecting their knowledge of the Greek, Latin, French, and Italian claſſics. Mr. Maty was a thinking conſcientious man; and having conceived ſome doubts about the articles he had ſubſcribed in early life, he never could be prevailed upon to place himſelf in the way of eccleſiaſtical preferment, though his connections were amongſt thoſe who could have ſerved him eſſentially in this point; and ſoon after his father's death he withdrew himſelf from miniſtering in the eſtabliſhed church, his reaſons for which he publiſhed in the 47th volume of the Gent. Magazine, p. 466. His whole life was thenceforwards taken up in literary purſuits. He received 100l. from the duke of Marlborough, with a copy of that beautiful work the *Gemmæ Marlburienſes*, of which only 100 copies were worked off for preſents; and of which Mr. Maty wrote the French account, as Mr. Bryant did the Latin. In January 1782 he ſet on foot a Review of Publications, principally foreign, which he carried on, with great credit to himſelf and ſatisfaction to the public, for near five years, when he was obliged to diſcontinue it from ill health. He had long laboured under an aſthmatic complaint, which at times made great ravages in his conſtitution, and at laſt put a period to his life in January 1787, at the age of 42; leaving behind him one ſon.—Mr. Maty enjoyed a reſpectable rank in the republic of letters, and by his talents and attainments was fully entitled to it. He was eminently acquainted with ancient and modern literature, and particularly converſant in critical reſearches. The purity and probity of his nature were unqueſtionable; and his humanity was as exquiſite as it would have been extenſive, had it been ſeconded by his fortune.

MAUCAUCO, Macaco, or *Maki*, in zoology. See Lemur.

MAVIS, in ornithology, a ſpecies of turdus. See Turdus.

MAUBEUGE, a fortified town of France, in the department of the North, and late province of French Hainault, with a late abbey of noble canoneſſes. In September 1793 the Auſtrians formed the blockade of this place, but were driven from their poſition in the following month. It is ſeated on the Sambre, 12 miles ſouth of Mons, and 40 ſouth-weſt of Bruſſels. E. lon. 4 5. N. lat. 50. 15.

MAUNCH, in heraldry, the figure of an ancient coat ſleeve, borne in many gentlemen's eſcutcheons.

MAUNDY Thursday, is the Thurſday in Paſſion week, which was called *Maundy* or *Mandate Thurſday*, from the command which our Saviour gave his apoſtles to commemorate him in the Lord's ſupper, which he this day inſtituted; or from the new commandment which he gave them to love one another, after he had waſhed their feet as a token of his love to them.

MAUPERTUIS (Peter Louis Morceau de), a celebrated French academician, was born at St. Malo in 1698; and was there privately educated till he arrived at his 16th year, when he was placed under the celebrated profeſſor of philoſophy M. le Blond, in the college of la Marche at Paris. He ſoon diſcovered a paſſion for mathematical ſtudies, and particularly for geometry. He likewiſe practiſed inſtrumental muſic in his early years with great ſucceſs; but fixed on no profeſſion till he was 20, when he entered into the army. He firſt ſerved in the Grey Muſqueteers, but in the year 1720 his father purchaſed him a company of cavalry in the regiment of La Rocheguyon. He remained but five years in the army, during which time he purſued his mathematical ſtudies with great vigour; and it was ſoon remarked by M. Freret and other academicians, that nothing but geometry could ſatisfy his active ſoul and unbounded thirſt for knowledge. In the year 1723 he was received into the Royal Academy of Sciences, and read his firſt performance, which was a memoir upon the conſtruction and form of muſical inſtruments, November 15, 1724. During the firſt years of his admiſſion he did not wholly confine his attention to mathematics; he dipped into natural philoſophy, and diſcovered great knowledge and dexterity in obſervations and experiments upon animals. If the cuſtom of travelling into remote climates, like the ſages of antiquity, in order to be initiated into the learned myſteries of thoſe times, had ſtill ſubſiſted, no one would have conformed to it with greater eagerneſs than M. de Maupertuis. His firſt gratification of this paſſion was to viſit the country which had given birth to Newton; and during his reſidence at London he became as zealous an admirer and follower of that philoſopher as of any one of his own countrymen. His next excurſion was to Baſil in Switzerland, where he formed a friendſhip with the famous John Bernouilli and his family, which continued to his death. At his return to Paris, he applied himſelf to his favourite ſtudies with greater zeal than ever:—and how well he

fulfilled the duties of an academician, may be gathered by running over the memoirs of the academy from the year 1724 to 1736; where it appears that he was neither idle nor occupied by objects of small importance. The most sublime questions in geometry and the relative sciences received from his hands that elegance, clearness, and precision, so remarkable in all his writings. In the year 1736 he was sent by the king of France to the polar circle, to measure a degree, in order to ascertain the figure of the earth, accompanied by Messrs. Clairault, Camus, Le Monnier, l'abbé Outhier, and Celsius the celebrated professor of astronomy at Upsal. This distinction rendered him so famous, that, at his return, he was admitted a member of almost every academy in Europe.

In the year 1740 Maupertuis had an invitation from the king of Prussia to go to Berlin; which was too flattering to be refused. His rank among men of letters had not wholly effaced his love for his first profession, namely, that of arms. He followed his Prussian majesty into the field, and was a witness of the dispositions and operations that preceded the battle of Molwitz; but was deprived of the glory of being present, when victory declared in favour of his royal patron, by a singular kind of adventure. His horse, during the heat of the action, running away with him, he fell into the hands of the enemy; and was at first but roughly treated by the Austrian soldiers, to whom he could not make himself known for want of language; but being carried prisoner to Vienna, he received such honours from their imperial majesties as were never effaced from his memory. From Vienna he returned to Berlin; but as the reform of the academy which the king of Prussia then meditated was not yet mature, he went again to Paris, where his affairs called him, and was chosen in 1742 director of the academy of sciences. In 1743 he was received into the French academy; which was the first instance of the same person being a member of both the academies at Paris at the same time. M. de Maupertuis again assumed the soldier at the siege of Fribourg, and was pitched upon by marshal Coigny and the count d'Argenson to carry the news to the French king of the surrender of that citadel.

He returned to Berlin in the year 1744, when a marriage was negotiated and brought about, by the good offices of the queen-mother, between our author and mademoiselle de Borck, a lady of great beauty and merit, and nearly related to M. de Borck at that time minister of state. This determined him to settle at Berlin, as he was extremely attached to his new spouse, and regarded this alliance as the most fortunate circumstance of his life.

In the year 1746, M. de Maupertuis was declared by his Prussian majesty president of the royal academy of sciences at Berlin, and soon after by the same prince was honoured with the order of Merit. However, all these accumulated honours and advantages, so far from lessening his ardour for the sciences, seemed to furnish new allurements to labour and application. Not a day passed but he produced some new project or essay for the advancement of knowledge. Nor did he confine himself to mathematical studies only: metaphysics, chemistry, botany, polite literature, all shared his attention, and contributed to his fame. At the same time, he had, it seems, a strange inquietude of spirit, with a dark atrabilaire humour, which rendered him miserable amidst honours and pleasures. Such a temperament did not promise a very pacific life; and he was engaged in several quarrels. He had a quarrel with Koenig the professor of philosophy at Francker, and another more terrible with Voltaire. Maupertuis had inserted into the volume of Memoirs of the Academy of Berlin for 1746, a discourse upon the laws of motion; which Koenig was not content with attacking, but attributed to Leibnitz. Maupertuis, stung with the imputation of plagiarism, engaged the academy of Berlin to call upon him for his proof; which Koenig failing to produce, he was struck out of the academy of which he was a member. Several pamphlets were the consequence of this; and Voltaire, for some reason or other, engaged against Maupertuis. We say, for some reason or other: because Maupertuis and Voltaire were apparently upon the most amicable terms; and the latter respected the former as his master in the mathematics. Voltaire, however, exerted all his wit and satire against him; and on the whole was so much transported beyond what was thought right, that he found it expedient in 1753 to quit the court of Prussia.

Our philosopher's constitution had long been considerably impaired by the great fatigues of various kinds in which his active mind had involved him; though from the amazing hardships he had undergone in his northern expedition, most of his future bodily sufferings may be traced. The intense sharpness of the air could only be supported by means of strong liquors; which helped but to lacerate his lungs, and bring on a spitting of blood, which began at least 12 years before he died. Yet still his mind seemed to enjoy the greatest vigour; for the best of his writings were produced, and most sublime ideas developed, during the time of his confinement by sickness, when he was unable to occupy his presidial chair at the academy. He took several journeys to St. Malo, during the last years of his life, for the recovery of his health: and though he always received benefit by breathing his native air, yet still, upon his return to Berlin, his disorder likewise returned with greater violence.—His last journey into France was undertaken in the year 1757; when he was obliged, soon after his arrival there, to quit his favourite retreat at St. Malo, on account of the danger and confusion which that town was thrown into by the arrival of the English in its neighbourhood. From thence he went to Bourdeaux, hoping there to meet with a neutral ship to carry him to Hamburgh, in his way back to Berlin; but being disappointed in that hope, he went to Toulouse, where he remained seven months. He had then thoughts of going to Italy, in hopes a milder climate would restore him to health; but finding himself grow worse, he rather inclined towards Germany, and went to Neufchatel, where for three months he enjoyed the conversation of Lord Marischal, with whom he had formerly been much connected. At length he arrived at Basil, October 16, 1758, where he was received by his friend Bernouilli and his family with the utmost tenderness and affection. He at first found himself much better here than he had been at Neufchatel: but this amendment was of short duration; for, as the winter approached, his disorder returned, accompanied by new and more alarming symptoms. He languished here many months, during which he was attended by M. de la Condamine; and died in 1759.

He wrote in French, 1. The figure of the earth determined. 2. The measure of a degree of the meridian. 3. A discourse on the parallax of the moon. 4. A discourse on the figure of the stars. 5. The elements of geography. 6. Nautical astronomy. 7. Elements of astronomy. 8. A physical dissertation on a white inhabitant of Africa. 9. An essay on cosmography. 10. Reflections on the origin of languages. 11. An essay on moral philosophy. 12. A letter on the progress of the sciences. 13. An essay on the formation of bodies. 14. An eulogium on M. de Montesquieu. 15. Letters, and other works.

MAUR (St.), was a celebrated disciple of St. Benedict. If we can believe a life of St. Maur ascribed to Faustus his companion, he was sent by Benedict on a mission to France. But this life is considered as apocryphal. In rejecting it, however, as well as the circumstances of the mission, we must beware of denying the mission itself. It is certain that it was believed in France as early as the 9th century; and notwithstanding the silence of Bede, Gregory of Tours, and others, there are several

documents which prove this, or at leaſt render it extremely probable. A celebrated ſociety of Benedictines took the name of *St. Maur* in the beginning of the laſt century, and received the ſanction of Pope Gregory XV. in 1621. This ſociety was early diſtinguiſhed by the virtue and the knowledge of its members, and it ſtill ſupports the character. There are perhaps fewer eminent men in it than formerly; but this muſt be aſcribed to the levity of the age, and partly to the little encouragement for the reſearches of learned men. The chief perſons of ingenuity which this ſociety has produced are, the Fathers Menard, d'Acheri, Mabillon, Ruinart, Germain, Lami, Montfaucon, Martin, Vaiſſette, le Nourri, Martianay, Martenne, Maſſuet, &c. &c. See *L'Hiſtoire Litteraire de la Congregation de St. Maur*, publiſhed at Paris under the title of *Bruſſels*, in 4to. 1770, by Dom. Taſſin.

MAURICEAU (Francis), a French ſurgeon, who applied himſelf with great ſucceſs and reputation to the theory and practice of his art for ſeveral years at Paris. Afterwards he confined himſelf to the diſorders of pregnant and lying-in women, and was at the head of all the operators in this way. His *Obſervations ſur la groſſeſſe et ſur l'accouchement des femmes, ſur leurs maladies, et celles des enfans nouveaux*, 1694, in 4to. is reckoned an excellent work, and has been tranſlated into ſeveral languages; German, Flemiſh, Italian, Engliſh: and the author himſelf tranſlated it into Latin. It is illuſtrated with cuts. He publiſhed another piece or two, by way of ſupplement, on the ſame ſubject; and died at Paris in 1709.

MAURICE (St.), commander of the Theban legion, was a Chriſtian, together with the officers and ſoldiers of that legion, amounting to 6600 men. This legion received its name from the city Thebes in Egypt, where it was raiſed. It was ſent by Diocleſian to check the Bagaudac, who had excited ſome diſturbances in Gaul. Maurice having carried his troops over the Alps, the emperor Maximinian commanded him to employ his utmoſt exertions to extirpate Chriſtianity. This propoſal was received with horror both by the commander and by the ſoldiers. The emperor, enraged at their oppoſition, commanded the legion to be decimated; and when they ſtill declared that they would ſooner die than do any thing prejudicial to the Chriſtian faith, every tenth man of thoſe who remained was put to death. Their perſeverance excited the emperor to ſtill greater cruelty; for, when he ſaw that nothing could make them relinquiſh their religion, he commanded his troops to ſurround them, and cut them to pieces. Maurice, the commander of theſe Chriſtian heroes, and Exuperus and Candidus, officers of the legion, who had chiefly inſtigated the ſoldiers to this noble reſiſtance, ſignalized themſelves by their patience and their attachment to the doctrines of the Chriſtian religion. They were maſſacred, it is believed, at Agaune, in Chablais, the 22d of September 286. Notwithſtanding many proofs which ſupport this tranſaction, Dubordier, Hottinger, Moyle, Burnet, and Moſheim, are diſpoſed to deny the fact. It is defended, on the other hand, by Hickes, an Engliſh writer, and by Dom Joſeph de Liſle a Benedictine monk *de la congregation de St. Vannes*, in a work of his, entitled, *Defence de la Verité du Martyre de la Legion Thebenne*, 1737. In defence of the ſame fact, the reader may conſult *Hiſtoria di S. Mauritie*, by P. Roſſignole a Jeſuit, and the *Acta Sanctorum* for the month of September. The martyrdom of this legion, written by St. Eucherius biſhop of Lyons, was tranſmitted to poſterity in a very imperfect manner by Surius. P. Chifflet, a Jeſuit, diſcovered, and gave to the public, an exact copy of this work. Dom Ruinart maintains, that it has every mark of authenticity. St. Maurice is the patron of a celebrated order in the king of Sardinia's dominions, created by Emmanuel Philibert duke of Savoy, to reward military merit, and approved by Gregory XIII. in 1572. The commander of the Theban legion muſt not be confounded with another *St. Maurice*, mentioned by Theodoret, who ſuffered martyrdom at Apamea, in Syria.

Maurice (Mauritius Tiberius), was born at Arabiſſus in Cappadocia, A. D. 539. He was deſcended from an ancient and honourable Roman family. After he had filled ſeveral offices in the court of Tiberius Conſtantine, he obtained the command of his armies againſt the Perſians. His gallantry was ſo conſpicuous, that the emperor gave him his daughter Conſtantina in marriage, and inveſted him with the purple the 13th Auguſt 582. The Perſians ſtill continued to make inroads on the Roman territories, and Maurice ſent Philippicus, his brother-in-law, againſt them. This general conducted the war with various ſucceſs. At firſt he gained ſeveral ſplendid victories, but he did not continue to have a decided ſuperiority. As there was great uſe for ſoldiers in theſe unfortunate times, the emperor iſſued a mandate in 592, forbidding any ſoldier to become a monk till he had accompliſhed the term of his military ſervice. Maurice acquired much glory in reſtoring Choſroes II. king of Perſia, to the throne, after he had been depoſed by his ſubjects. The empire was in his reign haraſſed by the frequent inroads of the Arabian tribes. He purchaſed peace from them by granting them a penſion nearly equal to 100,000 crowns; but theſe barbarians took frequent opportunities to renew the war. In different engagements the Romans deſtroyed 50,000, and took 17,000 priſoners. Theſe were reſtored, on condition that the king of the Abari ſhould return all the Roman captives in his dominions. Regardleſs of his promiſe, he demanded a ranſom of 10,000 crowns. Maurice, full of indignation, refuſed the ſum; and the barbarian, equally enraged, put the captives to the ſword. While the emperor, to revenge this cruelty, was making preparations againſt the Abari, Phocas, who from the rank of a centurion had attained the higheſt military preferment, aſſumed the purple, and was declared emperor. He purſued Maurice to Chalcedon, took him priſoner, and condemned him to die. The five ſons of this unfortunate prince were maſſacred before his eyes; and Maurice, humbling himſelf under the hand of God, was heard to exclaim, *Thou art juſt, O Lord, and thy judgments are without partiality.* He was beheaded on the 26th November 602, in the 63d year of his age and 20th of his reign. Many writers have eſtimated the character of this prince by his misfortunes inſtead of his actions. They believed him guilty without evidence, and condemned him without reaſon. It cannot be denied, however, that he allowed Italy to be haraſſed, but he was a father to the reſt of the empire. He reſtored the military diſcipline, humbled the pride of his enemies, ſupported the Chriſtian religion by his laws, and piety by his example. He loved the ſciences, and was the patron of learned men.

Maurice, elector of Saxony, ſon of Henry le Pieux, was born A. D. 1521. He was early remarkable for his courage, and during his whole life he was engaged in warlike purſuits. He ſerved under the emperor Charles V. in the campaign of 1544 againſt France; and in the year following againſt the league of Smalkalde; with which, although a Proteſtant, he would have no manner of connection. The emperor, as a reward for his ſervices, in the year 1547 made him elector of Saxony, having deprived his couſin John Frederick of that electorate. Ambition had led him to ſecond the views of Charles, in the hope of being elector, and ambition again detached him from that prince. In 1551 he entered into a league againſt the emperor, together with the elector of Brandenburgh, the Count Palatine, the duke of Wirtemburgh, and many other princes. This league, encouraged by the young and enterpriſing Henry II. of France, was more dangerous than that of Smalkalde. The pretext for the aſſociation was the deliverance of the Landgrave of Heſſe, whom the emperor kept priſoner. Maurice and the confederates marched, in 1552, to the defiles of Tirol, and put

to flight the imperial troops who guarded them. The emperor and his brother Ferdinand narrowly efcaped, and fled from the conquerors in great diforder. Charles having retired into Paffau, where he had collected an army, brought the princes of the league to terms of accommodation. By the famous peace of Paffau, which was finally ratified the 12th of Auguft 1552, the emperor granted an amnefty without exception to all thofe who had carried arms againft him from the year 1546. The Proteftants not only obtained the free exercife of their religion, but they were admitted into the imperial chamber, from which they had been excluded fince the victory of Mulberg. Maurice foon after united himfelf with the emperor againft the Margrave of Brandenburgh, who laid wafte the German provinces. He engaged him in 1553, gained the battle of Siverfhaufen, and died two days after of the wounds he had received in the engagement. He was one of the greateft protectors of the Lutherans in Germany, and a prince equally brave and politic. After he had profited by the fpoils of John Frederick, the chief of the Proteftants, he became himfelf the leader of the party, and by thefe means maintained the balance of power againft the emperor in Germany.

Maurice *de Naffau*, prince of Orange, fucceeded to the government of the Low Countries after the death of his father William, who was killed in 1584 by the fanatic Gerard. The young prince was then only eighteen years of age, but his courage and abilities were above his years. He was appointed captain general of the United Provinces, and he reared that edifice of liberty of which his father had laid the foundation. Breda fubmitted to him in 1590; Zutphen, Deventer, Hulft, Nimeguen, in 1591. He gained feveral important advantages in 1 9-, and in the year following he made himfelf mafter of Gertrudemburg. When he had performed thefe fplendid fervices, he returned to the Low Countries by the way of Zealand. His fleet was attacked by a dreadful tempeft, in which he loft forty veffels, and he himfelf had very nearly perifhed. His death would have been confidered by the Hollanders as a much greater calamity than the lofs of their veffels. They watched over his fafety with exceeding care. In 1594, one of his guards was accufed of an intention to take away his life; and it was generally believed that he was bribed to this fervice by the enemies of the republic. He fell a facrifice at Bruges, either to his own fanaticifm, or to the jealous anxiety of the friends of Maurice. The prince of Orange, increafing in reputation, defeated the troops of the archduke Albert in 1597, and drove the Spaniards entirely out of Holland. In 1600 he was obliged to raife the fiege of Dunkirk; but he took ample vengeance on Albert, whom he again defeated in a pitched battle near Newport. Before the action, this great general fent back the fhips which had brought his troops into Flanders: *My brethren* (faid he to his army), *we muft conquer the enemy, or drink up the waters of the fea. Determine for yourfelves; I have determined I fhall either conquer by your bravery, or I fhall never furvive the difgrace of being conquered by men in every refpect our inferiors.* This fpeech elevated the foldiers to the higheft pitch of enthufiafm, and the victory was complete. Rhinberg, Grave, and Eclufe, cities in Flanders, fubmitted to the conqueror the following year. Maurice, however, not only laboured for the commonwealth, but alfo for himfelf. He coveted the fovereignty of Holland, and was oppofed in the profecution of his defign by the penfioner Barneveldt. The zeal and activity of this wife republican coft him his life. He was an Arminian; and at this time Maurice defended Gomar againft Arminius. Taking advantage of the general odium under which the Arminians lay, he found means to get Barneveldt condemned in 1619. His death, wholly owing to the cruel ambition of the prince of Orange, made a deep impreffion on the minds of the Hollanders. The truce with Spain being expired, Spinola laid fiege to Breda in 1624, and in fix months, by the proper direction of his great talents, though with great flaughter of his troops, he took the place. The prince of Orange, unfuccefsful in every attempt to raife the fiege, died of vexation in 1625, aged 55 years, with the reputation of the greateft warrior of his time. "The life of this Stadtholder (fays the Abbé Raynal) was almoft an uninterrupted feries of battles, of fieges, and of victories. Of moderate abilities in every thing elfe, he fhone confpicuous in his military capacity. His camp was the fchool of Europe, and thofe who received their military education in his armies augmented, perhaps, the glory of their mafter. Like Montecuculi, he difcovered inimitable fkill in his marches and encampments; like Vauban, he poffeffed the talent of fortifying places, and of rendering them impregnable; like Eugene, the addrefs of finding fubfiftence for great armies, in countries barren by nature, or ravaged by war; like Vendome, the happy talent of calling forth, in the moment they became neceffary, greater exertions from his foldiers than could reafonably be expected; like Condé, that infallible quicknefs of eye which decides the fortune of battles; like Charles XII. the art of rendering his troops almoft invincible to cold, hunger, and fatigue; like Turenne, the fecret of making war with the leaft poffible expence of human blood." The Chevalier Folard maintains, that Maurice was the greateft commander of infantry fince the time of the Romans. He ftudied the military art of the ancients, and applied their rules with great exactnefs in the various occurrences of war. He not only took advantage of the inventions of others, but he enriched the fcience of war with feveral improvements. Telefcopes were firft ufed by him for a military purpofe; and, befides a kind of gallery in conducting a fiege, and the plan of blockading a ftrong place, which were of his invention, he greatly improved the whole art by his method of purfuing an attack with great vigour, and of defending, for the greateft length of time, and in the beft manner, a place befieged. In fhort, the many ufeful things which he practifed or invented, placed him in the higheft rank among men of a military character. On one occafion, a lady of quality afked him, *who was the firft general of the age? Spinola* (replied he) *is the fecond.* It was his conftant practice, during fleep, to have two guards placed by his bedfide, not only to defend him in cafe of danger, but to awake him if there fhould be the leaft occafion. The war betwixt Spain and Holland was never carried on with greater keennefs and animofity than during his adminiftration. The Grand Signior, hearing of the vaft torrents of blood fhed in this conteft, thought that a great empire muft depend on the decifion. The object of fo many battles was pointed out to him on a map, and he faid coldly, *If it were my bufinefs, I would fend my pioneers, and order them to caft this little corner of earth into the fea.* Maurice, like many great men, was impatient under contradiction, and too much devoted to women. He was fucceeded by Frederic Henry, his brother

MAURITANIA, an ancient kingdom of Africa, bounded on the weft by the Atlantic ocean, on the fouth by Getulia or Libya Interior, and on the north by the Mediterranean, and comprehending the greater part of the kingdoms of Fez and Morocco. Its ancient limits are not exactly mentioned by any hiftorian; neither can they now be afcertained by any modern obfervations, thefe kingdoms being but little known to Europeans.

This country was originally inhabited by a people called *Mauri*, concerning the etymology of which name authors are not agreed. It is probable, however, that this country, or at leaft a great part of it, was firft called *Phut*, fince it appears from Pliny, Ptolemy, and St. Jerom, that a river and territory not far from Mount Atlas went by that name. From the Je-

ruſalem Targum it likewiſe appears, that part of the Mauri may be deemed the offspring of Lud the ſon of Miſraim, ſince his deſcendants, mentioned Geneſis x. are there called מורטאני, *Mauri*, or *Mauritani*. It is certain, that this region, as well as the others to the eaſtward of it, had many colonies planted in it by the Phœnicians. Procopius tells us, that in his time two pillars of white ſtone were to be ſeen there, with the following inſcription, in the Phœnician language and character, upon them: "We are the *Canaanites*, that fled from *Joſhua* the ſon of Nun, that notorious robber." *Ibnu Rachic*, or *Ibnu Raquig*, an African writer cited by Leo, together with Evagrius and Nicephorus Calliſtus, aſſert the ſame thing.

The Mauritanians, according to Ptolemy, were divided into ſeveral cantons or tribes. The *Mctagonitæ* were ſeated near the ſtraits of Hercules, now thoſe of Gibraltar. The *Saccoſii*, or *Cocoſii*, occupied the coaſt of the Iberian ſea. Under theſe two petty nations the *Maſices*, *Verues*, and *Verbicæ* or *Vervicæ*, were ſettled. The *Saliſæ*, or *Salinſæ*, were ſituated lower, towards the ocean; and ſtill more to the ſouth, the *Volubiliani*. The *Maurenſii* and *Herpiditani* poſſeſſed the eaſtern part of this country, which was terminated by the *Mulucha*. The *Angaucani* or *Jangacaucani*, *Nectiberes*, *Zagrenſii*, *Baniubæ*, and *Vacuntæ*, extended themſelves from the ſouthern foot of Ptolemy's Atlas Minor to his Atlas Major. Pliny mentions the *Baniuræ*, whom Father Hardouin takes to be Ptolemy's Baniubæ; and Mela the Atlantes, whom he repreſents as poſſeſſed of the weſtern parts of this diſtrict.

The earlieſt prince of Mauritania mentioned in hiſtory is Neptune; and next to him were Atlas and Antæus his two ſons, both famous in the Grecian fables on account of their wars with Hercules. Antæus, in his contention with that hero, ſeems to have behaved with great bravery and reſolution. Having received large reinforcements of Libyan troops, he cut off great numbers of Hercules's men. But that celebrated commander, having at laſt intercepted a ſtrong body of Libyans ſent to the relief of Antæus, gave him a total overthrow, wherein both he and the beſt part of his forces were put to the ſword. This deciſive action put Hercules in poſſeſſion of Libya and Mauritania, and conſequently of the riches of all theſe kingdoms. Hence came the fable, that Hercules, finding Antæus, a giant of an enormous ſize with whom he was engaged in ſingle combat, to receive freſh ſtrength as often as he touched his mother earth when thrown upon her, at laſt lifted him up in the air and ſqueezed him to death. Hence likewiſe may be deduced the fable intimating that Hercules took the globe from Atlas upon his own ſhoulders, overcame the dragon that guarded the orchards of the Heſperides, and made himſelf maſter of all the golden fruit there. Bochart thinks that the fable alluded chiefly to naval engagements, wherein Hercules, for the moſt part, was victorious; though Antæus from time to time received ſuccours by ſea. But at laſt Hercules, coming up with one of his ſquadrons which had a ſtrong reinforcement on board, made himſelf maſter of it, and thus rendered Antæus incapable for the future of making head againſt him. The ſame author likewiſe inſinuates, that the notion of Antæus's gigantic ſtature prevailing for ſo many centuries among the Tingitanians, pointed out the ſize of the veſſels of which his fleets and ſquadrons were compoſed. As for the golden apples ſo frequently mentioned by the old mythologiſts, they were the treaſures that fell into Hercules's hands upon the defeat of Antæus; the Greeks giving the oriental word מאל, *riches*, the ſignification affixed to their own term μηλα, *apples*.

With regard to the age in which Atlas and Antæus lived, the moſt probable ſuppoſition ſeems to be that of Sir Iſaac Newton. According to that illuſtrious author, Ammon the father of Seſac was the firſt king of Libya, or that vaſt tract extending from the borders of Egypt to the Atlantic ocean; the conqueſt of which country was effected by Seſac in his father's life-time. Neptune afterwards excited the Libyans to a rebellion againſt Seſac, and ſlew him; and then invaded Egypt under the command of Atlas or Antæus, the ſon of Neptune, Seſac's brother and admiral. Not long after Hercules, the general of Thebais and Ethiopia for the gods or great men of Egypt, reduced a ſecond time the whole continent of Libya, having overthrown and ſlain Antæus near a town in Thebais, from that event called *Antæa* or *Antæopolis*: this, we ſay, is the notion advanced by Sir Iſaac Newton, who endeavours to prove, that the firſt reduction of Libya, by Seſac, happened a little above a thouſand years before the birth of Chriſt, as the laſt, by Hercules, did ſome few years after. Now, though we do not pretend to adopt every particular circumſtance of Sir Iſaac Newton's ſyſtem, yet we cannot forbear obſerving, that it appears undeniably plain from ſcripture, that neither the weſtern extremity of Libya, nor even the other parts of that region, could poſſibly have been ſo well peopled before the time of David or Solomon, as to have ſent a numerous army to invade Egypt. For Egypt and Phœnicia, from whence the greateſt part of the anceſtors of the Libyans came, and which were much nearer the place from whence the firſt diſperſion of mankind was made, could not themſelves have been greatly overſtocked with inhabitants any conſiderable time before the reign of Saul. And that ſuch an invaſion happened in the reign of Neptune, or at leaſt of his ſon Antæus, has been moſt fully evinced by this moſt excellent chronologer.

From the defeat of Antæus, nothing remarkable occurs in the hiſtory of Mauritania till the times of the Romans, who at laſt brought the whole kingdom under their juriſdiction; for which ſee the article Rome. With regard to the cuſtoms, &c. of this people, it would ſeem from what Hyginus inſinuates, that they fought only with clubs, till one Belus, the ſon of Neptune, as that author calls him, taught them the uſe of the ſword. Sir Iſaac Newton makes this Belus to have been the ſame perſon with Seſoſtris king of Egypt, who over-ran a great part of the then known world. 2. All perſons of diſtinction in Mauritania went richly attired, wearing much gold and ſilver in their clothes. They took great pains in cleanſing their teeth, and curled their hair in a curious and elegant manner. They combed their beards, which were very long, and always had their nails pared extremely cloſe. When they walked out in any numbers, they never touched one another, for fear of diſconcerting the curls into which their hair had been formed. 3. The Mauritanian infantry, in time of action, uſed ſhields made of elephants' ſkins, being clad in thoſe of lions, leopards, and bears, which they kept on both night and day. 4. The cavalry of this nation was armed with broad ſhort lances, and carried targets or bucklers, made likewiſe of the ſkins of wild beaſts. They uſed no ſaddles. Their horſes were ſmall and ſwift, had wooden collars about their necks, and were ſo much under the command of their riders, that they would follow them like dogs. The habit of theſe horſemen was not much different from that of the foot abovementioned, they conſtantly wearing a large tunic of the ſkins of wild beaſts. The Phutæi, of whom the Mauritanians were a branch, were eminent for their ſhields, and the excellent uſe they made of them, as we learn from Homer, Xenophon, Herodotus, and Scripture. Nay, Herodotus ſeems to intimate, that the ſhield and helmet came from them to the Greeks. 5. Notwithſtanding the fertility of their ſoil, the poorer ſort of the Mauritanians never took care to manure the ground, being ſtrangers to the art of huſbandry; but roved about the country in a wild ſavage manner, like the ancient Scythians or Arabes Scenitæ. They had tents, or *mapalia*, ſo extremely ſmall, that they could ſcarce breathe in them. Their food was corn, herbage, &c. which they frequently ate green, without any

manner of preparation, being deſtitute of wine, oil, and all the elegancies as well as many neceſſaries of life. Their habit was the ſame both in ſummer and winter, conſiſting chiefly of an old tattered, though thick garment, and over it a coarſe rough tunic; which anſwered probably to that of their neighbours the Numidians. Moſt of them lay every night upon the bare ground; though ſome of them ſtrewed their garments thereon, not unlike the preſent African Kabyles and Arabs, who, according to Dr. Shaw, uſe their hykes for a bed and covering in the night. 6. If the moſt approved reading of Horace may be admitted, the Mauritanians ſhot poiſoned arrows; which clearly intimates, that they had ſome ſkill in the art of preparing poiſons, and were excellent dartmen. This laſt obſervation is countenanced by Herodian and Ælian, who entirely come into it, affirming them to have been in ſuch continual danger of being devoured by wild beaſts, that they durſt not ſtir out of their tents or mapalia without their darts. Such perpetual exerciſe muſt render them exceedingly ſkilful in hurling that weapon. The Mauritanians ſacrificed human victims to their deities, as the Phœnicians, Carthaginians, &c. did.

The country people were extremely rude and barbarous; but thoſe inhabiting cities muſt undoubtedly have had at leaſt ſome ſmattering in the literature of the ſeveral nations they deduced their origin from. That the Mauritanians had ſome knowledge in naval affairs, ſeems probable, not only from the intercourſe they had with the Phœnicians and Carthaginians, as well as the ſituation of their country; but likewiſe from Orpheus, or Onomacritus, who aſſerts them to have made a ſettlement at the entrance into Colchis, to which place they came by ſea. Magic, ſorcery, divination, &c. they appear to have applied themſelves to in very early times. Cicero and Pliny ſay, that Atlas was the inventor of aſtrology and the doctrine of the ſphere, i. e. he firſt introduced them into Mauritania. This, according to Diodorus Siculus, gave riſe to the fable of Atlas's bearing the heavens upon his ſhoulders. The ſame author relates, that Atlas inſtructed Hercules in the doctrine of the ſphere and aſtrology, or rather aſtronomy, who afterwards brought thoſe ſciences into Greece.

MAURITIA, the Ginkgo, or *Maiden-hair tree:* a genus of plants belonging to the natural order of *Palmæ*. The calyx of the male is monophyllous; the corolla monopetalous; with ſix ſtamina. It is a native of Japan, where it is alſo known by the names of *Ginan* and *Itſio*. It riſes with a long, erect, thick and branched ſtem, to the ſize of a walnut-tree. The bark is aſh-coloured, the wood brittle and ſmooth, the pith ſoft and fungous. The leaves are large, expanded from a narrow bottom into the figure of a maiden-hair leaf, unequally parted, ſtreaked, without fibres or nerves; both ſurfaces having the ſame appearance, and ſupported upon footſtalks, which are compreſſed upon the upper ſurface, and extended into the ſubſtance of the leaf. From the uppermoſt ſhoots hang the flowers in long catkins that are filled with the fertilizing powder; and to which ſucceeds the fruit, adhering to a thick fleſhy pedicle, which proceeds from the boſom of the leaves. This fruit is either exactly or nearly round, and of the appearance and ſize of a damaſk plum. The ſubſtance ſurrounding the fruit is fleſhy, juicy, white, very harſh, and adheres ſo firmly to the incloſed nut, as not to be ſeparated from it except by putrefaction. The nut, properly termed *Gineau*, reſembles the piſtachia nut, eſpecially a Perſian ſpecies named *bergjes piſtai*; but is almoſt double in ſize, and of the figure of an apricot ſtone. The ſhell is ſomewhat white, woody, and brittle; and incloſes a white looſe kernel, having the ſweetneſs of an almond, along with a degree of harſhneſs. Theſe kernels taken after dinner are ſaid to promote digeſtion, and to give relief in furfeits; whence they never fail to make part of the deſſert in great feaſts and anniverſary entertainments.—Many of theſe plants have been reared by Mr. James Gordon at his nurſery near Mile-end. They ſeem to be very hardy, and thrive in this country in the open air.

MAURITIUS. See *Iſle de* France.

MAURUA, one of the Society-Iſlands in the South Sea. It is a ſmall iſland, entirely ſurrounded with a ridge of rocks, and without any harbour for ſhipping. It is inhabited; and its productions are the ſame with thoſe of the neighbouring iſlands. A high round hill riſes in the middle of it, which may be ſeen at the diſtance of 10 or 12 leagues.

MAUSOLEUM, a magnificent tomb or funeral monument. The word is derived from Mauſolus king of Caria, to whom Artemiſia his widow erected a moſt ſtately monument, eſteemed one of the wonders of the world, and called it from his own name, *Mauſoleum*.

St. MAWES, a town in the county of Cornwall, ſeated on the eaſt ſide of Falmouth haven, in W. lon. 5. 26. N. lat. 50. 30. Though but a hamlet of the pariſh of St. Juſt, two miles off, without a miniſter, or either church, chapel, or meeting-houſe, it has ſent members to parliament ever ſince 1562, who are returned by its mayor or portreve. It conſiſts but of one ſtreet, under a hill, and fronting the ſea, and its inhabitants ſubſiſt purely by fiſhing. King Henry VIII. built a caſtle here, over againſt Pendennis, for the better ſecurity of Falmouth haven. It has a governor, a deputy, and two gunners, with a platform of guns. Here is a fair the Friday after St. Luke's day.

MAXENTIUS (Marcus Aurelius Valerius), a ſon of the emperor Maximianus Hercules, was, by the voluntary abdication of Dioclefian, and of his father, raiſed to the empire A. D. 306. He afterwards incited his father to re-aſſume his imperial authority; and in a perfidious manner deſtroyed Severus, who had delivered himſelf into his hands, and relied upon his honour for the ſafety of his life. His victories and ſucceſſes were impeded by Galerius Maximianus, who oppoſed him with a powerful force. The defeat and voluntary death of Galerius ſoon reſtored peace to Italy; and Maxentius paſſed into Africa, where he rendered himſelf odious by his cruelty and oppreſſion. He ſoon after returned to Rome, and was informed that Conſtantine was come to dethrone him. He gave his adverſary battle near Rome, and, after he had loſt the victory, he fled back to the city. The bridge over which he croſſed the Tiber was in a decayed ſituation, and he fell into the river, and was drowned, A. D. 312. The cowardice and luxuries of Maxentius were as conſpicuous as his cruelties. He oppreſſed his ſubjects with heavy taxes, to gratify the cravings of his pleaſures, or the avarice of his favourites. He was debauched in his manners, and neither virtue nor innocence was ſafe whenever he was inclined to voluptuous purſuits. His body was deformed and unwieldy. To viſit a pleaſure-ground, or to exerciſe himſelf under a marble portico, or walk under a ſhady terrace, was to him a Herculean labour, which required the greateſt exertions of ſtrength and reſolution.

MAXILLA, the Jaw. See Anatomy.

MAXIM, an eſtabliſhed propoſition or principle; in which ſenſe it denotes much the ſame with axiom.

MAXIMILIAN I. emperor of Germany, ſignalized himſelf againſt the French while he was king of the Romans, and after he was emperor entered into the army of Henry VIII. of England as a volunteer againſt that nation: he was a protector of learned men, and aboliſhed an iniquitous tribunal, ſtyled *Judicium oculum Weſtphaliæ:* he compoſed ſome poems, and the memoirs of his own life. He died in 1519, aged 60.

MAXIMUM, in mathematics, denotes the greateſt quantity attainable in any given caſe. If a quantity conceived to be generated by motion increaſes or decreaſes till it arrives at a certain magnitude or poſition, and then, on the contrary, grows

greater or leſſer, and it be required to determine the ſaid magnitude or poſition, the queſtion is called a *problem de maximis et minimis*.

MAXIMUS, a celebrated Cynic philoſopher and magician of Epheſus. He inſtructed the emperor Julian in magic; and, according to the opinion of ſome hiſtorians, it was in the converſation and company of Maximus that the apoſtacy of Julian originated. The emperor not only viſited the philoſopher, but he even ſubmitted his writings to his inſpection and cenſure. Maximus refuſed to live in the court of Julian; and the emperor, not diſſatisfied with the refuſal, appointed him high pontiff in the province of Lydia, an office which he diſcharged with the greateſt moderation and juſtice. When Julian went into the eaſt, the philoſopher promiſed him ſucceſs, and even ſaid that his conqueſts would be more numerous and extenſive than thoſe of the ſon of Philip. He perſuaded his imperial pupil, that, according to the doctrine of Metempſychoſis, his body was animated by the ſoul which once animated the hero whoſe greatneſs and victories he was going to eclipſe. After the death of Julian, Maximus was almoſt ſacrificed to the fury of the ſoldiers; but the interpoſition of his friends ſaved his life, and he retired to Conſtantinople. He was ſoon after accuſed of magical practices, before the emperor Valens, and beheaded at Epheſus, A. D. 366. He wrote ſome philoſophical and rhetorical treatiſes, ſome of which were dedicated to Julian. They are all now loſt.

MAXIMUS *of Tyre*, a Platonic philoſopher, went to Rome in 146, and acquired ſuch reputation there, that the emperor Marcus Aurelius became his ſcholar, and gave him frequent proofs of his eſteem. This philoſopher is thought to have lived till the reign of the emperor Commodus. There are ſtill extant 41 of his diſſertations; a good edition of which was printed by Daniel Heinſius. in 1624, in Greek and Latin, with notes.

MAXIMUS MARIUS. See MARIUS.

MAXIMUS (St.) an abbot and confeſſor of the 7th century, was of a noble family of Conſtantinople, and diſtinguiſhed himſelf by his zeal againſt the Monothelites, for which he was thrown into priſon, and died there on the 13th of Auguſt 1662. He wrote a Commentary on the books attributed to Dionyſius the Areopagite, and ſeveral other works, of which an edition has been publiſhed by father Combefis.

MAY, the fifth month in the year, reckoning from our firſt, or January; and the third, counting the year to begin with March, as the Romans anciently did. It was called Maius by Romulus, in reſpect to the ſenators and nobles of his city, who were named *majores*; as the following month was called *Junius*, in honour of the youth of Rome, *in honorem juniorum*, who ſerved him in the war; though ſome will have it to have been thus called from *Maia*, the mother of Mercury, to whom they offered ſacrifice on the firſt day of it; and Papias derives it from *Madius, eo quod tunc terra madeat*. In this month the ſun enters Gemini, and the plants of the earth in general begin to flower.—The month of May has ever been eſteemed favourable to love; and yet the ancients, as well as many of the moderns, look on it as an unhappy month for marriage. The original reaſon may perhaps be referred to the feaſt of the Lemures, which was held in it. Ovid alludes to this in the fifth of his Faſti, when he ſays,

Nec viduæ tædis eadem, nec virginis apta
Tempora; quæ nupſit, non diuturna fuit;
Hac quoque de cauſa, ſi te proverbia tangunt,
Menſe malum Maio *nubere vulgus ait.*

MAY-*dew*. See DEW.

MAY *duke*, a ſpecies of cherry. See PRUNUS.

MAY (Iſle of), a ſmall iſland at the mouth of the Frith of Forth, in Scotland, about a mile and an half in circumference, and ſeven miles from the coaſt of Fife, almoſt oppoſite to the rock called the *Baſs*. It formerly belonged to the priory of Pittenweem; and was dedicated to St. Adrian, ſuppoſed to have been martyred in this place by the Danes; and hither, in times of Popiſh ſuperſtition, barren women uſed to come and worſhip at his ſhrine, in hopes of being cured of their ſterility. Here is a tower and light-houſe built by Mr. Cunningham of Barns, to whom King Charles I. granted the iſland in fee, with power to exact two-pence per ton from every ſhip that paſſes, for the maintenance of a light-houſe. In the middle of it there is a freſh-water ſpring, and a ſmall lake. The ſoil produces paſturage for 100 ſheep and 20 black cattle. On the weſt ſide the ſteep rocks render it inacceſſible; but to the eaſt there are four landing-places and good riding. It was here that the French ſquadron, having the chevalier de St. George on board, anchored in the year 1708, when the vigilance of Sir George Byng obliged him to relinquiſh his deſign, and bear away for Dunkirk. The ſhores all round the iſland abound with fiſh, and the cliffs with water-fowl.

MAY (THOMAS), an eminent Engliſh poet and hiſtorian in the 17th century, was born of an ancient but decayed family in Suſſex, educated at Cambridge, and afterwards removed to London, where he contracted a friendſhip with ſeveral eminent perſons, and particularly with Endymion Porter, eſq. one of the gentlemen of the bed-chamber to King Charles I. While he reſided at court, he wrote the five plays now extant under his name. In 1622, he publiſhed a tranſlation of Virgil's Georgics, with annotations; and in 1635 a poem on king Edward III. and a tranſlation of Lucan's Pharſalia, which poem he continued down to the death of Julius Cæſar, both in Latin and Engliſh verſe. Upon the breaking out of the civil wars he adhered to the parliament; and in 1647 he publiſhed "The hiſtory of the parliament of England, which began November the third MDCXL. With a ſhort and acceſſary view of ſome precedent years." In 1649 he publiſhed *Hiſtoriæ parliamenti Angliæ Breviarium*, in three parts; which he afterwards tranſlated into Engliſh. He wrote the Hiſtory of Henry II. in Engliſh verſe. He died in 1652. He went well to reſt over night, after a cheerful bottle as uſual, and died in his ſleep before morning: upon which his death was imputed to his tying his night-cap too cloſe under his fat cheeks and chin, which cauſed his ſuffocation; but the facetious Andrew Marvel has written a poem of 100 lines, to make him a martyr of Bacchus, and die by the force of good wine. He was interred near Camden, in Weſtminſter-Abbey; which cauſed Dr. Fuller to ſay, that "if he were a biaſſed and partial writer, yet he lieth buried near a good and true hiſtorian indeed." Soon after the reſtoration, his body, with thoſe of ſeveral others, was dug up, and buried in a pit in St. Margaret's church-yard: and his monument, which was erected by the appointment of Parliament, was taken down and thrown aſide.

MAYER (TOBIAS), one of the greateſt aſtronomers and mechanics this century has produced, was born at Maſpach, in the duchy of Wirtemberg, 1723. He taught himſelf mathematics, and at the age of fourteen deſigned machines and inſtruments with the greateſt dexterity and juſtneſs. Theſe purſuits did not hinder him from cultivating the belles lettres. He acquired the Latin tongue, and wrote it with elegance. In 1750 the univerſity of Gottingen choſe him for their mathematical profeſſor; and every year of his ſhort life was thenceforward marked with ſome conſiderable diſcoveries in geometry and aſtronomy. He publiſhed ſeveral works in this way, which are all reckoned excellent; and ſome are inſerted in the ſecond volume of the "Memoirs of the Univerſity of Gottingen." His labours ſeem to have exhauſted him; for he died worn out in 1762.

MAYERNE (Sir THEODORE DE), baron of Aulbone, was the ſon of Lewis de Mayerne, the celebrated author of The

general hiſtory of Spain, and of the *Monarchie ariſto-democratique*, dedicated to the ſtates-general. He was born in 1573, and had for his godfather Theodore Beza. He ſtudied phyſic at Montpelier, and was made phyſician in ordinary to Henry IV. who promiſed to do great things for him provided he would change his religion. James I. of England invited him over, and made him firſt phyſician to himſelf and his queen, in which office he ſerved the whole royal family to the time of his death in 1655. His works were printed at London in 1700, and make a large folio, divided into two books; the firſt containing his *Conſilia, Epiſtolæ & Obſervationes*; the ſecond his *Pharmacopœia variæque medicamentorum formulæ*.

MAYHEM. See MAIM.

MAYNE (JASPER), an eminent Engliſh poet and divine in the 17th century, who was bred at Oxford, and entered into holy orders. While his majeſty reſided at Oxford, he was one of the divines appointed to preach before him. He publiſhed in 1647 a piece entitled OXAOMAKIA, or, *The people's war examined according to the principles of reaſon and ſcripture, by Jaſper Mayne*. In 1648 he was deprived of his ſtudentſhip at Chriſt-church, and two livings he had: but was reſtored with the king, who made him his chaplain and archdeacon of Chicheſter; all which he held till he died. Dr. Mayne was held in very high eſteem both for his natural parts and his acquired accompliſhments. He was an orthodox preacher, and a man of ſevere virtue and exemplary behaviour; yet of a ready and facetious wit, and a very ſingular turn of humour. From ſome ſtories that are related of him, he ſeems to have borne ſome degree of reſemblance in his manner to the celebrated Dr. Swift; but if he did not poſſeſs thoſe very brilliant parts that diſtinguiſhed the Dean, he probably was leſs ſubject to that capriciouſneſs and thoſe unaccountable whimſies which at times ſo greatly eclipſed the abilities of the latter. In his younger years he had an attachment to poetry; and wrote two plays, the latter of which may be ſeen in the tenth volume of Dodſley's collection, viz. 1. Amorous war, a tragi-comedy. 2. The city-match, a comedy. He publiſhed a poem upon the naval victory by the duke of York over the Dutch, printed in 1665. He alſo tranſlated into Engliſh from the Greek part of Lucian's Dialogues.

MAYNOOTH, or MAXOOTH, a poſt town in the county of Kildare, and province of Leinſter, in Ireland, near 12 miles from Dublin. Though not very large, it is regularly laid out, and conſiſts of good houſes. Here is a charter-ſchool, which was opened 2 th July 1759.

MAYNWARING (ARTHUR), an eminent political writer in the beginning of the 18th century, ſtaid ſeveral years at Oxford, and then went to Cheſhire, where he lived ſome time with his uncle Mr. Francis Cholmondeley, a very honeſt gentleman, but extremely averſe to the government of king William III. to whom he refuſed the oaths. Here he proſecuted his ſtudies in polite literature with great vigour, and, coming up to London, applied to the ſtudy of the law. He was hitherto very zealous in anti-revolutional principles, and wrote ſeveral pieces in favour of king James II.; but, upon being introduced to the duke of Somerſet and the earls of Dorſet and Burlington, began to entertain very different notions in politics. His father left him an eſtate of near 800l. a-year, but ſo incumbered, that the intereſt money amounted to almoſt as much as the revenue. Upon the concluſion of the peace he went to Paris, where he became acquainted with Mr. Boileau. After his return he was made one of the commiſſioners of the cuſtoms, in which poſt he diſtinguiſhed himſelf by his ſkill and induſtry. He was a member of the kit-kat-club, and was looked upon as one of the chief ſupports of it by his pleaſantry and wit. In the beginning of queen Anne's reign, the lord treaſurer Godolphin engaged Mr. Done to quit the office of auditor of the impreſts, and made Maynwaring a preſent of a patent for that office worth about 2000l. a-year in a time of buſineſs. He had a conſiderable ſhare in the Medley, and was author of ſeveral other pieces. The Examiner, his antagoniſt in politics, allowed that he wrote with tolerable ſpirit, and in a maſterly ſtyle. Sir Richard Steele dedicated the firſt volume of the Tatler to him.

MAYO, one of the Cape de Verd iſlands, lying in the Atlantic ocean, near 300 miles from Cape Verd in Africa, about 17 miles in circumference. The ſoil in general is very barren, and water ſcarce: however, they have ſome corn, yams, potatoes, and plantains, with plenty of beeves, goats, and aſſes. What trees there are, grow on the ſides of the hills, and they have ſome figs and water-melons. The ſea round about the iſland abounds with fiſh. The chief commodity is ſalt, with which many Engliſh ſhips are loaded in the ſummer-time. The principal town is Pinoſa, inhabited by negroes, who ſpeak the Portugueſe language, and are ſtout and fleſhy. They are not above 200 in number, and many of them go quite naked. W. lon. 21. 25. N. lat. 15. 5.

MAYO, a county of Ireland, in the province of Connaught, having Sligo and the ſea on the north, Roſcommon on the ſouth, Leitrim and Roſcommon on the eaſt, and the Atlantic ocean on the weſt. It contains 724,640 Iriſh plantation acres, 73 pariſhes, 9 baronies, and one borough; and ſends four members to parliament. It gives title of earl to the family of Bourke. This county takes its name from an ancient city, built in 664; the ruins of the cathedral, and ſome traces of the ſtone walls which encompaſſed the city, yet remain on the plains of Mayo. It was an univerſity, founded for the education of ſuch of the Saxon youths as were converted to the Chriſtian faith: it was ſituated a little to the ſouth of Lough Conn; and is to this day frequently called *Mayo of the Saxons*, being celebrated for giving education to Alfred the great, king of England. As this town has gone to decay, Balinrobe is reckoned the chief town. The county by the ſea is mountainous; but inland has good paſtures, lakes, and rivers. It is about 57 miles long, and 48 broad. Caſtlebar is the aſſizes town. Mayo was formerly a biſhop's ſee, which is now united to TUAM.

MAYOR, the chief magiſtrate of a city or town, choſen annually out of the aldermen. The word, anciently written *mayr*, comes from the Britiſh *mi'et*, i. e. *cuſtodire*, or from the old Engliſh *maier*, viz. *poteſtas*, and not from the Latin *major*. King Richard I. in 1189, changed the bailiff of London into a mayor, and from that example king John made the bailiff of King's Lynn a mayor anno 1204: though the famous city of Norfolk obtained not this title for its chief magiſtrate till the ſeventh year of king Henry V. anno 1419; ſince which there are few towns of note but have had a mayor appointed for government. Mayors of corporations are juſtices of peace *pro tempore*, and they are mentioned in ſeveral ſtatutes; but no perſon ſhall bear any office of magiſtracy concerning the government of any town, corporation, &c. who hath not received the ſacrament according to the church of England within one year before his election, and who ſhall not take the oaths of ſupremacy, &c. If any perſon intrudes into the office of mayor, a *quo warranto* lies againſt him, upon which he ſhall not only be ouſted, but fined. And no mayor, or perſon holding an annual office in a corporation for one year, is to be elected into the ſame office for the next: in this caſe, perſons obſtructing the choice of a ſucceſſor are ſubject to 100l. penalty. Where the mayor of a corporation is not choſen on the day appointed by charter, the next officer in place ſhall the day after hold a court and elect one; and if there be a default or omiſſion that way, the electors may be compelled to chooſe a mayor, by a writ of mandamus out of the king's bench. Mayors, or other magiſtrates of a corporation, who ſhall voluntarily abſent them-

ſelves on the day of election, are liable to be impriſoned, and diſqualified from holding any office in the corporation.

Mayor's *Courts*. To the lord mayor and city of London belong ſeveral courts of judicature. The higheſt and moſt ancient is that called the *huſtings*, deſtined to ſecure the laws, rights, franchiſes, and cuſtoms of the city. The ſecond is a court of *requeſt*, or of *conſcience*; of which before. The third is the court of the lord mayor and aldermen, where alſo the ſheriffs ſit: to which may be added two courts of ſheriffs and the court of the city orphans, whereof the lord mayor and aldermen have the cuſtody. Alſo the court of common council, which is a court or aſſembly, wherein are made all by-laws which bind the citizens of London. It conſiſts, like the parliament, of two houſes: an upper, conſiſting of the lord mayor and aldermen; and a lower, of a number of common council men, choſen by the ſeveral wards as repreſentatives of the body of the citizens. In the court of common council are made laws for the advancement of trade, and committees yearly appointed, &c. But acts made by them are to have the aſſent of the lord mayor and aldermen, by ſtat. 11 Geo. I. Alſo the chamberlain's court, where every thing relating to the rents and revenues of the city, as alſo the affairs of ſervants, &c. are tranſacted. Laſtly, to the lord mayor belong the courts of coroner and of eſcheator; another court for the conſervation of the river Thames; another of gaol-delivery, held uſually eight times a year, at the Old Bailey, for the trial of criminals, whereof the lord mayor is himſelf the chief judge. There are other courts called *wardmotes* or meetings of the wards; and courts of halymote or aſſemblies of the ſeveral guilds and fraternities.

MAZA, among the Athenians, was a ſort of cake made of flour boiled with water and oil, and ſet, as the common fare, before ſuch as were entertained at the public expence in the common hall or *prytaneum*.

MAZAGAN, a ſtrong place of Africa, in the kingdom of Morocco, and on the frontiers of the province of Duguela. It was fortified by the Portugueſe, and beſieged by the king of Morocco with 200,000 men in 1562, but to no purpoſe. It is ſituated near the ſea. W. lon. 7. 45. N. lat. 33. 5.

MAZARA, an ancient town of Sicily, and capital of a conſiderable valley of the ſame name, which is very fertile, and watered with ſeveral rivers. The town is a biſhop's ſee, and has a good harbour; is ſeated on the ſea coaſt, in E. lon. 12. 39. N. lat. 37. 42.

MAZARIN (Julius), a famous cardinal and prime miniſter of France, was born at Piſcina in the province of Abruzzo, in Naples, in 1602. After having finiſhed his ſtudies in Italy and Spain, he entered into the ſervice of cardinal Sachetts, and became well ſkilled in polities, and in the intereſts of the princes at war in Italy; by which means he was enabled to bring affairs to an accommodation, and the peace of Queiras was ſhortly concluded. Cardinal Richelieu being taken with his conduct, did from thenceforward highly eſteem him; as did alſo cardinal Antonio, and Louis XIII. who procured him a cardinal's hat in 1641. Richelieu made him one of the executors of his will; and during the minority of Louis XIV. he had the charge of affairs. At laſt he became the envy of the nobility, which occaſioned a civil war; whereupon Mazarin was forced to retire, a price was ſet on his head, and his library ſold. Notwithſtanding, he afterwards returned to the court in more glory than ever; concluded a peace with Spain, and a marriage treaty betwixt the king and the infanta. This treaty of peace paſſes for the maſter-piece of cardinal de Mazarin's politics, and procured him the French king's moſt intimate confidence: but at laſt his continual application to buſineſs threw him into a diſeaſe, of which he died at Vincennes in 1661.—Cardinal Mazarin was of a mild and affable temper. One of his greateſt talents was his knowing mankind, and his being able to adapt himſelf, and to aſſume a character conformable to the circumſtances of affairs. He poſſeſſed at one and the ſame time the biſhopric of Metz, and the abbeys of St. Arnauld, St. Clement, and St. Vincent, in the ſame city; that of St. Dennis, Clugny, and Victor, of Marſeilles; of St. Michael at Soiſſons, and a great number of others. He founded Mazarin-college at Paris, which is alſo called the *college of the four nations*. There has been publiſhed a collection of his letters, the moſt copious edition of which is that of 1745, in 2 vols. duodecimo.

MAZZUOLI. See Parmigiano.

MEAD, a wholeſome, agreeable liquor, prepared of honey and water. One of the beſt methods of preparing mead is as follows: Into twelve gallons of water ſlip the whites of ſix eggs; mixing theſe well together, and to the mixture adding twenty pounds of honey. Let the liquor boil an hour, and when boiled add cinnamon, ginger, cloves, mace, and a roſemary. As ſoon as it is cold, put a ſpoonful of yeſt to it, and tun it up, keeping the veſſel filled as it works; when it has done working, ſtop it up cloſe; and, when fine, bottle it off for uſe.

Thorley ſays, that mead not inferior to the beſt of foreign wines may be made in the following manner: Put three pounds of the fineſt honey to one gallon of water, and two lemon peels to each gallon; boil it half an hour, well ſcummed; then put in, while boiling, lemon peel: work it with yeſt; then put it in your veſſel with the peel, to ſtand five or ſix months, and bottle it off for uſe. If it is to be kept for ſeveral years, put four pounds to a gallon of water.

The author of the Dictionary of Chemiſtry directs to chooſe the whiteſt, pureſt, and beſt-taſted honey, and to put it into a kettle with more than its weight of water: a part of this liquor muſt be evaporated by boiling, and the liquor ſcummed, till its conſiſtence is ſuch, that a freſh egg ſhall be ſupported on its ſurface without ſinking more than half its thickneſs into the liquor; then the liquor is to be ſtrained, and poured through a funnel into a barrel; this barrel, which ought to be nearly full, muſt be expoſed to a heat as equable as poſſible, from 20 to 27 or 28 degrees of Mr. Reaumur's thermometer, taking care that the bung-hole be ſlightly covered, but not cloſed. The phenomena of the ſpirituous fermentation will appear in this liquor, and will ſubſiſt during two or three months, according to the degree of heat; after which they will diminiſh and ceaſe. During this fermentation, the barrel muſt be filled up occaſionally with more of the ſame kind of liquor of honey, ſome of which ought to be kept apart, on purpoſe to replace the liquor which flows out of the barrel in froth. When the fermentation ceaſes, and the liquor has become very vinous, the barrel is then to be put into a cellar, and well cloſed; a year afterwards the mead will be fit to be put into bottles.

Mead (Dr. Richard), a celebrated Engliſh phyſician, was born at Stepney near London, where his father, the Reverend Mr. Matthew Mead, had been one of the two miniſters of that pariſh; but in 1662 was ejected for nonconformity, but continued to preach at Stepney till his death. As Mr Mead had a handſome fortune, he beſtowed a liberal education upon 13 children, of whom Richard was the eleventh; and for that purpoſe kept a private tutor in his houſe, who taught him the Latin tongue. At 16 years of age Richard was ſent to Utrecht, where he ſtudied three years under the famous Grævius; and then chooſing the profeſſion of phyſic, he went to Leyden, where he attended the lectures of the famous Piteairn on the theory and practice of medicine, and Hermon's botanical courſes. Having alſo ſpent three years in theſe ſtudies, he went with his brother and two other gentlemen to viſit Italy, and at Padua took his degree of doctor of philoſophy and

phyſic in 1695. Afterwards he ſpent ſome time at Naples and at Rome; and returning home the next year, ſettled at Stepney, where he married, and practiſed phyſic with a ſucceſs that laid the foundation of his future greatneſs.

In 1703, Dr. Mead having communicated to the Royal Society an analyſis of Dr. Bonomo's diſcoveries relating to the cutaneous worms that generate the itch, which they inſerted in the Philoſophical Tranſactions; this, with his account of poiſons, procured him a place in the Royal Society, of which Sir Iſaac Newton was then preſident. The ſame year he was elected phyſician of St. Thomas's hoſpital, and was alſo employed by the ſurgeons to read anatomical lectures in their hall, which obliged him to remove into the city. In 1707 his Paduan diploma for doctor of phyſic was confirmed by the univerſity of Oxford; and being patronized by Dr. Radcliffe, on the death of that famous phyſician he ſucceeded him in his houſe at Bloomſbury-ſquare, and in the greateſt part of his buſineſs. In 1727 he was made phyſician to King George II. whom he had alſo ſerved in that capacity while he was prince of Wales; and he had afterwards the pleaſure of ſeeing his two ſons-in-law, Dr. Nichols and Dr. Wilmot, his coadjutors in that eminent ſtation.

Dr. Mead was not more to be admired for the qualities of the head than he was to be loved for thoſe of his heart. Though he was himſelf a hearty whig, yet, uninfluenced by party-principles, he was a friend to all men of merit, by whatever denomination they might happen to be diſtinguiſhed. Thus he was intimate with Garth, with Arbuthnot, and with Freind; and long kept up a conſtant correſpondence with the great Boerhaave, who had been his fellow-ſtudent at Leyden: they communicated to each other their obſervations and projects, and never loved each other the leſs for being of different ſentiments. In the mean time, intent as Dr. Mead was on the duties of his profeſſion, he had a greatneſs of mind that extended itſelf to all kinds of literature, which he ſpared neither pains nor money to promote. He cauſed the beautiful and ſplendid edition of Thuanus's hiſtory to be publiſhed in 1713, in ſeven volumes folio: and by his interpoſition and aſſiduity, Mr. Sutton's invention of drawing foul air from ſhips and other cloſe places was carried into execution, and all the ſhips in his majeſty's navy provided with this uſeful machine. Nothing pleaſed him more than to call hidden talents into light; to give encouragement to the greateſt projects, and to ſee them executed under his own eye. During almoſt half a century he was at the head of his buſineſs, which brought him one year above ſeven thouſand pounds, and for ſeveral years between five and ſix thouſand: yet clergymen, and in general all men of learning, were welcome to his advice. His library conſiſted of 10,000 volumes, of which his Latin, Greek, and oriental manuſcripts, made no inconſiderable part. He had a gallery for his pictures and antiquities, which coſt him great ſums. His reputation, not only as a phyſician, but as a ſcholar, was ſo univerſally eſtabliſhed, that he correſponded with all the principal literati in Europe: even the king of Naples ſent to deſire a complete collection of his works; and in return made him a preſent of the two firſt volumes of Signior Bajardi, which may be conſidered as an introduction to the collection of the antiquities of Herculaneum. At the ſame time that prince invited him to his palace, that he might have an opportunity of ſhowing him thoſe valuable monuments of antiquity; and nothing but his great age prevented his undertaking a journey ſo ſuited to his taſte. No foreigner of learning ever came to London without being introduced to Dr. Mead; and on theſe occaſions his table was always open, and the magnificence of princes was united with the pleaſures of philoſophers. It was principally to him that the ſeveral counties of England and our colonies abroad applied for the choice of their phyſicians, and he was likewiſe conſulted by foreign phyſicians from Ruſſia, Pruſſia, Denmark, &c. He wrote, beſides the above works, 1. A Treatiſe on the Scurvy. 2. *De variolis et morbillis diſſertatio.* 3. *Medica ſacra: ſive de Morbis inſignioribus, qui in Bibliis memorantur, Commentarius.* 4. *Monita et Præcepta medica.* 5. A Diſcourſe concerning peſtilential contagion, and the methods to be uſed to prevent it. The works he wrote and publiſhed in Latin were tranſlated into Engliſh, under the doctor's inſpection, by Thomas Stack, M. D. and F. R. S. This great phyſician, naturaliſt, and antiquarian, died on the 16th of February 1754.

MEADOW, in its general ſignification, means paſture or graſs-land, annually mown for hay: but it is more particularly applied to lands that are ſo low as to be too moiſt for cattle to graze upon them in winter without ſpoiling the ſward. An improvement in agriculture by watering of meadows has of late come into much uſe, and been found of very conſiderable importance. See the article IRRIGATION.

Mr. Boſwell in his treatiſe gives the following explanation of the terms uſed in this art; of the inſtruments neceſſary to perform it; and of the principles on which it is founded. The terms uſed are:

1. A WARE. This is an erection acroſs a brook, rivulet, or river, frequently conſtructed of timber, but more commonly of bricks or ſtones and timber, with openings to let the water paſs, from two to ten in number according to the breadth of the ſtream; the height being always equal to the depth of the ſtream compared with the adjacent land. The uſe of this is occaſionally to ſtop the current, and to turn it aſide into the adjacent lands.

2. A SLUICE is conſtructed in the ſame manner as a ware; only that it has but a ſingle paſſage for the water, and is put acroſs ſmall ſtreams for the ſame purpoſes as a ware.

3. A TRUNK is deſigned to anſwer the ſame purpoſes as a ſluice; but, being placed acroſs ſuch ſtreams as either cattle or teams are to paſs over, or where it is neceſſary to carry a ſmall ſtream at right angles to a large one to water ſome lands lower down, is for theſe reaſons made of timber, and is of a ſquare figure. The length and breadth are various as circumſtances determine.

4. A CARRIAGE is made of timber or of brick. If of timber, oak is the beſt; if of brick, an arch ought to be thrown over the ſtream that runs under it, and the ſides bricked up: but when made of timber, which is the moſt common material, it is conſtructed with a bottom and ſides as wide and high as the main in which it lies. It muſt be made very ſtrong, cloſe, and well-jointed. Its uſe is to convey the water in one main over another, which runs at right angles to it; the depth and breadth are the ſame with thoſe of the main to which it belongs; and the length is determined by that which it croſſes. The carriage is the moſt expenſive inſtrument belonging to watering.

5. A DRAIN-SLUICE, or *Drain-Trunk*, is always placed in the lower part of ſome main, as near to the head as a drain can be found; that is, ſituated low enough to draw the main, &c. It is made of timber, of a ſquare figure like a trunk, only much ſmaller. It is placed with its mouth at the bottom of the main, and let down into the bank; and from its other end a drain is cut to communicate with ſome trench drain that is neareſt. The dimenſions are various, and determined by circumſtances. The uſe of it is, when the water is turned ſome other way, to convey the leaking water that oozes through the hatches, &c. into the drain, that otherwiſe would run down into the tails of thoſe trenches which lie loweſt, and there poach and rot the ground, and probably contribute not a little to the making it more unſound for ſheep. This operation is of the utmoſt conſequence in watering; for, if the water be not

thoroughly drained off the land, the ſoil is rotted; and when the hay comes to be removed, the wheels of the carriages ſink, the horſes are mired, and the whole load ſometimes ſticks faſt for hours together. On the other hand, when the drain-trunks are properly placed, the ground becomes firm and dry, and the hay is ſpeedily and eaſily removed.

7. HATCHES are beſt made of oak, elm, or deal; the uſe of them is to fit the openings of wares, trunks, or ſluices; and to keep back the water when neceſſary, from paſſing one way, to turn it another. They ought to be made to fit as cloſe as poſſible. When hatches belong to wares that are erected acroſs large ſtreams, or where the ſtreams ſwell quickly with heavy rains, when the hatches are in their places to water the meadows; they are ſometimes made ſo that a foot or more of the upper part can be taken off, ſo that vent may be given to the ſuperfluous water, and yet enough retained for the purpoſe of watering the meadows. In this caſe, they are called *flood-hatches:* but Mr. Boſwell entirely diſapproves of this conſtruction, and recommends them to be made entire, though they ſhould be ever ſo heavy, and require the aſſiſtance of a lever to raiſe them up. For when the water is very high, and the hatches are ſuddenly drawn up, the water falls with great force upon the bed of the ware, and in time greatly injures it: but when the whole hatch is drawn up a little way, the water runs off at the bottom, and does no injury.

8. A HEAD MAIN, is a ditch drawn from the river, rivulet, &c. to convey the water out of its uſual current, to water the lands laid out for that purpoſe, by means of leſſer mains and trenches. The head-main is made of various dimenſions according to the quantity of land to be watered, the length or deſcent of it, &c. Smaller mains are frequently taken out of the head one; and the only difference is in point of ſize, the ſecondary mains being much ſmaller than the other. They are generally cut at right angles, or nearly ſo with the other, though not invariably. The uſe of the mains, whether great or ſmall, is to feed the trenches with water, which branch out into all parts of the meadow, and convey the water to float the land. By ſome, theſe ſmaller mains are improperly called *Carriages.*

9. A TRENCH is a ſmall ditch made to convey the water out of the mains for the immediate purpoſe of watering the land. It ought always to be drawn in a ſtraight line from angle to angle, with as few turnings as poſſible. It is never deep, but the width is in proportion to the length it runs, and the breadth of the plane between that and the trench-drain. The breadth tapers gradually to the lower end.

10. A TRENCH-DRAIN is always cut parallel to the trench, and as deep as the tail-drain water will admit, when neceſſary. It ought always, if poſſible, to be cut down to a ſtratum of ſand, gravel, or clay. If into the latter, a ſpade's depth into it will be of great advantage. The uſe of it is to carry away the water immediately after it has run over the panes from the trench. It need not be drawn up to the head of the land by five, ſix, or more yards, according to the nature of the ſoil. Its form is directly the reverſe of the trench; being narrower at the head, and growing gradually wider and wider until it empties itſelf into the tail-drain.

11. The TAIL-DRAIN is deſigned as a receptacle for all the water that flows out of the other drains, which are ſo ſituated that they cannot empty themſelves into the river. It ſhould run, therefore, nearly at right angles with the trenches, though generally it is thought moſt eligible to draw it in the loweſt part of the ground, and to uſe it to convey the water out of the meadows at the place where there is the greateſt deſcent; which is uſually in one of the fence-ditches: and hence a fence-ditch is uſually made uſe of inſtead of a tail-drain, and anſwers the double purpoſe of fencing a meadow and draining it at the ſame time.

12. A PANE of ground, is that part of the meadow which lies between the trench and the trench-drain; and in which the graſs grows for hay. It is watered by the trenches, and drained by the trench-drains; whence there is a pane on each ſide of every trench.

13. A WAY-PANE is that part of the ground which lies in a properly watered meadow, on the ſide of the main where no trenches are taken out, but is watered the whole length of the main over its banks. A drain for carrying off the water from this pane runs parallel to the main. The uſe is to convey the hay out of the meadows, inſtead of the teams having to croſs all the trenches.

14. A BEND is made in various parts of thoſe trenches which have a quick deſcent, to obſtruct the water. It is made, by leaving a narrow ſtrip of green ſward acroſs the trench where the bend is intended to be left; cutting occaſionally a piece of the ſhape of a wedge out of the middle of it. The uſe is to check the water, and force it over the trench into the panes; which, were it not for theſe bends, would run rapidly on in the trench, and not flow over the land as it paſſes along. The great art in watering conſiſts in giving to each part of the pane an equal proportion of water.

15. A GUTTER is a ſmall groove cut out from the tails of theſe trenches where the panes run longer at one corner than the other. The uſe is to carry the water to the extreme point of the pane. Thoſe panes which are interſected by the trench and tail-drains, meeting in an obtuſe angle, require the aſſiſtance of gutters to convey the water to the longeſt ſide. They are likewiſe uſeful, when the land has not been ſo well levelled, but ſome parts of the panes lie higher than they ought: in which caſe, a gutter is drawn from the trench over that high ground, which otherwiſe would not be overflowed. Without this precaution, unleſs the flats be filled up (which ought always to be done when materials can be had to do it) the water will not riſe upon it; and after the watering ſeaſon is paſt, thoſe places would appear ruſty and brown, while the reſt is covered with beautiful verdure. Our author, however, is of opinion, that this method of treating water-meadows ought never to be followed; but that every inequality in water-meadows ſhould either be levelled or filled up. Hence the waterman's ſkill is ſhown in bringing the water over thoſe places to which it could not naturally riſe, and in carrying it off from thoſe where it would naturally ſtagnate.

16. A CATCH-DRAIN is ſometimes made uſe of when water is ſcarce. When a meadow is pretty long, and has a quick deſcent, and the water runs quickly down the drains, it is cuſtomary to ſtop one or more of them at a proper place, till the water flowing thither riſes ſo high as to ſtrike back either into the tail-drains ſo as to ſtagnate upon the ſides of the panes, or till it flows over the banks of the drains and waters the grounds below, or upon each ſide. It is then to be conveyed over the land in ſuch quantity as is thought proper, either by a ſmall main, out of which trenches are to be cut with their proper drains, or by trenches taken properly out of it. In caſe of a ſtagnation, the deſign will not ſucceed; and it will then be neceſſary to cut a paſſage to let the ſtagnating water run off. Even when the method ſucceeds beſt, Mr. Boſwell is of opinion, that it is not by any means eligible; the water having been ſo lately ſtrained over the ground, that it is ſuppoſed by the water-men not to be endowed with ſuch fertilizing qualities as at firſt; whence nothing but abſolute neceſſity can juſtify the practice.

17. A POND is any quantity of water ſtagnating upon the ground, or in the tail-drain, trench-drains, &c. ſo as to annoy the ground near them. It is occaſioned ſometimes by the flats not having been properly filled up; at others, when the ware not being cloſe ſhut, in order to water ſome grounds higher

up, the water is thereby thrown back upon the ground adjacent.

18. A TURN of water ſignifies as much ground as can be watered at once. It is done by ſhutting down the hatches in all thoſe wares where the water is intended to be kept out, and opening thoſe that are to let the water through them. The quantity of land to be watered at once muſt vary according to circumſtances; but Mr. Boſwell lays down one general rule in this caſe, viz. that no more land ought to be kept under water at one time than the ſtream can ſupply regularly with a ſufficient quantity of water; and if this can be procured, water as much ground as poſſible.

19. The HEAD of the meadow, is that part of it into which the river, main, &c. firſt enter.

20. The TAIL is that part out of which the river, &c. laſt paſſes.

21. The UPPER SIDE of a main or trench, is that ſide which (when the main or trench is drawn at right angles, or nearly ſo, with the river) fronts the part where the river entered. The lower ſide is the oppoſite.

22. The UPPER PANE in a meadow, is that which lies on the upper ſide of the main or trench that is drawn at right angles with the river: where the river runs north and ſouth, it enters in the former direction, and runs out in the ſouthern, the main and trenches running eaſt and weſt. Then all thoſe panes which lie on the north ſide of the mains are called *upper* panes; and thoſe on the ſouth ſide the *lower* panes. But when the mains, trenches, &c. run parallel to the river, there is no diſtinction of panes into upper and lower.

The inſtruments uſed in watering meadows are:

1. A *Water-Level*. The uſe of this is to take the level of the land at a diſtance, and compare it with that of the river, in order to know whether the ground can be overflowed by it or not. This inſtrument, however, is uſeful only in large undertakings; for ſuch as are on a ſmaller ſcale, the workmen diſpenſe with it in the following manner: In drawing a main, they begin at the head, and work deep enough to have the water follow them. In drawing a tail-drain, they begin at the lower end of it and work upwards, to let the tail-water come after them. By this method we obtain the moſt exact level.

The *Line*, *Reel*, and Breaſt-*Plough*, are abſolutely neceſſary. The line ought to be larger and ſtronger than that uſed by gardeners.

3. *Spades*. Thoſe uſed in watering meadows are made of a particular form, on purpoſe for the work; having a ſtem conſiderably more crooked than thoſe of any other kind. The bit is iron, about a foot wide in the middle, and terminating in a point: a thick ridge runs perpendicularly down the middle, from the ſtem almoſt to the point. The edges on both ſides are drawn very thin, and being frequently ground and whetted, the whole ſoon becomes narrow; after which the ſpades are uſed for trenches and drains; new ones being procured for other purpoſes. The ſtems being made crooked, the workmen ſtanding in the trench or drain are enabled to make the bottoms quite ſmooth and even.

4. *Wheel* and *Hand-barrows*. The former are uſed for removing the clods to the flat places, and are quite open, without any ſides or hinder part. The latter are of ſervice where the ground is too ſoft to admit the uſe of wheel-barrows, and when clods are to be removed during the time that the meadow is under water.

5. *Three-wheeled Carts* are neceſſary when large quantities of earth are to be removed; particularly when they are to be carried to ſome diſtance.

6. Short and narrow *Scythes* are made uſe of to mow the weeds and graſs, when the water is running in the trenches, drains, and mains.

7. *Forks*, and long *Crooks* with four or five tines, are uſed for pulling out the roots of ſedge, ruſhes, reeds, &c. which grow in the large mains and drains. The crooks ſhould be made light, and have long ſtems to reach wherever the water is ſo deep that the workmen cannot work in it.

8. Strong *Water-boots*, the tops of which will draw up half the length of the thigh, are indiſpenſably neceſſary. They muſt alſo be large enough to admit a quantity of hay to be ſtuffed down all round the legs, and be kept well tallowed to reſiſt the running water for many hours together.

The principles on which the practice of watering meadows depend are few and eaſy. 1. Water will always riſe to the level of the receptacle out of which it is originally brought. 2. There is in all ſtreams a deſcent greater or ſmaller; the quantity of which is in ſome meaſure ſhown by the running of the ſtream itſelf. If it runs ſmooth and ſlow, the deſcent is ſmall; but if rapidly and with noiſe, the deſcent is conſiderable. 3. Hence if a main be taken out of the river high enough up the ſtream, water may be brought from that river to flow over the land by the ſide of the river, to a certain diſtance below the head of the main, although the river from whence it is taken ſhould, oppoſite to that very place, be greatly under it. 4. Water, ſunk under a carriage which conveys another ſtream at right angles over it, one, two, or more feet below its own bed, will, when it has paſſed the carriage, riſe again to the level it had before. 5. Water conveyed upon any land, and there left ſtagnant for any length of time, does it an injury; deſtroying the good herbage, and filling the place with ruſhes, flags, and other weeds. 6. Hence it is abſolutely neceſſary, before the work is undertaken, to be certain that the water can be thoroughly drained off.

After the work of watering a meadow is totally finiſhed, and the hay carried off, cattle may be let in to eat the aftermath. When this is done, it will then be neceſſary to examine whether or not the mains have ſuffered any injury from their feet; whether there be quantities of mud or ſand collected at the angles, &c. all of which muſt be thrown out, and the breaches repaired; by which means the trenches, drains, &c. will laſt three years, but otherwiſe not more than two. The roots, mud, &c. may be uſed in repairing the breaches, but never left upon the ſides of the trenches out of which they are taken. The tail-drains require to be cleanſed oftener than any of the other works—for this obvious reaſon, that the mud, &c. is carried down from all the others into them; where if it be allowed to accumulate, it occaſions a ſtagnation of water upon the meadow itſelf. In repairing the trenches, particular care ought to be taken that the workmen do not make them any wider than before, which they are very apt to do; neither are they to be allowed to throw the materials which they dig out in a ridge behind the edge of the trench, which both widens it and promotes weeds.

During the time of watering, it will be neceſſary to examine the meadow every two or three days in order to remove obſtructions, &c. If the drains ſhould be filled with water and run over, they ought to be made deeper; or if this cannot be done, they ſhould be widened. In the winter time a regular ſtrong water ſhould be kept, avoiding very ſtrong great floods. In this ſeaſon the water may be kept on the ground with ſafety for a month, or even ſix weeks, if the ſoil be corky or boggy, or a ſtrong clay; but not quite ſo long if it be gravel or ſand. At the ſecond watering a fortnight or three weeks will be ſufficient; and after Candlemas a fortnight will be rather too long. At the third watering a week will be ſufficient, which will bring it to about the middle of March; by which time, if

the weather be tolerably mild, the graſs will be long enough for the ewes and lambs, or fatting lambs; which may then be turned into the meadow with great advantage. Even in the end of February, if the winter has been very mild, the graſs will be long enough for them. Here they may be permitted to feed till the beginning of May, changing them into different meadows. As ſoon as they are taken out, the water muſt be turned in for a week, carefully examining every trench and drain for the reaſons already given. The water is then to be ſhifted into others, alternately watering and draining, leſſening the time the water remains upon it as the weather grows warmer; and in five, ſix, or ſeven weeks, the graſs will be fit to be mown for hay, and produce from one to two tons, or even more, an acre upon good ground.

Mr. Boſwell directs, that about a week before the graſs is to be mown the water ſhould be let into the meadow for 24 hours; which, he ſays, will make the ground moiſt at the bottom, the ſcythe will go through it the more eaſily, and the graſs will be mown cloſer to the ground. This practice, however, is entirely diſapproved of by Mr. Wright.

Rolling meadows in the ſpring of the year is an excellent method. It ſhould be done after Candlemas, when the meadow has been laid dry a week. It ſhould be always rolled lengthwiſe of the panes, up one ſide of the trench and down the other. Rolling alſo contributes much to the graſs being cut cloſe to the ſurface when mown, which is no ſmall advantage; for the little hillocks, ſpewings of worms, ant-hills, &c. are by this means preſſed cloſe to the ground, which would otherwiſe obſtruct the ſcythe and take off its edge; and to avoid that inconvenience, the workmen always mow over them.

MEAL, the flour of grain. The meal or flour of Britain is the fineſt and whiteſt in the world. The French is uſually browner, and the German browner than that. Our flour keeps well with us, but in carrying abroad it often contracts damp, and becomes bad. All flour is ſubject to breed worms; theſe are white in the white flour, and brown in that which is brown: they are therefore not always diſtinguiſhable to the eye; but when the flour feels damp, and ſmells rank and muſty, it may be conjectured that they are there in great abundance.

The colour and the weight are the two things which denote the value of meal or flower; the whiter and the heavier it is, other things being alike, the better it always is. Pliny mentions theſe two characters as the marks of good flour; and tells us, that Italy in his time produced the fineſt in the world. This country indeed was famous before his time for this produce; and the Greeks have celebrated it; and Sophocles in particular ſays, that no flour is ſo white or ſo good as that of Italy. The corn of this country has, however, loſt much of its reputation ſince that time; and the reaſon of this ſeems to be, that the whole country being full of ſulphur, alum, vitriol, marcaſites, and bitumens, the air may have in time affected them ſo far as to make them diffuſe themſelves through the earth, and render it leſs fit for vegetation; and the taking fire of ſome of theſe inflammable minerals, as has ſometimes happened, is alone ſufficient to alter the nature of all the land about the places where they are.

The flour of Britain, though it pleaſes by its whiteneſs, yet wants ſome of the other qualities valuable in flour: the bread that is made of it is brittle, and does not hold together, but after keeping a few days becomes hard and dry as if made of chalk, and is full of cracks in all parts; and this muſt be a great diſadvantage in it when intended for the ſervice of an army or the like occaſions, where there is no baking every day, but the bread of one making muſt neceſſarily be kept a long time.

The flour of ſome parts of France is very like that of Britain; and, after it has been kept ſome time, is found improper for making into paſte or dough. The French are forced either to uſe it immediately on the grinding, or elſe to mix it with an equal quantity of the flour of Brittany, which is coarſer, but more unctuous and fatty: but neither of theſe kinds of flour keep well.

The flour of almoſt any country will do for the home conſumption of the place, as it may be always freſh ground; but the great care to be uſed in ſelecting it is in order to the ſending it abroad, or furniſhing ſhips for their own uſe. The ſaline humidity of the ſea air ruſts metals, and fouls every thing on board, if great care be not taken in the preſerving them. This alſo makes the flour damp and mouldy, and is often the occaſion of its breeding inſects, and being wholly ſpoiled.

The flour of ſome places is conſtantly found to keep better at ſea than that of others; and when that is once found out, the whole caution needs only be to carry the flour of thoſe places. The keeping it dry is the next conſideration; and, in regard to this, the barrels in which it is put up ought to be made of dry and well-ſeaſoned oak, and not to be larger than to hold two hundred weight at the moſt. If the wood of the barrels have any ſap remaining in it, it will moiſten and ſpoil the flour; and no wood is ſo proper as oak for this purpoſe, or for making the bins and other veſſels for keeping flour in at home, ſince when once well dried and ſeaſoned it will not contract humidity afterwards. The beech-wood, of which ſome make their bins for flour, is never thoroughly dry, but always retains ſome ſap. The fir will give the flour a taſte of turpentine; and the aſh is always ſubject to be eaten by worms. The oak is preferable, becauſe of its being free from theſe faults; and when the ſeveral kinds of wood have been examined in a proper manner, there may be others found as fit, or poſſibly more ſo than this, for the purpoſe. The great teſt is their having more or leſs ſap. See FLOUR and WOOD.

MEAN, in general, denotes the middle between two extremes: thus we ſay the mean diſtance, mean proportion, &c.

MEARNS, or KINCARDINESHIRE, a county of Scotland, bounded on the north by Aberdeenſhire, on the eaſt by the Britiſh Ocean, and on the ſouth-weſt by Angusſhire. In form it reſembles a harp, having the lower point towards the ſouth. Its length along the coaſt is ſcarce 30 miles; its greateſt breadth about 20. Some derive the firſt name from Mearns a valiant nobleman, who, ſubduing the country, received it in reward from his prince Kenneth II. Camden, with much probability, ſuppoſes it to retain part of the name of the old inhabitants, the Vernicones of Ptolemy, it being common for the Britons in diſcourſe to change the V. into M. The other name is taken from its ancient capital *Kincardine*, now an inconſiderable village. The tract of country through which the Dee paſſes, and the plain along the ſea-coaſt, are well cultivated, and produce much corn and flax. The fields are in many places ſcreened by woods; and the heaths afford ſheep-walks and much good paſture for cattle. Near Stonehaven, to the ſouth, are the ruins of Dunotter caſtle, the ancient ſeat of the earls Mariſchal of Scotland, ſituated on a high perpendicular rock, almoſt ſurrounded by the ſea. In this neighbourhood is a precipitous cliff overhanging the ſea, called *Fowl's Cleugh*; noted as the reſort of kittiwakes, the young of which are much ſought after in the hatching ſeaſon, being eſteemed a great delicacy.—At a little diſtance from Stonehaven, up the river, ſtands Urie, the birth-place of Barclay the famous apologiſt for the Quakers. The Quakers have here a burying-ground; and in the vicinity are ſeen the traces of a Roman ſtation. The great valley called *Strathmore* commences here, and extends in a ſouth-weſt direction nearly as far as

Benlomond in Stirlingſhire, bounded all along to the north-weſt by the Grampian mountains.

MEASLES, a cutaneous diſeaſe attended with a fever, in which there is an appearance of eruptions that do not tend to a ſuppuration. See MEDICINE.

MEASURE, in geometry, denotes any quantity aſſumed as one, or unity, to which the ratio of the other homogeneous or ſimilar quantities is expreſſed.

MEASURE, in a legal and commercial ſenſe, denotes a certain quantity or proportion of any thing bought, ſold, valued, or the like. It is neceſſary, for the convenience of commerce, that an uniformity ſhould be obſerved in weights and meaſures, and regulated by proper ſtandards. A foot-rule may be uſed as a ſtandard for meaſures of length, a buſhel for meaſures of capacity, and a pound for weights. There ſhould be only one authentic ſtandard of each kind, formed of the moſt durable materials, and kept with all poſſible care. A ſufficient number of copies, exactly correſponding to the principal ſtandard, may be diſtributed for adjuſting the weights and meaſures that are made for common uſe. There are ſeveral ſtandards of this kind both in England and Scotland. See the article WEIGHTS *and Meaſures.*

If any one of the ſtandards above mentioned be juſtly preſerved, it will ſerve as a foundation for the others, by which they may be corrected if inaccurate, or reſtored if entirely loſt. For inſtance, if we have a ſtandard foot, we can eaſily obtain an inch, and can make a box which ſhall contain a cubical inch, and may ſerve as a ſtandard for meaſures of capacity. If it be known that a pint contains 100 cubical inches, we may make a veſſel five inches ſquare, and four inches deep, which will contain a pint. If the ſtandard be required in any other form, we may fill this veſſel with water, and regulate another to contain an equal quantity. Standards for weights may be obtained from the ſame foundation; for, if we know how many inches of water it takes to weigh a pound, we have only to meaſure that quantity, and the weight which balances it may be aſſumed as the ſtandard of a pound.

Again, if the ſtandard of a pound be given, the meaſure of an inch may be obtained from it: for we may weigh a cubical inch of water, and pour it into a regular veſſel; and having noticed how far it is filled, we may make another veſſel of like capacity in the form of a cube. The ſide of this veſſel may be aſſumed as the ſtandard for an inch; and ſtandards for a foot, a pint, or a buſhel, may be obtained from it. Water is the moſt proper ſubſtance for regulating ſtandards; for all other bodies differ in weight from others of the ſame kind; whereas it is found by experience that ſpring and river water, rain, and melted ſnow, and all other kinds, have the ſame weight; and this uniformly holds in all countries when the water is pure, alike warm, and free from ſalt and minerals.

Thus, any one ſtandard is ſufficient for reſtoring all the reſt. It may further be deſired to hit on ſome expedient, if poſſible, for reſtoring the ſtandards, in caſe that all of them ſhould ever fall into diſorder, or ſhould be forgotten, through the length of time, and the viciſſitudes of human affairs. This ſeems difficult, as no words can convey a preciſe idea of a foot-rule, or a pound weight. Meaſures, aſſumed from the dimenſions of the human body, as a foot, a hand-breadth, or a pace, muſt nearly be the ſame in all ages, unleſs the ſize of the human race undergo ſome change; and therefore, if we know how many ſquare feet a Roman acre contained, we may form ſome judgment of the nature of the law which reſtricted the property of a Roman citizen to ſeven acres; and this is ſufficient to render hiſtory intelligible; but it is too inaccurate to regulate meaſures for commercial purpoſes. The ſame may be ſaid of ſtandards, deduced from the meaſure of a barley-corn, or the weight of a grain of wheat. If the diſtance of two mountains be accurately meaſured and recorded, the nature of the meaſure uſed will be preſerved in a more permanent manner than by any ſtandard; for, if ever that meaſure fall into diſuſe, and another be ſubſtituted in its place, the diſtance may be meaſured again, and the proportion of the ſtandards may be aſcertained by comparing the new and ancient diſtances.

But the moſt accurate and unchangeable manner of eſtabliſhing ſtandards is, by comparing them with the length of pendulums. The longer a pendulum is, it vibrates the ſlower; and it muſt have one preciſe length in order to vibrate in a ſecond. The ſlighteſt difference in length will occaſion a difference in the time; which will become abundantly ſenſible after a number of vibrations, and will be eaſily obſerved if the pendulum be applied to regulate the motion of a clock. The length of a pendulum which vibrates ſeconds in London is about $39\frac{1}{8}$ inches, is conſtantly the ſame at the ſame place; but it varies a little with the latitude of the place, being ſhorter as the latitude is leſs. Therefore, though all ſtandards of weights and meaſures were loſt, the length of a ſecond pendulum might be found by repeated trials: and if the pendulum be properly divided, the juſt meaſure of an inch will be obtained; and from this all other ſtandards may be reſtored. See *Whitehurſt on Invariable* MEASURES.

Meaſures are various, according to the various kinds and dimenſions of the things meaſured.—Hence ariſe lineal or longitudinal meaſures, for lines or lengths; ſquare meaſures, for areas or ſuperfices; and ſolid or cubic meaſures, for bodies and their capacities: all which again are very different in different countries and in different ages, and even many of them for different commodities. Whence ariſe other diviſions of ancient and modern meaſures, domeſtic and foreign ones, dry meaſures, liquid meaſures, &c.

I. LONG *Meaſures, or Meaſures of Application.*

1.] The *Engliſh* and *Scotch* Standards.

The Engliſh lineal ſtandard is the yard, containing 3 Engliſh feet; equal to 3 Paris feet 1 inch and $\frac{3}{4}$ of an inch, or $\frac{7}{9}$ of a Paris ell. The uſe of this meaſure was eſtabliſhed by Henry I. of England, and the ſtandard taken from the length of his own arm. It is divided into 36 inches, and each inch is ſuppoſed equal to 3 barley-corns. When uſed for meaſuring cloth, it is divided into four quarters, and each quarter ſubdivided into 4 nails. The Engliſh ell is equal to a yard and a quarter, or 45 inches, and is uſed in meaſuring linens imported from Germany and the Low Countries.

The Scots *elwand* was eſtabliſhed by king David I. and divided into 37 inches. The ſtandard is kept in the council-chamber of Edinburgh, and, being compared with the Engliſh yard, is found to meaſure $37\frac{1}{2}$ inches; and therefore the Scots inch and foot are larger than the Engliſh, in the proportion of 180 to 185; but this difference being ſo inconſiderable, is ſeldom attended to in practice. The Scots ell, though forbidden by law, is ſtill uſed for meaſuring ſome coarſe commodities, and is the foundation of the land meaſure of Scotland.

Itinerary meaſure is the ſame both in England and Scotland. The length of the chain is 4 poles, or 22 yards; 8 chains make a mile. The old Scots computed miles were generally about a mile and a half each.

The reel for yarn is $2\frac{1}{2}$ yards, or 10 quarters, in circuit; 120 threads make a cut, 12 cuts make a haſp or hank, and 4 hanks make a ſpindle.

2.] The *French* ſtandard is the aune or ell, containing 3 Paris feet 7 inches 8 lines, or 1 yard $\frac{2}{7}$ Engliſh; the Paris foot royal exceeding the Engliſh by $\frac{8}{1000}$ parts, as in one of

the following tables. This ell is divided two ways, viz. into halves, thirds, ſixths, and twelfths; and into quarters, half-quarters, and ſixteenths.

This ell holds throughout the greateſt part of France; excepting at Troyes in Champagne, at Arc in the Barrois, and in ſome parts of Picardy and Burgundy, where the ell contains only 2 feet 5 inches 1 line; in Bretagne, where it contains 4 feet 2 inches 11 lines; and at St. Genoux in Berry, where it exceeds the Paris ell by 8 lines. See ELL. But in Languedoc, particularly at Marſeilles, Montpelier, Thouloufe in Provence, and in Guienne, they meaſure by the canna, which at Thouloufe and in Guienne contains 5 Paris feet 5 inches and 6 lines; or one Paris ell and a half. But at Montpelier, and throughout the Lower Languedoc, as alſo in Provence and Avignon, and even Dauphiné, the canna is 6 feet and 9 lines, or 1 Paris ell and $\frac{2}{3}$. See CANNA.

We have lately had ſome accurate compariſons between ſome of the French weights and meaſures and thoſe of England, the reſult of which is, (1.) The Paris half toiſe, as ſet off on the ſtandard kept in the Royal Society, contains of Engliſh inches by the ſame ſtandard 38.355; whence it appears, that the Engliſh yard and foot is to the Paris half toiſe and foot nearly as 107 to 114; for as 107 to 114, ſo is 36 to 38.3514.

(2.) The Paris 2 marc, or 16 ounce weight, weighs Engliſh Troy grains 7560; whence it appears, that the Engliſh Troy pound of 12 ounces, or 5760 grains, is to the Paris 2 marc, or 16 ounce weight, as 16 to 21; that the Paris ounce weighs Engliſh Troy grains 472.5, and that conſequently the Engliſh Troy ounce is to the Paris ounce as 64 is to 63.

(3.) The Engliſh Avoirdupois pound weighs Troy grains 7004; whence the Avoirdupois ounce, whereof 16 make a pound, is found equal to 437.75 Troy grains.—And it follows, that the Troy pound is to the Avoirdupois pound as 88 to 107 nearly; for as 88 to 107, ſo is 5760 to 7003.636: that the Troy ounce is to the Avoirdupois ounce, as 80 to 73 nearly; for as 80 to 73, ſo is 480 to 438. And, laſtly, that the Avoirdupois pound and ounce is to the Paris two marc weight and ounce, as 63 to 68 nearly; for as 63 to 68, ſo is 7004 to 7559.873. See WEIGHT. (4). The Paris foot expreſſed in decimals, is equal to 1.0654 of the Engliſh foot, or contains 12.785 Engliſh inches. See FOOT.

3.] The ſtandard in *Holland*, *Flanders*, *Sweden*, a good part of *Germany*, many of the Hanſe-towns, as *Dantzick* and *Hamburgh*, and at *Geneva*, *Franckfort*, &c. is likewiſe the ell: but the ell, in all theſe places, differs from the Paris ell. In Holland it contains one Paris foot eleven lines, or four ſevenths of the Paris ell. The Flanders ell contains two feet one inch five lines and half a line; or ſeven twelfths of the Paris ell. The ell of Germany, Brabant, &c. is equal to that of Flanders.

4.] The *Italian* meaſure is the bracchio, brace, or fathom. This obtains in the ſtates of Modena, Venice, Florence, Lucca, Milan, Mantua, Bologna, &c. but is of different lengths. At Venice, it contains one Paris foot eleven inches three lines, or eight fifteenths of the Paris ell. At Bologna, Modena, and Mantua, the brace is the ſame as at Venice. At Lucca it contains one Paris foot nine inches ten lines, or half a Paris ell. At Florence, it contains one foot nine inches four lines, or forty-nine hundredths of a Paris ell. At Milan, the brace for meaſuring of ſilks is one Paris foot ſeven inches four lines, or four-ninths of a Paris ell: that for woollen cloths is the ſame with the ell of Holland. Laſtly, at Bergama, the brace is one foot ſeven inches ſix lines, or five-ninths of a Paris ell. The uſual meaſure at Naples, however, is the canna, containing ſix feet ten inches and two lines, or one Paris ell and fifteen ſeventeenths.

5.] *The Spaniſh* meaſure is the vara or yard, in ſome places called the barra; containing ſeventeen twenty-fourths of the Paris ell. But the meaſure in Caſtile and Valencia is the pan, ſpan, or palm; which is uſed, together with the canna, at Genoa. In Arragon, the vara is equal to a Paris ell and a half, or five feet five inches ſix lines.

6. *The Portugueſe* meaſure is the cavedos, containing two feet eleven lines, or four-ſevenths of a Paris ell; and the vara, a hundred and ſix whereof make a hundred Paris ells.

7.] *The Piedmonteſe* meaſure is the ras, containing one Paris foot nine inches ten lines, or half a Paris ell. In Sicily, their meaſure is the canna, the ſame with that of Naples.

8.] *The Muſcovite* meaſures are the cubit, equal to one Paris foot four inches two lines; and the arcin, two whereof are equal to three cubits.

9.] *The Turkiſh* and *Levant* meaſures are the picq, containing two feet two inches and two lines, or three-fifths of the Paris ell. The Chineſe meaſure, the cobre; ten whereof are equal to three Paris ells. In Perſia, and ſome parts of the Indies, the gueze, whereof there are two kinds; the royal gueze, called alſo the *gueze monkelſer*, containing two Paris feet ten inches eleven lines, or four-fifths of the Paris ell; and the ſhorter gueze, called ſimply *gueze*, only two thirds of the former. At Goa and Ormuz, the meaſure is the vara, the ſame with that of the Portugueſe, having been introduced by them. In Pegu, and ſome other parts of the Indies, the cando or candi, equal to the ell of Venice. At Goa, and other parts, they uſe a larger cando, equal to ſeventeen Dutch ells; exceeding that of Babel and Balſora by $\frac{7}{8}$ *per centum*, and the vara by $6\frac{1}{2}$. In Siam, they uſe the ken, ſhort of three Paris feet by one inch. The ken contains two ſoks, the ſok two keubs, the keub twelve nious or inches, the niou to be equal to eight grains of rice, i. e. to about nine lines. At Camboia, they uſe the haſter; in Japan, the tatam; and the ſpan on ſome of the coaſts of Guinea.

TABLES *of* LONG *Meaſure.*

1. ENGLISH.

Barley-corn	Inch	Palm	Span	Foot	Cubit	Yard	Pace	Fathom	Pole	Furlong	Mile.
3	Inch										
9	3	Palm									
27	9	3	Span								
36	12	4	1⅓	Foot							
54	18	6	2	1½	Cubit						
108	36	12	4	3	2	Yard					
180	60	20	6⅔	5	3⅓	1⅔	Pace				
216	72	24	8	6	4	2	1 1/5	Fathom			
594	198	66	22	16½	11	5½	3 3/10	2¾	Pole		
23760	7920	2640	880	660	440	220	132	110	40	Furlong	
190080	63360	21120	7040	5280	3520	1760	1056	880	320	8	Mile.

2. SCRIPTURE *Meaſures reduced into Engliſh.*

Digit	Palm	Span	Cubit	Fathom	Ezekiel's reed	Arabian pole	Schœnus, or meaſuring line	Eng. feet.	Inch	Dec.
								0		0.912
4	Palm							0		3.648
12	3	Span						0		10.944
24	6	2	Cubit					1		9.888
96	24	8	4	Fathom				7		3.552
144	36	12	6	1½	Ezekiel's reed			10		11.328
192	48	16	8	2	1⅓	Arabian pole		14		7.104
1920	480	160	80	20	13⅓	10	Schœnus, or meaſuring line	145		11.04

3. *The* SCRIPTURE *Itinerary Meaſures.*

Cubit	Stadium	Sab. day's journey	Eaſtern mile	Paraſan	a day's journey	Eng. Miles.	Paces.	Feet.
						0	0	1.824
400	Stadium					0	145	4.6
2000	5	Sab. day's journey				0	729	3.000
4000	10	2	Eaſtern mile			1	403	1.000
12000	30	6	3	Paraſan		4	153	3.000
96000	240	48	24	8	a day's journey	33	172	4.000

4. GRECIAN.

											Paces.	Feet.	Dec.
Dactylus, digit	—	—	—								0	0	0.7554 $\frac{11}{16}$
4	Doron, dochme	—	—								0	0	3.0218 $\frac{3}{4}$
10	$2\frac{1}{2}$	Lichas	—	—							0	0	7.5546 $\frac{7}{8}$
11	$2\frac{3}{4}$	$1\frac{7}{16}$	Orthodoron	—	—						0	0	8.3101 $\frac{9}{16}$
12	3	$1\frac{1}{5}$	$1\frac{1}{11}$	Spithame	—	—					0	0	9.0656 $\frac{1}{4}$
16	4	$1\frac{5}{16}$	$1\frac{5}{11}$	$1\frac{1}{3}$	Foot	—	—				0	1	0.0875
18	$4\frac{1}{2}$	$1\frac{4}{5}$	$1\frac{7}{11}$	$1\frac{1}{2}$	$1\frac{1}{8}$	Cubit	—	—			0	1	1.5984 $\frac{3}{8}$
20	5	2	$1\frac{9}{11}$	$1\frac{2}{3}$	$1\frac{1}{4}$	$1\frac{1}{9}$	Pygon	—			0	1	3.109 $\frac{3}{8}$
24	6	$2\frac{2}{5}$	$2\frac{2}{11}$	2	$1\frac{1}{2}$	$1\frac{1}{3}$	$1\frac{1}{5}$	Cubit larger			0	1	6.13125
96	24	$9\frac{3}{5}$	$8\frac{8}{11}$	8	6	$5\frac{1}{3}$	$4\frac{4}{5}$	4	Pace		0	6	0.525
9600	2400	960	$872\frac{8}{11}$	800	600	$533\frac{1}{3}$	480	400	100	Furlong	100	4	4.5
76800	19200	7680	$6981\frac{9}{11}$	6400	6800	$4266\frac{2}{3}$	3840	3200	800	8 Mile	805	5	0

5. ROMAN.

										Paces.	Feet.	Dec.
Digitus tranſverſus	—	—	—							0	0	0.725 $\frac{1}{8}$
$1\frac{1}{3}$	Uncia	—	—	—						0	0	0.967
4	3	Palmus minor	—	—	—					0	0	2.901
16	12	4	Pes	—	—	—				0	0	11.604
20	15	5	$1\frac{1}{4}$	Palmipes	—	—				0	1	2.505
24	18	6	$1\frac{1}{2}$	$1\frac{1}{5}$	Cubitus	—	—			0	1	5.406
40	30	10	$2\frac{1}{2}$	2	$1\frac{2}{3}$	Gradus	—	—		0	2	5.01
80	60	20	5	4	$3\frac{1}{3}$	2	Paſſus	—		0	4	10.02
10000	7500	2500	625	500	$416\frac{2}{3}$	250	125	Stadium	—	120	4	4.5
80000	60000	20000	5000	4000	$33\ 33\frac{1}{3}$	2000	1000	8	Milliare	967	0	0

6. *Proportions of ſeveral Long Meaſures to each other, by M. Picard.*

The Rhinland or Leyden foot (12 whereof make the Rhinland perch) ſuppoſed - - 696
The Engliſh foot - - - $675\frac{1}{2}$
The Paris foot - - - - 720
The Amſterdam foot, from that of Leyden, by Snellius 629
The Daniſh foot (two whereof make the Daniſh ell) $701\frac{9}{16}$
The Swediſh foot - - - $658\frac{1}{4}$
The Bruſſels foot - - - $609\frac{3}{5}$
The Dantzick foot, from Hevelius's Selenographia 636
The Lyons foot, by M. Auzout - - $757\frac{2}{5}$
The Bologna foot, by the ſame - - 843
The bracchio of Florence, by the ſame, and Father Merſenne - - - 1290
The palm of the architects at Rome, according to the obſervations of Meſſrs. Picard and Auzout - $494\frac{1}{4}$
The Roman foot in the Capitol, examined by Meſſrs. Picard and Auzout - - 653 or $653\frac{5}{12}$
The ſame from the Greek foot - - 652
From the vineyard Mattei - - $657\frac{1}{2}$
From the palm - - - - $658\frac{1}{4}$
From the pavement of the Pantheon, ſuppoſed to contain ten Roman feet - - - - 653
From a ſlip of marble in the ſame pavement, ſuppoſed to contain three Roman feet - - 650
From the pyramid of Ceſtius, ſuppoſed to contain 95 Roman feet - - - - $653\frac{1}{2}$
From the diameters of the columns in the arch of Septimius Severus - - - - - $653\frac{1}{3}$
From a ſlip of porphyry in the pavement of the Pantheon - - - - $653\frac{1}{3}$

See on this ſubject Phil. Tranſ. Vol. LI. art. 69. p. 774.

7. *Proportions of the Long Meaſures of ſeveral Nations to the Engliſh Foot, taken from Mr. Greaves, Auzout, Picard, and Eiſenſchmid.* See FOOT.

The Engliſh ſtandard foot being divided into 1000 equal parts, the other meaſures will have the proportions to it which follow:

	Feet.	Inches.
Engliſh foot	1000	12
Paris foot	1068	12,816
Venetian foot	1162	13,944
Rhinland foot	1033	12,396
Straſburgh foot	952	11,424
Norimbergh foot	1000	12
Dantzick foot	944	11,328
Daniſh foot	1042	12,504
Swediſh foot	977¾	11,733
Derahor cubit of Cairo	1824	21,888
Perſian ariſh	3197	38,364
Greater Turkiſh pike	2200	26,4
Leſſer Turkiſh pike	2131	25,572
Braccio at Florence	1913	22,956
Braccio for woollen at Siena	1242	14,904
Braccio for linen at Siena	1974	23,688
Canna at Naples	6880	82,56
Vera at Almaria and Gibraltar	2760	33,12
Palmo di architetti at Rome	732	87,84
Canna di architetti	7320	87,84
Palmo di braccio di mercantia	695½	8,346
Genoa palm	815	9,78
Bolognian foot	1250	15
Antwerp ell	2283	27,396
Amſterdam ell	2268	27,216
Leyden ell	2260	27,12
Paris draper's ell	3929	47,148
Paris mercer's ell	3937	47,244

8. *Different Itinerary Meaſures.*

A French league is about	2¾	Engliſh miles.
A German mile	4	ditto
A Dutch mile	3½	ditto
An Italian mile	1½	ditto
A Spaniſh league	3⅔	ditto
A Ruſſian verſt	¾	ditto

II. SQUARE, SUPERFICIAL, *or* LAND *Meaſure.*

1.] *Engliſh* ſquare meaſures are raiſed from the yard of 36 inches multiplied into itſelf, and thus producing 1296 ſquare inches in the ſquare yard; the diviſions of this are ſquare feet and inches; and the multiples, poles, roods, and acres. Becauſe the length of a pole is 5½ yards, the ſquare of the ſame contains 30¼ ſquare yards. A ſquare mile contains 640 ſquare acres. In meaſuring fens and woodlands, 18 feet are generally allowed to the pole, and 21 feet in foreſt lands.

A hide of land, frequently mentioned in the earlier part of the Engliſh hiſtory, contained about 100 arable acres; and 5 hides were eſteemed a knight's fee. At the time of the Norman conqueſt, there were 243,600 hides in England.

2.] *Scotch* ſquare or land meaſure is regulated by the Scotch ell: 36 ſquare ells = 1 fall, 40 falls = 1 rood, 4 roods = 1 acre.—The proportion between the Scotch and Engliſh acre, ſuppoſing the feet in both meaſures alike, is as 1369 to 1089, or nearly as 5 to 4. If the difference of the feet be regarded, the proportion is as 10,000 to 7869. The length of the chain for meaſuring land in Scotland is 24 ells, or 74 feet.—A huſband-land contains 6 acres of fock and ſcythe land, that is, of land that may be tilled with a plough, or mown with a ſcythe: 13 acres of arable land make one ox-gang, and 4 ox-gangs make a pound-land of old extent.

3.] *French* ſquare meaſures are regulated by 12 ſquare lines in the inch ſquare; 12 inches in the foot, 22 feet in the perch, and 100 perches in the arpent or acre.

TABLES *of* SQUARE *Meaſure.*

1. ENGLISH.

Inches	Feet	Yards	Paces	Poles	Rood	
144						
1296	9					
3600	25	2⅞				
39204	272¼	30¼	10.89			
1568160	10890	1210	435.6	40		
6272640	43560	4840	1743.6	160	4	Acre

2. *Grecian* ſquare meaſures were the plethron or acre, by ſome ſaid to contain 1444, by others 10,000 ſquare feet; and aroura the half of the plethron. The aroura of the Egyptians was the ſquare 100 cubits.

3. *Roman* ſquare meaſure reduced to Engliſh. The integer was the jugerum or acre, which the Romans divided like the libra or as: thus the jugerum contained

	ſquare feet.	ſcruples.	Eng. roods.	ſq. poles.	Square feet.
As	28800	288	2	18	250.05
Deunx	26400	264	2	10	183.85
Dextans	24000	240	2	2	117.64
Dodrans	21600	216	1	34	51.42
Bes	19200	192	1	25	257.46
Septunx	16800	168	1	17	191.25
Semis	14400	144	1	9	125.03
Quincunx	12000	120	1	1	58.82
Triens	9600	96	0	32	264.85
Quadrans	7200	72	0	24	198.64
Sextans	4800	48	0	16	132.43
Uncia	2400	24	0	8	66.21

Note, Actus major was 14,400 ſquare feet, equal to a ſemis; clima, 3600 ſquare feet, equal to a ſeſcuncia; and actus minimus equal to a ſextans.

III. CUBICAL *Meaſures*, or Meaſures of Capacity, for LIQUIDS.

1.] The *Engliſh* meaſures were originally raiſed from troy-weight: it being enacted by ſeveral ſtatutes, that eight pounds troy of wheat, gathered from the middle of the ear, and well dried, ſhould weigh a gallon of wine meaſure, the diviſions and multiples whereof were to form the other meaſures: at the ſame time it was alſo ordered, that there ſhould be but one liquid meaſure in the kingdom: yet cuſtom has prevailed, and there having been introduced a new weight, viz. the avoirdupois, we have now a ſecond ſtandard gallon adjuſted thereto, and therefore exceeding the former in the proportion of the avoirdupois weight to troy weight. From this latter ſtandard are raiſed two ſeveral meaſures, the one for ale, the other for beer. The ſealed gallon at Guildhall, which is the ſtandard for wines, ſpirits, oils, &c. is ſuppoſed to contain 231 cubic

inches; and on this ſuppoſition the other meaſures raiſed therefrom, will contain as in the table underneath: yet, by actual experiment, made in 1688, before the lord-mayor and the commiſſioners of exciſe, this gallon was found to contain only 224 cubic inches: it was however agreed to continue the common ſuppoſed contents of 231 cubic inches; ſo that all computations ſtand on their old footing. Hence, as 12 is to 231, ſo is $14\frac{12}{16}$ to $281\frac{1}{2}$ the cubic inches in the ale-gallon: but in effect the ale-quart contains $70\frac{1}{2}$ cubic inches, on which principle the ale and beer gallon will be 282 cubic inches. The ſeveral diviſions and multiples of theſe meaſures, and their proportions, are exhibited in the tables underneath.

The barrel for ale in London is 32 gallons, and the barrel for beer 36 gallons. In all other places of England, the barrel, both for ale and beer, is 34 gallons.

2.] *Scotch* liquid meaſure is founded on the pint. The Scotch pint was formerly regulated by a ſtandard jug of caſt metal, the cuſtody of which was committed to the borough of Stirling. This jug was ſuppoſed to contain 105 cubic inches; and though, after ſeveral careful trials, it has been found to contain only about $103\frac{1}{2}$ inches; yet, in compliance with eſtabliſhed cuſtom, founded on that opinion, the pint *ſtoups* are ſtill regulated to contain 105 inches, and the cuſtomary ale meaſures are about $\frac{1}{16}$ above that ſtandard. It was enacted by James I. of Scotland, that the pint ſhould contain 41 ounces Trone weight of the clear water of Tay, and by James VI. that it ſhould contain 55 Scots Troy ounces of the clear water of Leith. This affords another method of regulating the pint, and alſo aſcertains the ancient ſtandard of the Trone weight. As the waters of Tay and Leith are alike, the Trone weight muſt have been to the Scots Troy weight as 55 to 41; and therefore, the pound Trone muſt have contained about $21\frac{1}{2}$ ounces Scots Troy.

4 gills	=	1 mutchkin.
2 mutchkins	=	1 chopin.
2 chopins	=	1 pint.
2 pints	=	1 quart.
4 quarts	=	1 gallon.

The Scotch quart contains 210 inches; and is, therefore, about $\frac{1}{16}$ leſs than the Engliſh wine gallon, and about $\frac{1}{4}$ leſs than the ale-gallon.

3.] As to the liquid meaſures of foreign nations, it is to be obſerved, that their ſeveral veſſels for wine, vinegar, &c. have alſo various denominations according to their different ſizes and the places wherein they are uſed. The woeders of Germany, for holding Rheniſh and Moſelle wines, are different in their gauges; ſome containing 14 aumes of Amſterdam meaſure, and others more or leſs. The aume is reckoned at Amſterdam for 8 ſteckans, or 20 verges, or for $\frac{1}{6}$ of a ton of 2 pipes; or 4 barrels of French or Bourdeaux, which $\frac{1}{6}$ at this latter place is called *tierçon*, becauſe 3 of them make a pipe or 2 barrels, and 6 the ſaid ton. The ſteckan is 16 mingles, or 32 pints; and the verge is, in reſpect of the ſaid Rheniſh and Moſelle, and ſome other ſorts of wine, 6 mingles; but in meaſuring brandy, it conſiſts of $6\frac{1}{2}$ mingles. The aume is divided into 4 anckers, and the ancker into 2 ſteckans, or 32 mingles. The ancker is taken ſometimes for $\frac{1}{24}$ of a ton, or 4 barrels; on which footing the Bourdeaux-barrel ought to contain at Amſterdam (when the caſk is made according to the juſt gauge) $12\frac{1}{2}$ ſteckans, or 200 mingles, wine and lees; or 12 ſteckans, or 192 mingles racked wine; ſo that the Bourdeaux-ton of wine contains 50 ſteckans, or 800 mingles, wine and lees; and 48 ſteckans, or 768 mingles, of pure wine. The barrels or poinçons of Nantes and other places on the river Loire, contain only 12 ſteckans Amſterdam meaſure. The wine-ton of Rochelle, Cognac, Charente, and the Iſle of Rhé, differs very little from the ton of Bourdeaux, and conſequently from the barrels and pipes. A ton of wine of Chaloſſe, Bayonne, and the neighbouring places, is reckoned 60 ſteckans, and the barrel 15, Amſterdam-meaſure.

The muid of Paris contains 150 quarts, or 300 pints, wine and lees; or 280 pints clear wine; of which muids 3 make a ton, and the fractions are

The muid	containing	36 ſetiers
The ſetier		4 quarts
The quart		2 pints
The pint		2 chopins
The chopin		2 demi-ſetiers
The demi-ſetier		2 poiſſons.

The muid is alſo compoſed of pipes, or poinçons, quarteaux, queves, and demiqueves; thoſe poinçons of Paris and Orleans contain about 15 ſteckans Amſterdam meaſure, and ought to weigh with the caſk 666 lb. a little more or leſs. In Provence they reckon by milleroles, and the millerole of Toulon contains 66 Paris pints, or 100 pints of Amſterdam, nearly; and the Paris pint is nearly equal to the Engliſh wine-quart.

The butts or pipes from Cadiz, Malaga, Alicant, Benecarlo, Saloe, and Mataro, and from the Canaries, from Liſbon, Oporto, and Fayal, are very different in their gauges, though in affreightments they are all reckoned two to the ton.

Vinegar is meaſured in the ſame manner as wine; but the meaſures for brandies are different: theſe ſpirits from France, Spain, Portugal, &c. are generally ſhipped in large caſks called *pipes*, *butts*, and *pieces*, according to the places from whence they are exported, &c. In France, brandy is ſhipped in caſks called *pieces* at Bourdeaux, and *pipes* at Rochelle, Cognac, the iſle of Rhé, and other neighbouring places, which contain ſome more and ſome leſs, even from 60 to 90 Amſterdam verges or veertels, according to the capacity of the veſſels, and the places they come from, which being reduced into barrels will ſtand as follows, viz.

At Rochelle, Cognac, the Iſle of Rhé, and the country of Aunis	27 Veertels	per barrel.
At Nantes, and ſeveral places of Bretagne and Anjou	29 Veertels	
At Bourdeaux, and different parts of Guienne	32 Verges	
At Amſterdam, and other cities of Holland	30 Veertels	
At Hamburgh and Lubeck	30 Verges	
At Embden	27 Verges	

In Provence and Languedoc, brandy is ſold by the quintal, the caſks included; and at Bruges in Flanders, the verges are called *ſeſters* of 16 ſtops each, and the ſpirit is ſold at ſo much per ſtop.

Olive oil is alſo ſhipped in caſks of various ſizes, according to the cuſtom of the places where it is embarked and the conveniency of ſtowage. In England it is ſold by the ton of 236 gallons; and at Amſterdam by the ton of 717 mingles, or 1434 pints. In Provence it is ſold by milleroles of 66 Paris pints; from Spain and Portugal it is brought in pipes or butts, of different gauges; at the firſt place it is ſold by roves whereof 40 go to the butt; and at the latter place by almoudas, whereof 26 make a pipe. Train oil is ſold in England by the ton, at Amſterdam by the barrel.

TABLES *of* LIQUID *Measure.*

1. ENGLISH.

[*Wine.*]

Solid inches.								
$28\frac{7}{8}$	Pint							
231	8	Gallon						
4158	144	18	Rundlet					
$7276\frac{1}{2}$	252	$31\frac{1}{2}$	$1\frac{3}{4}$	Barrel				
9702	336	42	$2\frac{1}{3}$	$1\frac{1}{3}$	Tierce			
14553	504	63	$3\frac{1}{2}$	2	$1\frac{1}{2}$	Hogshead		
19279	672	84	$4\frac{2}{3}$	$2\frac{2}{3}$	2	$1\frac{1}{3}$	Puncheon	
29106	1008	126	7	4	3	2	$1\frac{1}{2}$	Butt or pipe
58212	2016	252	14	8	6	4	3	2 Tun

[*Ale.*]

Pints				
8	Gallon			
64	8	Firkin		
128	16	2	Kilderkin	
256	32	4	2	Barrel
512	64	8	4	2 Hog.

[*Beer.*]

Pints				
8	Gallon			
72	9	Firkin		
144	18	2	Kilderkin	
288	36	4	2	Barrel
576	72	8	4	2 Hog.

2. JEWISH reduced to Englifh Wine-meafure.

	Gall.	Pints	Solid inches.
Caph	0	$0\frac{5}{8}$	0.177
$1\frac{1}{3}$ Log	0	$0\frac{5}{6}$	0.211
$5\frac{1}{3}$ 4 Cab	0	$3\frac{1}{3}$	0.844
16 12 3 Hin	1	2	2.533
32 24 6 2 Seah	2	4	5.067
96 72 18 6 3 Bath, or Epha	7	4	15.2
960 720 180 60 30 10 Chomer	75	5	7.625

3. ATTIC reduced to Englifh Wine-meafure.

	Gal.	Pints.	Sol. inch. Dec.
Cochliarion	0	$\frac{1}{120}$	$0.0356\frac{5}{12}$
2 Cheme	0	$\frac{1}{60}$	$0.0712\frac{5}{6}$
$2\frac{1}{2}$ $1\frac{1}{4}$ Myftron	0	$\frac{1}{48}$	$0.089\frac{11}{48}$
5 $2\frac{1}{2}$ 2 Conche	0	$\frac{1}{24}$	$0.178\frac{11}{24}$
10 5 4 2 Cyathos	0	$\frac{1}{12}$	$0.356\frac{11}{12}$
15 $7\frac{1}{2}$ 6 3 $1\frac{1}{2}$ Oxybaphon	0	$\frac{1}{8}$	$0.535\frac{3}{8}$
60 30 24 12 6 4 Cotyle	0	$\frac{1}{2}$	$2.141\frac{1}{4}$
120 60 48 24 12 8 2 Xeftes	0	1	4.283
720 360 288 144 72 48 12 6 Chous	0	6	25.698
8640 4320 3456 1728 864 576 144 72 12 Metretes	10	2	29.629

4. ROMAN reduced to English Wine-measure.

									Gal.	Pints.	Sol. inch. Dec.
Ligula									0	$0\frac{1}{4\frac{1}{8}}$	$0.117\frac{5}{12}$
4	Cyathus								0	$0\frac{1}{12}$	$0.469\frac{3}{3}$
6	$1\frac{1}{2}$	Acetabulum							0	$0\frac{1}{8}$	$0.704\frac{1}{2}$
12	3	2	Quartarius						0	$0\frac{1}{4}$	1.40
24	6	4	2	Hemina					0	$0\frac{1}{2}$	2.818
48	12	8	4	2	Sextarius				0	1	5.636
288	72	48	24	12	6	Congius			0	7	4.942
1152	288	192	98	48	24	4	Urna		3	$4\frac{1}{2}$	5.33
2304	576	384	192	96	48	8	2	Amphora	7	1	10.66
46080	11520	7680	3840	1920	960	160	40	20 Culeus	143	3	11.095

IV. *Meaſures of Capacity for Things* DRY.

1.] *Engliſh dry* or corn meaſure. The ſtandard for meaſuring corn, ſalt, coals, and other dry goods, in England, is the Wincheſter gallon, which contains $272\frac{1}{4}$ cubic inches. The buſhel contains 8 gallons, or 2178 inches. A cylindrical veſſel, $18\frac{1}{2}$ inches diameter, and 8 inches deep, is appointed to be uſed as a buſhel in levying the malt-tax. A veſſel of theſe dimenſions is rather leſs than the Wincheſter buſhel of 8 gallons, for it contains only 2150 inches; though probably there was no difference intended. The denominations of dry meaſure commonly uſed, are given in the firſt of the ſubjoined tables. Four quarters of corn make a chaldron, 5 quarters make a wey or load, and 10 quarters make a tun. In meaſuring ſea-coal, 5 pecks make a buſhel, 9 buſhels make a quarter or vatt, 4 quarters make a chaldron, and 21 chaldrons make a ſcore.

40 feet hewn timber make a load.
50 feet unhewn timber make a load.
32 gallons make a herring barrel.
42 gallons make a ſalmon barrel.
1 cwt. gun-powder makes a barrel.
256 lb. ſoap make a barrel.
10 dozen candles make a barrel.
12 barrels make a laſt.

2.] *Scotch dry* meaſure. There was formerly only one meaſure of capacity in Scotland; and ſome commodities were heaped, others *ſtraiked*, or meaſured exactly to the capacity of the ſtandard. The method of heaping was afterwards forbidden as unequal, and a larger meaſure appointed for ſuch commodities as that cuſtom had been extended to.

The wheat-firlot, uſed alſo for rye, peaſe, beans, ſalt, and graſs-ſeeds, contains 21 pints 1 mutchkin, meaſured by the Stirling jug. The barley firlot, uſed alſo for oats, fruit, and potatoes, contains 31 pints. A different method of regulating the firlot was appointed, from the dimenſions of a cylindrical veſſel. The diameter for both meaſures was fixed at $10\frac{1}{8}$ inches, the depth $7\frac{1}{5}$ inches for the wheat-firlot, and $10\frac{1}{4}$ for the barley-firlot. A ſtandard conſtructed by theſe meaſures is rather leſs than when regulated by the pint; and as it is difficult to make veſſels exactly cylindrical, the regulation by the pint has prevailed, and the other method gone into diſuſe.

If the Stirling jug contain $103\frac{1}{2}$ inches, the wheat-firlot will contain 2109 inches; which is more than two *per cent.* larger than the legal malt buſhel of England, and about 1 *per cent.* larger than the Wincheſter buſhel: and the barley-firlot will contain 3208 inches. The barley-boll is nearly equal to ſix legal malt buſhels.

In Stirlingſhire, 17 pecks are reckoned to the boll: in Inverneſs-ſhire, 18 pecks: in Ayrſhire, the boll is the ſame as the Engliſh quarter. And the firlots, in many places, are larger than the Linlithgow ſtandard.

3.] *French dry*, are, the litron, buſhel, minot, mine, ſeptier, muid, and tun. The litron is divided into two demi-litrons and four quarter-litrons, and contains 36 cubic inches of Paris. By ordonnance the litron is to be three inches and a half high, and three inches 10 lines broad. The litron for ſalt is larger, and is divided into two halves, four quarters, eight demi-quarters, and 16 meſurettes. The French buſhel is different in different juriſdictions. At Paris it is divided into demi-buſhels; each demi-buſhel into two quarts; the quart into two half quarts; and the half-quart into two litrons: ſo that the buſhel contains 16 litrons. By ordonnance the Paris buſhel is to be eight inches two lines and a half high, and ten inches broad, or in diameter within-ſide. The minot conſiſts of three buſhels, the mine of two minots or ſix buſhels, the ſeptier of two mines or 12 buſhels, and the muid of 12 ſeptiers, or 144 buſhels. The buſhel of oats is eſtimated double that of any other grain; ſo that there go 24 buſhels to make the ſeptier, and 288 to make the muid. It is divided into four picotins, the picotin containing two quarts, or four litrons. The buſhel for ſalt is divided into two half-buſhels, four quarters, eight half quarters, and 16 litrons; four buſhels make a minot, 16 a ſeptier, and 192 a muid. The buſhel for wood is divided into halves, quarters, and half-quarters. Eight buſhels make the minot, 16 a mine; 20 mines, or 320 buſhels, the muid. For plaſter, 12 buſhels make a ſack, and 36 ſacks a muid. For lime, three buſhels make a minot, and 48 minots a muid. The minot is by ordonnance to be 11 inches 9 lines high, and 14 inches 8 lines in diameter. The minot is compoſed of three buſhels, or 16 litrons; four minots make a ſeptier, and 48 a muid. The French mine is no real veſſel, but

an eſtimation of ſeveral others. At Paris the mine contains ſix buſhels, and 24 make the muid; at Rouen the mine is four buſhels; and at Dieppe, 18 mines make a Paris muid. The ſeptier differs in different places: at Paris it contains two mines, or eight buſhels, and 12 ſeptiers the muid. At Rouen the ſeptier contains two mines or 12 buſhels. Twelve ſeptiers make a muid at Rouen, as well as at Paris; but 12 of the latter are equal to 14 of the former. At Toulon the ſeptier contains a mine and a half; three of which mines make the ſeptier of Paris. The muid or muy of Paris conſiſts of 12 ſeptiers; and is divided into mines, minots, buſhels, &c. That for oats is double that for other grain, *i. e.* contains twice the number of buſhels. At Orleans the muid is divided into mines, but thoſe mines only contain two Paris ſeptiers and a half. In ſome places they uſe the tun in lieu of the muid; particularly at Nantes, where it contains 10 ſeptiers of 16 buſhels each, and weighs between 2200 and 2250 pounds. Three of theſe tuns make 28 Paris ſeptiers. At Rochelle, &c. the tun contains 42 buſhels, and weighs two *per cent.* leſs than that of Nantes. At Breſt it contains 20 buſhels, is equal to 10 Paris ſeptiers, and weighs about 2240 pounds. See TUN.

4.] *Dutch, Swediſh, Poliſh, Pruſſian,* and *Muſcovite.* In theſe places, they eſtimate their dry things on the foot of the *laſt, leſt, leth,* or *lecht*; ſo called according to the various pronunciations of the people who uſe it. In Holland, the laſt is equal to 19 Paris ſeptiers, or 38 Bourdeaux buſhels, and weighs about 4560 pounds; the laſt they divide into 27 mudes, and the mude into four ſchepels. In Poland, the laſt is 40 Bourdeaux buſhels, and weighs about 4800 Paris pounds. In Pruſſia, the laſt is 133 Paris ſeptiers. In Sweden and Muſcovy, they meaſure by the great and little laſt; the firſt containing 11 barrels, and the ſecond half as many. See LAST. In Muſcovy, they likewiſe uſe the chefford, which is different in various places: that of Archangel is equal to three Rouen buſhels.

5.] *Italian.* At Venice, Leghorn, and Lucca, they eſtimate their dry things on the foot of the ſtaro or ſtaio; the ſtaro of Leghorn weighs 54 pounds: 112 ſtaros and ſeven-eighths are equal to the Amſterdam laſt. At Lucca, 119 ſtaros make the laſt of Amſterdam. The Venetian ſtaro weighs 128 Paris pounds: the ſtaro is divided into four quarters. Thirty-five ſtaros and one-fifth, or 140 quarters and four-fifths, make the laſt of Amſterdam. At Naples and other parts, they uſe the tomolo or tomalo, equal to one-third of the Paris ſeptier. Thirty-ſix tomoli and a half make the carro: and a carro and a half, or 54 tomoli, make the laſt of Amſterdam. At Palermo, 16 tomoli make the ſalma, and four mondili the tomolo. Ten ſalmas and three ſevenths, or 171 tomoli and three-ſevenths, make the laſt of Amſterdam.

6.] *Flemiſh.* At Antwerp, &c. they meaſure by the viertel; 32 and one-half whereof make 19 Paris ſeptiers. At Hamburgh, the ſchepel; 90 whereof make 19 Paris ſeptiers.

7.] *Spaniſh and Portugueſe.* At Cadiz, Bilboa, and St. Sebaſtian, they uſe the fanega; 23 whereof make the Nantes or Rochelle tun, or nine Paris ſeptiers and a half: though the Bilboa fanega is ſomewhat larger, inſomuch that 21 fanegas make a Nantes tun. At Seville, &c. they uſe the anagora, containing a little more than the Paris mine; 36 anagoras make 19 Paris ſeptiers. At Bayonne, &c. the concha; 30 whereof are equal to nine Paris ſeptiers and an half. At Liſbon the alquiver, a very ſmall meaſure, 240 whereof make 19 Paris ſeptiers, 60 the Liſbon muid.

TABLES *of* DRY *Meaſure.*

1. ENGLISH.

Solid inches						
33.6	Pint					
268.8	8	Gallon				
537.6	16	2	Peck			
2150.4	64	8	4	Buſhel		
17203.2	512	64	32	8	Quarter.	

2. SCRIPTURE Dry, reduced to Engliſh.

						Peck.	Gal.	Pint.	Sol. inch. Dec.
Gachal - - - -						0	0	0 17/25	0.031
20	Cab - - -					0	0	2 5/8	0.073
36	1 4/5	Gomor - -				0	0	5 1/10	1.211
120	6	3 1/3	Seah - -			1	0	1	4.036
360	18	10	3	Epha - -		3	0	3	12.107
1800	90	50	15	5	Leteeh -	16	0	0	26.500
3600	180	100	30	10	2	Chomer	32	0	1	18.969

3. ATTIC Meaſures of Capacity for Things Dry, reduced to Engliſh Corn Meaſure.

							Peck.	Gal.	Pint.	Sol. inch. Dec.
Cochliarion - - - -							0	0	0	0.276 1/2
10	Cyathos - - - -						0	0	0	2.763 1/2
15	1 1/2	Oxybaphon - -					0	0	0	4.144 3/4
60	6	4	Cotyle - -				0	0	0	16.579
120	12	8	2	Xeſtes - -			0	0	0	33.158
180	18	12	3	1 1/2	Choenix -		0	0	1	15.705 1/4
8640	864	576	144	72	48	Medimnos	4	0	6	3.501

4. ROMAN Meaſures of Capacity for Things Dry, reduced to Engliſh Corn Meaſure.

							Peck.	Gal.	Pint.	Sol. inch. Dec.
Ligula - - - -							0	0	0 1/8	0.01
4	Cyathus - - -						0	0	0 1/2	0.04
6	1 1/2	Acetabulum - -					0	0	0 3/4	0.06
24	6	4	Hemina - -				0	0	8 1/2	0.24
48	12	8	2	Sextarius -			0	0	1	0.48
384	96	64	16	8	Semimodius		0	1	0	3.84
768	192	128	32	16	2	Modius -	1	0	0	7.68

What we have ſaid of French meaſures in this article evidently applies to the ſtate of things before the deſtruction of their monarchy. With the new order of things in that country, however, has been introduced a law to equalize the weights and meaſures. The following account of them appeared in one of the Engliſh journals:

"The equalization of weights and meaſures being now accompliſhed throughout the whole territory of the French Republic, the following claſſification of terms has been adopted:

In Meaſures of Length,

10 metres make one decametre
100 - one hectometre
1,000 - one kilometre
10,000 - one myriametre.

In Land Meaſure,

10 acres make one decare
100 - one hectare
1,000 - one kilare
10,000 - one myriare.

In Meaſures of Capacity,

10 litres make one decalitre
100 - one hectolitre
1,000 - one kilolitre
10,000 - one myrialitre.

In Weights,

10 gramme make one decagramme
100 - one hectogramme
1,000 - one kilogramme
10,000 - one myriagramme.

"The *metre* is in Engliſh meaſure 3 feet 3 inches, 1,708 line. The acre is 10,000 ſquare metres, 107,623,048 Engliſh ſquare feet.

"The *litre* is equal to 1,766 pints Winchester meaſure, or 2,081 pints wine meaſure.

"The *gramme* is 2lbs. 8oz 4dwts. 10 8grs. troy, or 2lbs. 3oz. 6,274 drachms avoirdupoiſe."

Measure *of Wood for Firing*, is uſually the cord, four feet high, and as many broad, and eight long; this is divided into two half-cords called *ways*, and by the French *membrures*, from the pieces ſtuck upright to bound them; or *voyes*, as being ſuppoſed half a waggon-load.

Measure *for Horſes*, is the hand, which, by ſtatute, contains four inches.

Measure, among Botaniſts. In deſcribing the parts of plants, Tournefort introduced a geometrical ſcale, which many of his followers have retained. They meaſured every part of the plant; and the eſſence of the deſcription conſiſted in an accurate menſuration of the whole. As the parts of plants, however, are liable to variation in no circumſtance ſo much as that of dimenſion, Linnæus very rarely admits any other menſuration than that ariſing from the reſpective length and breadth of the parts compared together. In caſes that require actual menſuration, the ſame author recommends, in lieu of Tournefort's artificial ſcale, the following natural ſcale of the human body, which he thinks is much more convenient, and equally accurate. The ſcale in queſtion conſiſts of 11 degrees, which are as follows: 1. A hair's-breadth, or the diameter of a hair, (*capillus.*) 2. A line, (*linea,*) the breadth of the creſcent or white appearance at the root of the finger, (not thumb,) meaſured from the ſkin towards the body of the nail; a line is equal to 12 hair breadths, and is the 12th part of a Pariſian inch. 3. A nail, (*unguis,*) the length of a finger nail; equal to ſix lines, or half a Pariſian inch. 4. A thumb, (*pollex,*) the length of the firſt or outermoſt joint of the thumb; equal to a Pariſian inch. 5. A palm, (*palmus,*) the breadth of the palm excluſive of the thumb; equal to three Pariſian inches. 6. A ſpan, (*ſpithama,*) the diſtance between the extremity of the thumb and that of the firſt finger when extended; equal to ſeven Pariſian inches. 7. A great ſpan, (*dodrans,*) the diſtance between the extremity of the thumb and that of the little finger when extended; equal to nine inches. 8. A foot, (*pes,*) meaſuring from the elbow to the baſis of the thumb; equal to 12 Pariſian inches. 9. A cubit, (*cubitus,*) from the elbow to the extremity of the middle finger; equal to 17 inches. 10. An arm-length, (*brachium*) from the arm-pit to the extremity of the middle-finger; equal to 24 Pariſian inches, or two feet. 11. A fathom, (*orgya,*) the meaſure of the human ſtature; the diſtance between the extremities of the two middle fingers when the arms are extended; equal, where greateſt, to ſix feet.

Measure is alſo uſed to ſignify the cadence and time obſerved in poetry, dancing, and muſic, to render them regular and agreeable. The different meaſures or metres in poetry are the different manners of ordering and combining the quantities, or the long and ſhort ſyllables. Thus, hexameter, pentameter, iambic, ſapphic verſes, &c. conſiſt of different meaſures.

In Engliſh verſes, the meaſures are extremely various and arbitrary, every poet being at liberty to introduce any new form that he pleaſes. The moſt uſual are the heroic, generally conſiſting of five long and five ſhort ſyllables; and verſes of four feet; and of three feet and a cæſura, or ſingle ſyllable.

The ancients, by variouſly combining and tranſpoſing their quantities, made a vaſt variety of different meaſures. Of words, or rather feet of two ſyllables, they formed a ſpondee, conſiſting of two long ſyllables; a pyrrhic, of two ſhort ſyllables; a trochee, of a long and a ſhort ſyllable; and an iambic, of a ſhort and a long ſyllable. Of their feet of three ſyllables they formed a moloſſus, conſiſting of three long ſyllables; a tribrach, of three ſhort ſyllables; a dactyl, of one long and two ſhort ſyllables; and an anapæſt, of two ſhort and one long ſyllable. The Greek poets contrived 124 different combinations or meaſures, under as many different names, from feet of two ſyllables to thoſe of ſix.

Measure *in Muſic*, the interval or ſpace of time which the perſon who beats time takes between the raiſing and falling of his hand or foot, in order to conduct the movement, ſometimes quicker and ſometimes ſlower, according to the kind of muſic, or the ſubject that is ſung or played. The meaſure is that which regulates the time we are to dwell on each note. See Time. The ordinary or common meaſure is one ſecond or 60th part of a minute, which is nearly the ſpace between the beats of the pulſe or heart; the ſyſtole, or contraction of the heart, anſwering to the elevation of the hand; and its diaſtole, or dilatation, to the letting it fall. The meaſure uſually takes up the ſpace that a pendulum of two feet and a half long employs in making a ſwing or vibration. The meaſure is regulated according to the different quality or value of the notes in the piece; by which the time that each note is to take up is expreſſed. The ſemibreve, for inſtance, holds one riſe and one fall; and this is called the *meaſure*, or *whole meaſure*; ſometimes the *meaſure-note*, or *time note*; the minim, one riſe or one fall; and the crotchet, half a riſe or half a fall, there being four crotchets in a full meaſure.

Measure *Binary or Double*, is that wherein the riſe and fall of the hand are equal.

Measure *Ternary or Triple*, is that wherein the fall is double to the riſe, or where two minims are played during a fall, and but one in the riſe. To this purpoſe, the number 3 is placed at the beginning of the lines, when the meaſure is in-

tended to be triple; and a C when the meaſure is to be common or double. This riſing and falling of the hands was called by the Greeks ἄρσις and θέσις. St. Auguſtine calls it *plauſus*, and the Spaniards *compas*. See Arsis and Thesis.

Powder Measures *in Artillery*, are made of copper, and contain from an ounce to 12 pounds: theſe are very convenient in a ſiege, when guns or mortars are loaded with looſe powder, eſpecially in ricochet firing, &c.

MEASURING, or Mensuration, is the uſing a certain known meaſure, and determining thereby the preciſe extent, quantity, or capacity of any thing.

Measuring, in the general, makes the practical part of geometry. From the various ſubjects whereon it is employed, it acquires various names, and conſtitutes various arts. See Geometry, Levelling, Trigonometry, &c.

MEAT. See Food, Diet, Drink, &c. Amongſt the Jews, ſeveral kinds of animals were forbidden to be uſed as food. The fleſh with the blood, and the blood without the fleſh, were prohibited; the fat alſo of ſacrificed animals was not to be eaten. Roaſted meat, boiled meat, and ragouts, were in uſe amongſt the Hebrews; but we meet with no kind of ſeaſoning except ſalt, bitter herbs, and honey.—They never mingled milk in any ragout or haſh, and never ate at the ſame meal both meat and milk, butter or cheeſe. The daily proviſion for Solomon's table was 30 meaſures of fine wheat flour, 60 of common flour, 20 ſtalls of oxen, 20 paſture oxen, 100 ſheep, beſides veniſon and wild-fowl.

The principal and moſt neceſſary food among the ancient Greeks was bread, which they called ἄρτος, and produced in a wicker baſket called κανοῦν. Their loaves were ſometimes baked under the aſhes, and ſometimes in an oven. They alſo uſed a ſort of bread called *Maza*. Barley meal was uſed amongſt the Greeks, which they called ἄλφιτον. They had a frequent diſh called ἕψον, which was a compoſition of rice, cheeſe, eggs, and honey, wrapped in fig-leaves. The Μυττωτὸν was made of cheeſe, garlic, and eggs, beaten and mixed together. Their bread, and other ſubſtitutes for bread, were baked in the form of hollow plates, into which they poured a ſauce. Garlic, onions, and figs, ſeem to have been a very common food among the poorer Athenians. The Greeks, eſpecially in the heroical times, ate fleſh roaſted; boiled meat ſeldom was uſed. Fiſh ſeems not to have been uſed for food in the early ages of Greece. The young people only, amongſt the Lacedemonians, ate animal food; the men and the old men were ſupported by a black ſoup called μέλας ζωμός, which to people of other nations was always a diſagreeable meſs. Graſshoppers and the extremities or tender ſhoots of trees were frequently eaten by the poor among the Greeks. Eels dreſſed with beet-root were eſteemed a delicate diſh, and they were fond of the jowl and belly of ſalt-fiſh. Neither were they without their ſweet-meats: the deſſert conſiſted frequently of fruits, almonds, nuts, figs, peaches, &c. In every kind of food we find ſalt to have been uſed.

The diet of the firſt Romans conſiſted wholly of milk, herbs, and roots, which they cultivated and dreſſed with their own hands; they alſo had a kind of gruel, or coarſe groſs pap, compoſed of meal and boiling water; this ſerved for bread: and when they began to uſe bread, they had none for a great while but of unmixed rye. Barley-meal was eaten by them, which they called *Polenta*. When they began to eat animal food, it was eſteemed a piece of luxury, and an indulgence not to be juſtified but by ſome particular occaſion. After animal food had grown into common uſe, the meat which they moſt frequently produced upon their tables was pork.

Method of Preſerving Fleſh-Meat *without Spices, and with very little Salt.* Jones, in his *Miſcellanea Curioſa*, gives us the following deſcription of the Mooriſh *Elcholle*, which is made of beef, mutton, or camel's fleſh, but chiefly beef, and which they cut all in long ſlices, and let it lie for 24 hours in a pickle. They then remove it out of thoſe jars or tubs into others with water; and when it has lain a night, they take it out, and put it on ropes in the ſun and air to dry. When it is thoroughly dried and hard, they cut it into pieces of two or three inches long, and throw it into a pan or cauldron, which is ready with boiling oil and ſuet ſufficient to hold it, where it boils till it be very clear and red when cut. After this, they take it out, and ſet it to drain; and when all is thus done it ſtands to cool, and jars are prepared to put it up in, pouring upon it the liquor in which it was fried; and as ſoon as it is thoroughly cold, they ſtop it up cloſe. It will keep two years; will be hard, and the hardeſt they look upon to be the beſt done. This they diſh up cold, ſometimes fried with eggs and garlic, ſometimes ſtewed, and lemon ſqueezed on it. It is very good any way, either hot or cold.

MEATH, commonly ſo called, or otherwiſe *Eaſt* Meath, to diſtinguiſh it from the county called *Weſt* Meath: a county of Ireland, in the province of Leinſter, bounded by the counties of Cavan and Louth on the north, the Iriſh channel on the eaſt, Kildare and Dublin on the ſouth, and Weſt Meath and Longford on the weſt. It is a fine champaign country, abounding with corn, and well inhabited. It returns 14 members to parliament; and gives title of earl to the family of Brabazon. It contains 326,480 Iriſh plantation acres, 139 pariſhes, 12 baronies, and ſix boroughs: chief town Trim. This diſtrict being the moſt ancient ſettlement of the Belgians in Ireland, the inhabitants were eſteemed the eldeſt and moſt honourable tribe: from which ſeniority their chieftains were elected monarchs of all the Belgæ; a dignity that was continued in the Hy-n-Faillian without intermiſſion, until the arrival of the Caledonian colonies, under the name of Tuath de Danan, when Conor-Mor, chieftain of theſe people, obtained or rather uſurped the monarchical throne, obliged Eochy Failloch, with ſeveral of his people, to croſs the Shannon, and eſtabliſh themſelves in the preſent county of Roſcommon, where Crothar founded the palace of Atha or Croghan; a circumſtance which brought on a long and bloody war between the Belgian and Caledonian races, which was not finally terminated until the cloſe of the 14th century, when the Belgian line was reſtored in the perſon of O Neil the Great, and continued until Brian Boromh uſurped the monarchical dignity, by depoſing Malachy O'Malachlin, about the year 1001. Tuathal Tetchomar, by a decree of the Tarah Aſſembly, ſeparated certain large tracts of land from each of the four provinces, where the borders joined together; whence, under the notion of adopting this ſpot for demeſne lands to ſupport the royal houſehold, he formed the county or kingdom of Meath, which afterwards became the peculiar inheritance of the monarchs of Ireland. In each of the portions thus ſeparated from the four provinces, Tuathal cauſed palaces to be erected, which might adorn them, and commemorate the name in which they had been added to the royal domain. In the tract taken out of Munſter he built the palace called Flachtaga, where the ſacred fire, ſo called, was kindled, and where all the prieſts and druids annually met on the laſt day of October; on the evening of which day it was enacted, that no other fire ſhould be uſed throughout the kingdom, in order that all the fires might be derived from this, which being lighted up as a fire of ſacrifice, their ſuperſtition led them to believe would render all the reſt propitious and holy: and for this privilege every family was to pay three-pence, by way of acknowledgement, to the king of Munſter. The ſecond royal palace was erected in the proportion taken out of Connaught, and was built for the aſſembly called the convocation of Viſneach, at which all the inhabitants were ſummoned to appear on the 1ſt

day of May, to offer ſacrifice to *Bea'*, or *Bel*, the god of fire, in whoſe honour two large fires being kindled, the natives uſed to drive their cattle between them, which was ſuppoſed to be a preſervative for them againſt accidents and diſtempers, and this was called *Beal-Tinne*, or *Bel-Tine*, or the feſtival of the god of fire. The king of Connaught at this meeting claimed a horſe and arms from every lord of a manor or chieftain, as an acknowledgment for the lands taken from that province, to add to the territory of Meath. The third was that which Tailtean erected in the part taken from Ulſter, where the fair of that name was held, which was remarkable for this particular circumſtance, that the inhabitants brought their children thither, males and females, and contracted them in marriage, where the parents having agreed upon articles, the young people were joined accordingly; every couple contracted at this meeting paid the king of Ulſter an ounce of ſilver by way of acknowledgment. The royal manſion of Tarah, formerly deſtroyed by fire, being re-built by Tuathal on the lands originally belonging to the king of Leinſter, was reckoned as the fourth of theſe palaces; but as a fabric of that name had ſtood there before, we do not find that any acknowledgment was made for it to the king of Leinſter.

Meath, with *Clonmacnois*, is a biſhop's ſee, valued in the king's books at 373l. 7s. 0½d. ſterling, by an extent returned *anno* 28th Elizabeth; but, by a former extent taken *anno* 30th Henry VIII. the valuation amounts to 373l. 12s. which being the largeſt and moſt profitable for the king, is the meaſure of the firſt fruits at this day. This ſee is reputed to be worth annually 3420l. There were formerly many epiſcopal ſees in Meath, as Clonard, Duleek, Kells, Trim, Ardbraccan, Donſhaghlin, Slaine, and Foure, beſides others of leſs note; all theſe, except Duleek and Kells, were conſolidated, and their common ſee was fixed at Clonard, before the year 1112; at which time the diviſion of the biſhopricks in Ireland was made by John Paparo, cardinal-prieſt, entitled cardinal of St. Lawrence in Damaſo, then legate from pope Eugene III. to the Iriſh. This diviſion was made in a ſynod held on the 6th of March in the abbey of Melliſont, or, as ſome ſay, at Kells; and the two ſees of Duleek and Kells afterwards ſubmitted to the ſame fate. The conſtitution of this dioceſe is ſingular, having no dean nor chapter, cathedral, or economy.—Under the biſhop, the archdeacon is the head officer, to whom, and to the clergy in general, the *congé d'élire* iſſued while biſhops were elective. The affairs of the dioceſe are tranſacted by a ſynod, in the nature of a chapter, who have a common ſeal, which is annually lodged in the hands of one of the body, by the appointment and vote of the majority. The dioceſe is divided into twelve rural deaneries.

Of CLONMACNOIS, *now annexed to Meath*. There is no valuation of this ſee in the king's books; but it is ſuppoſed to be included in the extent of the fee of Meath, taken *anno* 30th Henry VIII. The chapter of this ſee conſiſted anciently of dean, chanter, chancellor, treaſurer, archdeacon, and 12 prebendaries, but moſt of the poſſeſſions of them have fallen into lay hands. At preſent the deanery is the only part of the chapter, which ſubſiſts, to which the prebend of Cloghran is annexed; and he hath a ſeal of office, which appears to have been the ancient epiſcopal ſeal of this ſee. This ſee was founded by St. Kiaran, or Ciaran, the younger, in 548 or 549; and Dermod, the ſon of Ceronill king of Ireland, granted the ſite on which the church was built.

Weſt MEATH. See WESTMEITH.

MEATUS AUDITORIUS, the external paſſage to the drum of the ear. See ANATOMY.

MEAUX, an ancient town of France, in the department of Seine and Marne and late province of the Iſle of France, with a biſhop's ſee. It is large and populous; and the fine market-place is a peninſula contiguous to the town, which was formerly well fortified, and, in 1421, ſtood a ſiege of three months againſt the Engliſh. It is ſeated on the Marne, 10 miles north-weſt of Colomiers, and 25 north eaſt of Paris. E. lon. 2. 58. N. lat. 48. 58.

MECÆNAS, or MECŒNAS (C. CILNIUS), a celebrated Roman knight, deſcended from the kings of Etruria. He has rendered himſelf immortal by his liberal patronage of learned men and of letters; and to his prudence and advice Auguſtus acknowledged himſelf indebted for the ſecurity he enjoyed. His fondneſs for pleaſure removed him from the reach of ambition; and he preferred dying, as he was born a Roman knight, to all the honours and dignities which either the friendſhip of Auguſtus or his own popularity could heap upon him. To the interference of Mecænas, Virgil owed the retribution of his lands; and Horace was proud to boaſt that his learned friend had obtained his forgiveneſs from the emperor for joining the cauſe of Brutus at the battle of Philippi. Mecænas was himſelf fond of literature; and, according to the moſt received opinion, he wrote a hiſtory of animals, a journal of the life of Auguſtus, a treatiſe on the different natures and kinds of precious ſtones, beſides the two tragedies of Octavia and Prometheus, and other things, all now loſt. He died eight years before Chriſt; and on his death-bed he particularly recommended his poetical friend Horace to the care and confidence of Auguſtus. Seneca, who has liberally commended the genius and abilities of Mecænas, has not withheld his cenſure from his diſſipation, indolence, and effeminate luxury. From the patronage and encouragement which the princes of heroic and lyric poetry among the Latins received from the favourite of Auguſtus, all patrons of literature have ever ſince been called *Mecænates*. Virgil dedicated to him his Georgics, and Horace his Odes.

MECCA, an ancient and very famous town of Aſia, in Arabia the Happy; ſeated on a barren ſpot, in a valley ſurrounded with little hills, about a day's journey from the Red Sea. It is a place of no ſtrength, having neither walls nor gates, and the buildings are very mean. That which ſupports it is the reſort of a great many thouſand pilgrims annually, for the ſhops are ſcarcely open all the year beſides. The inhabitants are poor, very thin, lean, and ſwarthy. The hills about the town are very numerous, and conſiſt of a blackiſh rock, ſome of them half a mile in circumference. On the top of one of them is a cave, where they pretend Mahomet uſually retired to perform his devotions, and hither they affirm the greateſt part of the Alcoran was brought him by the angel Gabriel. The town has plenty of water, and yet little garden-ſtuff; but there are ſeveral ſorts of good fruits to be had, ſuch as grapes, melons, water-melons, and cucumbers. There are alſo plenty of ſheep brought thither to be ſold to the pilgrims. It ſtands in a very hot climate; and the inhabitants uſually ſleep on the tops of their houſes for the ſake of coolneſs. In order to protect themſelves from the heat through the day, they carefully ſhut the windows, and water the ſtreets to refreſh the air. There have been inſtances of perſons ſuffocated in the middle of the town by the burning wind called *Simoom*.

As a great number of the people of diſtinction in the province of Hedsjas reſide in the city, it is better built than any other in Arabia. Amongſt the beautiful edifices it contains, the moſt remarkable is the famous *Kaba*, or *Caaba*, "The houſe of God," which was held in great veneration by the Arabs even before Mahomet's time.

No Chriſtian dare go to Mecca: not that the approach to it is prohibited by any expreſs law, or that the ſenſible part of the Mahometans have any thing to object to it; but on account of the prejudices of the people, who, regarding this ground as ſacred, think Chriſtians unworthy of ſetting their foot on it;

it would be profaned, in the opinion of the ſuperſtitious, if it was trode upon by infidels. The people even believe that Chriſtians are prevented from approaching by ſome ſupernatural power; and they tell the ſtory of an infidel, who having got ſo far as the hills that ſurround Mecca, all the dogs of the city came out and fell upon him; and who, being ſtruck with this miracle, and the auguſt appearance of the Kaba, immediately became a Muſſulman. It is therefore to be preſumed, that all the Europeans who deſcribe Mecca as eye-witneſſes, have been renegadoes eſcaped from Turkey. A recent example confirms this ſuppoſition. On the promiſe of being allowed to preſerve his religion, a French ſurgeon was prevailed on to accompany the emir Hadsji to Mecca, in quality of phyſician; but at the very firſt ſtation he was forced to ſubmit to circumciſion, and then he was permitted to continue his journey.

Although the Mahometans do not allow Europeans to go to Mecca, they do not refuſe to give them deſcriptions of the Kaba, and information with regard to that building; and there are perſons who gain their bread by making deſigns and little pictures of the Kaba, and ſelling them to pilgrims. See CAABA.

The Mahometans have ſo high an opinion of the ſanctity of Mecca, that they extend it to the places in the neighbourhood. The territory of that city is held ſacred to certain diſtances, which are indicated by particular marks. Every caravan finds in its road a ſimilar mark, which gives notice to the pilgrims when they are to put on the modeſt garb in which they muſt appear in thoſe ſacred regions. Every Muſſulman is obliged to go once in his life at leaſt to Mecca, to perform his devotions there. If that law was rigorouſly enforced, the concourſe of pilgrims would be prodigious, and the city would never be able to contain the multitudes from all the countries where the Mahometan religion prevails. We muſt therefore ſuppoſe, that devotees alone perform this duty. and that the others can eaſily diſpenſe with it. Thoſe whoſe circumſtances do not permit a long abſence, have the liberty of going to Mecca by a ſubſtitute.—A hired pilgrim, however, cannot go for more than one perſon at a time; and he muſt, to prevent frauds, bring an atteſtation in proper form, from an Imam of Mecca, that he has performed the requiſite devotions on behalf of ſuch a perſon, either alive or dead; for, after the deceaſe of a perſon who has not obeyed the law during his life, he is ſtill obliged to perform the journey by proxy.

The caravans, which are not numerous, when we conſider the immenſe number of the faithful, are compoſed of many people who do not make the journey from purpoſes of devotion. Theſe are merchants, who think they can tranſport their merchandiſes with more ſafety, and diſpoſe of them more eaſily; and contractors of every kind, who furniſh the pilgrims, and the ſoldiers who eſcort the caravans, with neceſſaries. Thus it happens, that many people have gone often to Mecca ſolely from views of intereſt. The moſt conſiderable of thoſe caravans is that of Syria, commanded by the pacha of Damaſcus. It joins at ſome diſtance the ſecond from Egypt, which is conducted by a bey, who takes the title of emir Hadsji. One comes from Yemen, and another, leſs numerous, from the country of Lachſa. Some ſcattered pilgrims arrive by the Red Sea from the Indies, and from the Arabian eſtabliſhments on the coaſt of Africa. The Perſians come in that which departs from Bagdad: the place of conductor to this laſt is beſtowed by the pacha, and is very lucrative, for he receives the ranſoms of the heretical Perſians.

It is of conſequence to a pilgrim to arrive early at the holy places. Without having been preſent from the beginning at all the ceremonies, and without having performed every particular act of devotion, a man cannot acquire the title of Hadsji: this is an honour very much coveted by the Turks, for it confers real advantages, and makes thoſe who attain it to be much reſpected. Its infrequency, however, in the Mahometan dominions, ſhows how much the obſervation of the law commanding pilgrimages is neglected. A ſimilar cuſtom prevails among the Oriental Chriſtians, who are alſo exceedingly emulous of the title of Hadsji, or Mokdaſi, which is given to pilgrims of their communion. In order to acquire this title, it is not ſufficient that the perſon has made the journey to Jeruſalem; he muſt alſo have kept the paſſover in that city, and have aſſiſted at all the ceremonies of the holy weeks.

After all the eſſential ceremonies are over, the pilgrims next morning move to a place where they ſay Abraham went to offer up his ſon Iſaac, which is about two or three miles from Mecca: here they pitch their tents, and then throw ſeven ſmall ſtones againſt a little ſquare ſtone building. This, as they affirm, is performed in defiance of the devil. Every one then purchaſes a ſheep, which is brought for that purpoſe, eating ſome of it themſelves, and giving the reſt to the poor people who attend upon that occaſion. Indeed theſe are miſerable objects, and ſuch ſtarved creatures, that they ſeem ready to devour each other. After all, one would imagine that this was a very ſanctified place; and yet a renegado, who went in pilgrimage thither, affirms there is as much debauchery practiſed here as in any part of the Turkiſh dominions. It is 25 miles from Jodda, the ſea-port town of Mecca, and 220 ſouth-eaſt of Medina. E. lon. 40. 55. N. lat. 21. 45.

MECHANICAL, an epithet applied to whatever relates to mechanics: thus we ſay mechanical powers, cauſes, &c. See the articles POWER, CAUSE, &c. The mechanical philoſophy is the ſame with what is otherwiſe called *corpuſcular philoſophy*. See CORPUSCULAR. This manner of reaſoning, formerly much uſed in medicine, is deſcribed by Dr. Quincy as the reſult of a thorough acquaintance with the ſtructure of animal bodies: for, conſidering an animal body as a compoſition out of the ſame matter from which all other bodies are formed, and to have all thoſe properties which concern a phyſician's regard, only by virtue of its peculiar conſtruction; it naturally leads a perſon to conſider the ſeveral parts, according to their figures, contexture, and uſe, either as wheels, pulleys, wedges, levers, ſcrews, cords, canals, ſtrainers, &c. For which purpoſe, continues he, it is frequently found helpful to deſign in diagrams, whatſoever of that kind is under conſideration, as is cuſtomary in geometrical demonſtrations.

MECHANICAL, in mathematics, denotes a conſtruction of ſome problem, by the aſſiſtance of inſtruments, as the duplicature of the cube and quadrature of the circle; in contradiſtinction to that which is done in an accurate and geometrical manner.

MECHANICAL *Curve*, is a curve, according to Deſcartes, which cannot be defined by any algebraic equation; and ſo ſtands contradiſtinguiſhed from algebraic or geometrical curves. Leibnitz and others call theſe mechanical curves *tranſcendental*, and differ from Deſcartes, in excluding them out of geometry. Leibnitz found a new kind of tranſcendental equations, whereby theſe curves are defined: but they do not continue conſtantly the ſame in all points of the curve, as algebraic ones do. See the article TRANSCENDENTAL.

MECHANICS,

IN the ſtrict ſenſe of the word, denotes the method of conſtructing machines to be ſet in motion, and to anſwer ſome uſeful purpoſes, by certain powers, either natural or artificial. According to this definition, the nature of the powers themſelves is not the object of mechanical inveſtigation, but rather the effect of them upon the paſſive bodies which we call *machines*; and the conſtructing of theſe in ſuch a manner that the powers may act upon them with the leaſt poſſible obſtruction, and produce the intended effect to the greateſt advantage, is the perfection of mechanics.

It is uſual, in treatiſes upon this ſubject, to begin with an inveſtigation of the properties of *matter* itſelf, and of *central forces*; but the former is not to be inveſtigated by mechanical means, and the latter belong ſo much to aſtronomy, that very little needs to be ſaid upon them in this place; for which reaſon we refer to the articles ASTRONOMY, MATTER, and MOTION, for a diſcuſſion of theſe ſubjects. In treating of mechanics, therefore, we ſhall begin with a deſcription of what are commonly called the *mechanic powers*; and afterwards conſider the various ways in which they may be modified, in order to produce the effects expected from them.

SECT. I. *Of Material or Mechanical Power in general.*

§ 1. *Production of Motion and Reſt.*

IN mechanics, every thing is called a power which is capable of acting upon a ſolid body; and every power which can act upon matter is ſuppoſed to be material, without regarding any abſtruſe ſpeculations concerning its nature. Hence the force of gravity, of electricity, of fire, of air, of water, the power of animals, of bodies preſſing or impinging with violence upon one another, are all accounted mechanical powers when applied to ſet machines in motion.

As any ſingle power, when applied to a material body, will ſet it in motion in proportion to its quantity, ſo the action of an oppoſite power upon the ſame body produces reſt. This may be eaſily conceived; for, ſuppoſing two men to pull a log of wood with equal degrees of ſtrength in directions exactly oppoſite to one another, the log will remain immoveable. In like manner, if we put in a weight into one ſcale of a balance, motion will be produced; but reſt is the certain conſequence of counterpoiſing it with an equal weight in the oppoſite ſcale. When a weight is ſuſpended freely in the air, we are apt to imagine that it is acted upon by no force whatever; but we ſhall ſoon diſcover our miſtake, by withdrawing the preſſure of the air from one ſide; for the body then, inſtead of remaining at reſt, will move with great violence to one ſide, and even contrary to the direction of gravity itſelf, unleſs it be extremely heavy. Whether reſt be in all caſes produced by the action of oppoſite powers upon the ſame ſubſtance, is a ſpeculation to be diſcuſſed under the article MOTION.

§ 2. *Of Reſiſtance.*

WHEN any moving power is ſtopped by a fixed obſtacle, ſo that it can proceed no farther, we ſay that it is *reſiſted* by that obſtacle. In this caſe we are apt to imagine that there is no force exerted by the reſiſting obſtacle; but it is found by experience, that *reſiſtance* is to all intents and purpoſes equivalent to a power equal and contrary to that which is impelled againſt the reſiſting obſtacle. This is exemplified in the caſe of a man ſtanding in a boat, and puſhing with a pole againſt the bank of a river or lake. In this caſe every one knows that the boat will go off in a direction contrary to that in which he puſhes; but if the boat be faſtened by means of a hook and rope to that part of the pole which is between the man's body and the bank, the boat will remain immoveable by reaſon of the equality betwixt the action of the man upon the pole forward, and of the boat upon the ſame pole backward. Thus, in fig. 1. pl. 16. when the man puſhes with the pole C againſt the bank D, in the direction CA, the boat B will be carried away from the bank in the direction AC; but if, by means of the rope E, the boat be faſtened to the pole AC, the recoil of the boat in the direction AC will be juſt equal to the puſh given by the man in the direction CA, ſo that no motion will enſue let him exert ever ſo much ſtrength. Hence we ſee, that by means of a reſiſting obſtacle, a power may be made to counteract itſelf, ſo that a motion or tendency to it may be produced in any direction; and in this caſe, as well as in the former, reſt is produced by the oppoſition of two contrary forces.

The very ſame effect would follow, though we ſhould ſuppoſe the man in the boat not to puſh againſt the bank or any fixed obſtacle, but againſt another boat faſtened by means of a rope to his own. In this caſe both the boats will recede from each other till the rope be ſtretched: after which they will both remain immoveable, unleſs they be acted upon by ſome power external to both. If both boats be at liberty, they will mutually recede from each other till they get beyond the reach of the pole.

Reſiſtance, whatever we may ſpeculate about it, ſeems ultimately to depend on the power of gravity joined with that of coheſion. Thus a weight of 100 pounds, even when ſuſpended in the freeſt manner we can imagine, will reſiſt much more than 20 pounds ſuſpended in the ſame manner; and though hard bodies reſiſt to a great degree, yet, unleſs connected with ſome very heavy body, they are eaſily moved out of their place; and the immenſe gravitation of the whole globe of earth, we may juſtly ſuppoſe to be the ſource of all reſiſtance whatever to mechanical powers.

On the whole, therefore, we may conſider reſiſtance as an active power; but the action of which is confined to a very limited ſpace, or to the ſingle point of contact; though ſeveral experiments tend to ſhow, that even before actual contact bodies ſhow a very perceptible degree of reſiſtance.

§ 3. *Of the Communication of Power.*

THIS depends entirely upon that property of bodies which is called their *attraction of coheſion*, and the immobility of their particles among themſelves; for, if the parts of a body are abſolutely moveable among themſelves, they can neither communicate motion by impulſe nor by preſſure. The moſt common method of communicating motion in the mechanical way is by preſſure, which is generally accompliſhed by means of the ſix mechanical powers to be afterwards deſcribed; colliſion being employed only in certain particular caſes, the moſt remarkable of which will be pointed out under the article MOTION.

The motion, which by means of a hard inflexible body is communicated to any other, may be confined to a ſingle point,

or it may be diffuſed over any aſſignable ſpace. Thus, in fig. 2. let us ſuppoſe that any aſſignable power is applied to the point E, urging it from E towards D; the whole of that force will reſt upon the point of contact betwixt the ball C and the line BD. The weight, if placed exactly perpendicular to the horizon, will remain upright, without inclining either to one ſide or other; for the power of reſiſtance in the line BD is exactly equal to the impulſe of the weight lying upon E; ſo that it is in the ſame ſituation with the man and boat in the firſt example, when he had the boat hooked to the pole with which he puſhed againſt the bank. If, inſtead of oppoſing the end of the reſiſting body BD to the ball C, we place them in the poſition repreſented in fig. 3. then the whole of the power will reſt upon any point of the line BD we pleaſe. For, if we ſuppoſe the line EC to drive the line BD before it in the poſition repreſented in the figure, it is plain that the whole force of that line will be diſcharged for a moment upon the line F, or upon any obſtacle we chooſe to put in its way in another part of the line; but if we place two ſupports or reſiſtances to the moving line BD, as F and G in fig. 4. it is equally plain, that one half of the power will reſt upon the one and one half upon the other. For the whole force urging forward the line BD is but a certain and determined quantity; and if divided betwixt two obſtacles, each of theſe muſt undoubtedly bear one half. In like manner, if, as in fig. 5. the power be oppoſed by four obſtacles, each of them will bear only one-fourth part; and ſo on, if we ſuppoſe it oppoſed by ever ſo many. For reaſons afterwards to be aſſigned, however, it is abſolutely neceſſary that the force on E act in a line directly perpendicular upon BD; that the obſtacles be all at equal diſtances, comparatively ſpeaking, from C; as H and I, F and G, &c. likewiſe that they be of exactly the ſame height; for thus only the preſſure, and conſequently the motion, can be made uniform in all parts. On this principle depends in a great meaſure the perfection of printing preſſes, oil preſſes, and all other machines intended to produce a violent and uniform preſſure upon any broad and flat ſurface.

As the preſſure upon a ſingle point may thus be diffuſed over a broad ſurface, ſo may that upon a broad ſurface be concentrated upon a ſingle point, or a ſurface of ſmall dimenſion, as in fig. 6. Here it is plain that whatever preſſure is applied to the line AB, or any part of it in a perpendicular direction, muſt be ſuſtained by the point D; for, if there was no reſiſtance, this point would be driven along with the line AB, and the moment it was ſtopped the power which urged it on muſt likewiſe be ſtopped. It is true, that unleſs the power act directly perpendicular to the point D, or the line CD be ſupported that it cannot move either to one ſide or to another, the impulſe will be but momentary; but of this we ſhall treat at large in the ſubſequent part of this article. On the principle juſt mentioned depends in a great degree the force of gimlets, augers, boring gimlets, &c.

§ 4. *Of changing the Direction of a Power into one directly oppoſite.*

This in all caſes is only to be accompliſhed by the application of a power greater than that of which we wiſh to change the direction. Thus, in fig. 2. pl. 16. ſuppoſe we wiſh to change the direction of the power at E from the direction AC to that of CA, we ſhall find it impoſſible to do ſo by any other means than the application of a greater power from D towards C. If the two powers are equal, there will be no motion whatever; and the degree of motion produced at laſt will only be the difference betwixt the two powers. If it be wanted therefore to produce a power in the direction C A, equal and oppoſite to that in the direction A C, one muſt be applied in the direction CA double to the former. This principle is different from that firſt mentioned, in which motion is produced by puſhing againſt a fixed obſtacle while the moving power is not reſiſted on the oppoſite ſide; for here the power of gravity, or whatever we ſuppoſe to act upon E, reſiſts according to its quantity, and the whole is in the ſituation of the boat when hooked to the pole fig. 1. To produce motion, therefore, a new force muſt be applied, as if a perſon was to puſh from the bank D againſt the hooked pole of the boat in that figure. The principle juſt now laid down does not militate againſt the apparent *aſcent* of bodies by the action of gravity, or the repulſion of elaſtic balls from one another by what is called the *power* of elaſticity. In both caſes a greater power is applied than the ſimple force of gravity, and with the exceſs of this power the body aſcends, as ſhall be afterwards ſhown.

§ 5. *Of the Motion produced by two or more Powers acting upon a Body in Directions oblique to each other.*

As the action of two powers in direct oppoſition to each other is attended with the deſtruction of both if the powers are equal, and of one of them if they are unequal; ſo the action of powers directed obliquely upon one another is productive of motions in various directions, according to that of the acting powers.

The motion produced by the action of two powers is always in the diagonal of the parallelogram expreſſed by theſe powers. Thus in fig. 7. let the body A be acted upon at once by two forces, one of which would carry it from A to B in the ſame time that the other would carry it from A to C. The body will then deſcribe AD the diagonal of a ſquare, in the time that it would have deſcribed one of the ſides by a ſingle power applied to it. This is in conſequence of its obeying both forces; as it is evident that it has moved as far as from A to B, and likewiſe from A to C, which is preciſely the effect that the two powers would have had upon it ſeparately. In this caſe the body has acquired a greater power than it would have had from a ſingle power, but leſs than it would have acquired from the union of the two powers if they had acted directly in concert with each other, becauſe the diagonal of a ſquare is leſs than the ſum of the ſides, and the power with which any body moves is exactly proportioned to its velocity. If, inſtead of ſuppoſing the forces equal, we ſuppoſe one of them conſiderably greater than the other, then the greater force will carry the body further in its own direction than the other, and the whole will be repreſented by a parallelogram, as in fig. 8. In this caſe it is evident that the body has moved exactly in conformity to the direction of both powers, *viz.* the whole length of AB, and the whole length of AC. In this caſe alſo the loſs of motion is leſs than in the former; becauſe the length of the oblong parallelogram approaches much nearer to the ſum of the ſides than the diagonal of a ſquare; and the greater inequality there is betwixt the ſides, the leſs power is loſt.

If, inſtead of acting at right angles to each other, the direction of the powers forms an acute angle, as in figs. 9, 10, 11, the power produced will be conſiderably greater than either of the original ones: and the more acute the angle is, the greater will be the augmentation, as is evident from an inſpection of the figures. The reaſon of this, though not quite ſo obvious, is the ſame with the former. Thus the body A in fig. 9. had it been acted upon by only one power, *viz.* that denoted by AB, would have been at B, or carried as far forward as E, the half of the diagonal; its oblique direction upward not being taken into the account. Had it been acted upon by the force AC alone, it would have been at C with an obliquity as far down as the other is up. As theſe obliquities, however, are in contrary directions, they muſt of neceſſity de-

ſtroy one another; and therefore the body moves neither to one ſide nor another, but proceeds with the ſum of the direct forces of the powers, or thoſe by which they move in the ſtraight diagonal. But either of the two powers would have brought it forward as far as E; of conſequence both conjoined muſt carry it on to D, the whole length of the diagonal. Thus it appears that when a body is acted upon by two powers which partly conſpire together, the power produced will be the exact ſum of them as far as they do conſpire, and the loſs ariſes entirely from the oppoſition betwixt them; for all powers which do not directly conſpire, oppoſe one another in a certain degree. Hence when the acting forces make an obtuſe angle with each other, as in figs. 12, 13, there is then a very great loſs of power, becauſe there is ſuch an oppoſition betwixt them; and it is only that ſmall part of their motion which acts in concert that can produce any in the body acted upon; but this, as in the former caſe, is exactly double to what it would be if only one of them acted upon the body. Thus, in fig. 12. the whole direction of the powers from E to B, and from B to C, is in abſolute oppoſition to each other; and therefore, ſuppoſing them equal, muſt be totally loſt. In the direction AD they conſpire; and therefore the body will move twice as far in that direction as is expreſſed by that of the lines in the figure; that is from A to D, inſtead of only from A to E, which is the limit of each of the forces. In caſes of this kind, the more obtuſe the angle is at which the forces act, the greater is the loſs of power, as is evident from an inſpection of figs. 12, 13.

Some who are but beginning the ſtudy of mechanics may be embarraſſed in their ideas how two forces acting at right angles to each other can in any manner of way oppoſe each other, as in fig. 7.; as we find that a body deſcending by the force of gravity may be puſhed to a ſide ſeemingly by the leaſt force imaginable. But this will eaſily be underſtood from fig. 14. which is only a ſquare turned into another poſture. Here it is plain that the powers AB and AC oppoſe each other as much as they conſpire; that is, in the proportion of half the diagonal of the ſquare: this quantity therefore is totally loſt, and the body proceeds with the other half; which being doubled on account of each of the powers proceeding with one half of the diagonal, gives the whole diagonal for the total motion produced.

But however plain this may appear from an inſpection of the figure, it is by no means ſo apparent when we come to try it by numbers. Thus, ſuppoſing each of the ſides AB and AC to be 5, the diagonal of the ſquare will be nearly 7.071; but if from the ſum of the ſides 10 we take this number, or half of it from each number, we ſhall have only 2.919 for the whole motion, inſtead of the diagonal 7.071, which is the reality. From an inſpection of the figure alſo we plainly ſee, that if one diagonal is gained by the powers conſpiring together or acting in concert, another is loſt by their oppoſition. It is natural therefore to enquire, How can any two powers gain or loſe more than their own quantity? for the two powers taken together amount but to *ten*, but the two diagonals, one of which is gained and the other loſt, amount between them to upwards of *fourteen*. To ſolve this ſeeming paradox, we muſt conſider, that as the diagonal of the ſquare ABCD, fig. 14. is generated from the two ſides AB and CD, ſo theſe ſides themſelves may be accounted the diagonals of two other ſmaller ſquares *a*BAE and AE*b*C, fig. 15. each of the ſides of which is half the diagonal of the large one. From the ſum of the ſides of theſe ſquares, which to the large ſquare are the ſource of power, it is evident that a diagonal may be taken and another remain, becauſe each of the ſides is half a diagonal.

Hence we not only ſee that every mechanical power we are acquainted with *may be* derived from two others, but have a demonſtration that it *actually is ſo*; not only becauſe this ſuppoſition explains the phænomena, but becauſe we are involved in an inexplicable contradiction if we ſuppoſe any thing elſe, for no power can loſe more than its own quantity; and if it loſes more than one half, it can never produce effects equivalent to another half; which we ſee muſt be the caſe, if we ſuppoſe any two *unoriginated* powers acting upon one another at right angles, or indeed any other way, though the ſuppoſition of their acting at right angles makes the matter more plain than any other. This leads to a very curious ſpeculation concerning the origin of mechanical motion. See the article MOTION.

Hitherto we have conſidered both the powers not only as equal at the beginning, but as continuing ſo throughout their whole courſe: but this is a ſuppoſition that ſcarcely exiſts in nature, unleſs the powers are kept from exerting themſelves otherwiſe than by ſimple preſſure. Thus, in fig. 16. ſuppoſing the body A pulled in the direction AB by the weight D of five pounds put over the fixed pin B, and pulled in the direction AC by C, another weight of five pounds faſtened to it by a ſtring; the whole will be kept in the poſition repreſented in the figure by a weight of 7.071 pounds faſtened to it by a ſtring, and put over the pin F, ſituated any where in the diagonal line FAG; and let us add ever ſo much weight, provided it be done to D and C in the proportion of five, and to E in that of 7.071, the body A will remain ſuſpended in the air without altering its poſition in the leaſt.

If, inſtead of making the weights equal, we make one exceed the other in any proportion, the weight neceſſary to counteract them will never be required equal to both, but will always be in proportion to the diagonal of the parallelogram of which the weights repreſent the ſides. Thus in fig. 17. if we ſuppoſe the body A pulled in the direction AB by the weight G of four pounds, and in the direction AC by the weight H of three pounds, it will be kept ſuſpended by the weight F of five pounds put over the pin E, placed any where in the diagonal line EAD. For the diagonal AD is equal (by Prop. 47. Book 1. of Euclid) to the ſquare-root of the ſum of the ſquares of the ſides AB and AC, or CD and BD. But the ſquare of AB is $4\times4=16$ pounds, and that of AC is $3\times3=9$ pounds by the ſuppoſition; and $16+9=25$, the ſquare-root of which is 5; and theſe proportions will be found to hold invariably in whatever way we apply mechanical powers; though, when they act at oblique angles, the diagonals muſt be calculated by other methods.

If, however, we ſet any of the powers at liberty, we ſhall find that none of them will continue the ſame even for a moment. If we ſuppoſe any of them to be the power of gravity, which is the moſt conſtant and equable we are acquainted with, this is found to increaſe prodigiouſly; and, on the other hand, if we ſuppoſe one of them to be a projectile force, as of a ſtone thrown by the hand, we ſhall find in like manner, that it will be diminiſhed to a great degree in a very little time. In all caſes, however, where a body is acted upon by two forces either increaſing or decreaſing, unleſs both increaſe or decreaſe exactly in proportion to their original quantity, the body acted upon will deſcribe a curve. Thus, in fig. 18. ſuppoſe the body A to be acted upon by two equal powers A*b* and A*c*; at the end of the firſt moment it will be at *d*, the end of the diagonal of the ſmall ſquare *Abcd*: but if now the force A*c* be increaſed to double what it was in the preceding moment, the body will at the end of the ſecond moment be at *g*, the extremity of the parallelogram *defg*; and by another increment of the ſame power, will be at the end of the third moment at *k*, and ſo on. This is ſimilar to the motion of falling bodies, of which we ſhall treat hereafter: but if one of the powers diminiſhes inſtead of increaſing, the phænomena will be different. Thus, in fig. 19. ſuppoſing the body at A to be actuated the firſt moment by the two forces A*b* and A*c*; at the

end of that moment it will be at the extremity of the diagonal *Ad*; but next moment ſuppoſing the power *Ac* to be diminiſhed one half, the other remaining the ſame, it will then be at *g*, and the third moment at *k*, thus deſcribing another kind of curve. If while one of the powers decreaſes the other increaſes, a third kind of curve will be generated; and by proper management of theſe powers, the body may be made to deſcribe the ſegment of a circle, as in pl. 17. fig. 20. where it is manifeſt that one power continually decreaſes while the other increaſes.

The following machine has been contrived to illuſtrate the operation of oblique powers upon each other. ABCD is a wooden ſquare, ſo contrived that the part BEFC may draw out from it or be puſhed back at pleaſure. To this is joined a pulley H, freely moving upon its axis, which will be at H when the piece is puſhed in, and at *h* when it is drawn out. To this part let the ends of a ſtraight wire *k* be fixed, ſo as to move along with it under the pulley; and let the ball G be made to ſlide eaſily upon the wire. A thread *m* is fixed to this ball, and goes over the pulley to I; by which means the ball may be drawn up on the wire parallel to the ſide AD, when the part BEFC is puſhed as far as it will go into the ſquare: but when this part is drawn out, the ball muſt be carried along with it parallel to the bottom of the ſquare DC. Thus the ball may be drawn either perpendicularly upward by pulling the thread *m*, or moved horizontally by pulling out the part BEFC, in equal times and through equal ſpaces, each power acting equally and ſeparately upon it. But if, when the ball is at G, the upper end of the thread be tied to the pin I, in the corner A of the fixed ſquare, and the moveable part BEFC be drawn out, the ball will then be acted upon by both the powers together: for it will be drawn up by the thread towards the top of the ſquare, and at the ſame time carried with its wire *k* towards the right hand BC, moving all the while in the diagonal line L, and will be found at *g* when the ſliding part is drawn out as far as it was before; which then will have cauſed the thread to draw up the ball to the top of the inſide of the ſquare, juſt as high as it was before when drawn up ſingly by the thread, without moving the ſliding part.

If a body is acted upon by three forces, the inveſtigation becomes ſomewhat more complex, though it is ſtill eaſily explained on the foregoing principles: Thus, in fig. 22. let the body A be pulled ſidewiſe in oppoſite directions by the two equal weights GG put over the pins B and C, and directly downward by the weight H, the ſame with G. In this caſe it is plain, that each of the weights G and G ſuſtain one half of the weight H; and as both taken together are double in quantity to H, it might be ſuppoſed that they would be abundantly able to keep the body A in its poſition. The caſe, however, is very different. As each of the weights G ſuſtains only one half of H, it follows that H acts only with one half of its weight upon them. The body A, therefore, is pulled in the direction AC and AB by two powers, each of which is as 2, and in the direction AF by two, which are only as one. With the force AB, therefore, were it to act upon it ſingly, it would deſcribe the diagonal AD, and with that AC it would deſcribe the diagonal AE. Theſe two diagonals are in truth the forces by which it is now actuated, and the effect is preciſely according to the principles already laid down. By each of them taken ſeparately, the body would be brought down to F; their lateral action being in oppoſite directions deſtroys itſelf; and by their conjunct action, the body would be brought down to double the ſpace AF, that is to H, and conſequently would deſcribe the diagonal of the ſmall ſquare ADHE; which diagonal is equal to the ſide of the large one, and the very ſame that the body would have deſcribed though the two lateral weights had not been preſent.

Hence it appears, that though we pull a body ever ſo ſtrongly by ſtrings in a direction oppoſite to each other, it will ſtill require an equal weight to retain it in equilibrio; that is, ſuppoſing the ſtrings to be perfectly flexible. There may indeed be a deception in making an experiment of this kind; for the body will never deſcend as far as H, nor near that diſtance; but then it muſt be obſerved, that when the ſtrings begin to bend in the middle, the weights GG act in a direction different from what they did originally, and pull the body upwards inſtead of laterally; in which caſe, it muſt either remain at reſt, as in fig. 23. or move upwards as in fig. 24.

When the powers act in the direction AB and AC, fig. 23. one half of the weight H is ſuſtained by each of them. The body is therefore pulled in the directi ns AB and AC by two powers, each of which is as 2; and in the direction AF by other two, each of which is as 1. By the power AB it would be made to move in the diagonal AD of the parallelogram ABDF; and by the power AC, in the diagonal AE of the parallelogram ACFE; but theſe diagonals are equal and contrary to each other, and therefore deſtroy each other; of conſequence the body remains at reſt.

In fig. 24. the body A with the weight H appended to it is placed nearer to the point B than to C by one-third. Of conſequence, as will afterwards be explained, it bears two-thirds of the weight H, while C ſuſtains only one-third. The acting powers, therefore, are now the diagonals of two unequal parallelograms. One power draws the body in the direction AB with a force as 3, while the weight H draws it in the direction AH with a force as 2. By it, therefore, the body would be drawn in the direction of the diagonal AD of the parallelogram BDEA. On the other hand, it is acted upon by the power AC, which is likewiſe at 3, while the weight H draws it down with a force only as 1. By this, therefore, it would be drawn in the direction of the line AG, the diagonal of the parallelogram ACGF. We muſt now make theſe two diagonals the ſides of a third parallelogram AD G; and in the diagonal AI of this parallelogram it will go, for the reaſons already given.

If four or more forces act upon a body in different directions, the caſe becomes very complicated; and if many powers be employed, it will by no means be eaſy to determine *à priori* which way the body will tend. Caſes of this kind, however, ſeldom occur in practical mechanics; and when they do, it will be better to determine them by actual experiment than by a tedious inveſtigation, which, after all, may be liable to a miſtake. We forbear, therefore, to give more examples; though, if the reader inclines to exerciſe his ingenuity, he muſt proceed upon the plan already laid down, viz. by combining the different powers together; forming diagonals from theſe parallelograms; combining theſe diagonals into a third ſet of parallelograms; and the diagonals thence reſulting into a fourth ſet, &c. until at laſt a ſingle one is met with prevailing over all the reſt, or two deſtroying each other. If one prevails, the body will move in that direction; but if two deſtroy each other, the body will remain at reſt.—It muſt alſo be obſerved, that in making drawings of this kind, the longeſt line always repreſents the greateſt power, and that without a ſingle exception to the contrary. By mere mechanical conſtruction, therefore, with ſcale and compaſs, we may be able to aſcertain the direction of oblique powers to as great accuracy as we can ever have occaſion for in practice.

We ſhall conclude this ſubject with obſerving, that as every power certainly *is* produced by the action of two others, ſo it *may be* by innumerable others. Thus, in fig. 25. the power AD may be produced by the two ſides of the ſquare ABDC; by the ſides of the oblique-angled parallelogram *Ac*D*b*; of the ſmaller parallelogram A*c*D*d*: or of the large parallelogram AE, DF, &c. Hence it is eaſy to produce any power, whether ſtrong or weak, from the action of any two powers whoſe

direction we have at our command, without regard to their quantity. If we make the generating powers conſpire together, a ſtrong one will be produced; or, if they oppoſe each other to a certain degree, they will produce a weak one. The ſtrongeſt that can be produced by any two powers is when they act the ſame way in a direct line.

§ 6. *Of the Relation betwixt Velocity and Power.*

HITHERTO we have ſuppoſed the bodies to be moved not to make any reſiſtance to motion in any direction, unleſs oppoſed by a fixed obſtacle; in which caſe, *velocity* and *power* would be the ſame thing; and thus it always appears to be when we repreſent powers by lines upon paper. But when we come to practice, matters turn out very different. A ball of cork moving with any degree of velocity will not have an equal power with one of wood moving with the ſame velocity; neither will a wooden ball have the ſame power with a metallic one. Among the metals themſelves, too, there is a difference; for the lighter metals are inferior in power to the heavier ones. Gravity, therefore, muſt be accounted the power which gives to moving bodies what we call their *force* or *momentum*; for, according to the weight of a body, ſo will its impulſe always be, and that whether it moves upwards, downwards, ſidewiſe, or in a circle. The abſolute power of a body, therefore, muſt be meaſured by comparing the gravity of different bodies together, and denoting one of them by unity; making the other 2, 3, 4, &c. according as it is twice, thrice, or four times, the ſpecific gravity of the former. Thus, let an hollow ball of metal be filled with water; if the ball be very thin, we may let its weight paſs unnoticed, or we may make allowance for it in the calculation. Suppoſing the weight of this ball then to be 1, if it moves with a velocity of 10 feet in a ſecond, its abſolute force or momentum will be $10 \times 1 = 10$; a ball of ſtone of equal ſize which weighs three times as much as the former, if moved with an equal velocity, will have a force of $10 \times 3 = 30$; a ball of tin which weighs 7 times as much, will have a momentum of 70; and a ball of gold or platina would have a momentum of 190 or 200.

This will alſo hold exactly, by increaſing the *quantity* of matter, where it is deficient in ſpecific gravity. Thus, if the hollow metallic ball be increaſed in diameter, ſo that it ſhall equal in weight the ball of ſtone or of metal, it will have the very ſame force with that ball; and in like manner, it might be made to have a momentum equal to the metallic balls, though not without a very conſiderable increaſe of ſize.—Great maſſes of matter will therefore ſupply the place of great velocity; and hence Mr. Atwood obſerves, that the battering-rams uſed by the ancients were no leſs powerful in beating down the walls of cities than the modern artillery. This difference between the momentum and force of penetration is alſo exemplified in knives, wedges, or any ſharp inſtruments, where a ſudden blow will cauſe a much deeper penetration than a weight vaſtly greater than could be ſtirred from the earth by the force of the blow.

§ 7. *Of the Multiplication and Increaſe of Power.*

WE have now ſeen that *power*, abſolutely ſo called, acts in a double kind of capacity, viz. either when it impreſſes a great velocity upon a ſmall quantity of matter, or when it impreſſes a ſmall velocity upon a great quantity of matter. It muſt, however, be remarked, that the matter we ſpeak of is always ſuppoſed ſubject to the laws of gravity; for what would be the conſequence of putting a body in motion which had no gravity we cannot poſſibly conceive, becauſe we never ſaw any ſuch body. Philoſophers indeed mention the *vis inertiæ* of matter as property diſtinct from gravity; but the arguments in favour of this property are now generally looked upon to be inconcluſive, and gravity and the *vis inertiæ* looked upon to be the ſame.

The two modes in which abſolute power acts, come preciſely to the ſame thing whether the velocity be great or ſmall: for it is evident, that when two pounds move with the velocity of 1, it is the ſame thing with one pound moving with the velocity of 2; the *velocities* as well as powers being exactly the ſame. But there is a third way in which power may be directed, in which it has not the relation to velocity already mentioned; and that is, by ſimple preſſure, where no motion is admitted. Thus may the ſmalleſt power be made to augment itſelf to an inconceivable degree, as in pl. 17. fig. 26. Here, ſuppoſe the body A to preſs directly downwards upon the line AB faſtened to the ſmall wheel B, moveable upon an axis. If we ſuppoſe the extremity of the line at A to be ſupported ſo that it ſhall not fall to a ſide, the wheel B will preſs downward with the whole of the weight A upon the line EF, and conſequently the line *g* muſt ſuſtain the whole of this weight. But if the line EF be ſupported ſo that it cannot move perpendicularly downwards to *g*, it will then roll along the line EF from B towards F; and this tendency to roll in the direction juſt mentioned will be exactly equivalent to the weight A. Any body, therefore, laid on the top of a ſtick ſet up at an angle of 45 degrees, will require a power double to its own weight to keep it ſteady at the foot, abſtracting from that which will be neceſſary to prevent it from falling to a ſide.

If now we ſuppoſe the wheel B to preſs laterally upon another C; and that other, by means of the line CD and wheel D, to preſs upon the two obſtacles *i* and *k*, both of which it touches at an angle of 45 degrees; it is plain that not only each of theſe obſtacles muſt bear the whole weight of the body A, but the reaction of the wheel D will preſs down the wheel C in the direction C*h* with the very ſame force that D is preſſed upwards. This is entirely ſimilar to the caſe of the man in the boat repreſented in fig. 1. pl. 16. Thus the weight A produces a preſſure equal to five times its own weight; and by multiplying the wheels and rods, we might increaſe the preſſure as much as we pleaſe. The caſe is ſimilar to that in hydroſtatics, where a little quantity of liquid may be made to burſt the ſtrongeſt veſſel.

SECT. II. *Of the Mechanical Powers.*

BY theſe we underſtand ſuch ſimple machines as are uſeful for comparing the velocity of various bodies together, and impreſſing them with greater or ſmaller degrees of it at pleaſure; by which means we may either cauſe a ſmall weight to overcome a great one, or by means of a great one we may make a ſmall weight move through a ſpace proportionably great. Thus by means of ſome of theſe powers, indeed by any of them, we may cauſe a weight of one pound, by moving through the ſpace of ten feet, to raiſe another of ten pounds through one foot; or *vice verſa*, by a weight of ten pounds moving through the ſpace of one foot, we may make a ſingle pound move through the ſpace of ten feet; but by none of the powers ſhall we be able, by moving a weight of ten pounds through one foot, to move a ſingle pound through 11 feet; nor by a ſingle pound moving through a ſpace of nine feet ſhall we be able to raiſe a weight of ten pounds through the ſpace of one foot. None of the mechanic powers, as they are called, therefore, can make any abſolute increaſe of the power applied: all that they can do is to alter the velocity of the power applied, and thus transfer it either to a larger or ſmaller body at pleaſure: and upon this principle depends the whole practical part of mechanics. The mechanical powers are ſix in number, viz. the *lever*, *wheel in axis* or *axis in peritrochio*, the *pulley*, *inclined plane*, *wedge*, and *ſcrew*; of all which we ſhall now treat particularly.

§ 1. *Of the Lever.*

THE common lever is the moſt ſimple of all the mechanical powers, and is uſually no other than a ſtraight bar of wood or

iron ſupported by a prop, as in fig. 27. pl. 17. The weight to be raiſed is ſuſpended at the ſhort arm of the lever A; and exactly in the inverſe proportion of the diſtance of the weight from the fulcrum or prop C, is the quantity of the weight at B neceſſary to keep it in equilibrio. Thus if the weight at A be diſtant one foot or one inch, it ſignifies nothing which, from the prop, it will require an equal weight placed at the ſame diſtance on the other ſide, as at 1, to balance it; but if the latter be placed at 2, then only half the weight ſuſpended at A will balance it: if the ſmall weight is placed at 3, then only one-third will be neceſſary; if at 4, only one-fourth, &c. and if, as in the figure, it be removed to 10, then only one-tenth part will be required to make a balance. It muſt ſtill be remembered, however, that if the lever is put in motion, the ſmall weight muſt move through a ſpace ten times as great as that through which the large one moves: ſo that in fact there is not any acquiſition of power by means of the lever, though it is one of the inſtruments moſt commonly uſed in mechanics, and very ſerviceable in looſening ſtones in quarries, or raiſing great weights to a ſmall diſtance from the ground; after which they may be raiſed to greater heights by other machines.

In making experiments with this kind of lever, it is neceſſary either to have the ſhort arm much thicker than the long one, ſo that it may exactly balance the latter, or a weight muſt be appended to it juſt ſufficient to keep it *in equilibrio*, otherwiſe no accuracy can be expected. This lever is the foundation of balances of all kinds, whether of the common kind, or of that called the *Roman ſtatera* or ſteel-yard. The latter is no other than the lever repreſented in fig. 27. For if a ſcale is appended to the end A of the lever, and a weight, ſuppoſe of one pound, uſed as a counterpoiſe to the body which is to be put in the ſcale, it will ſhew exactly the weight of that body, by putting it at a proper diſtance from the fulcrum upon the long arm. Thus if the weight when placed at the diviſion 5 counterpoiſes that placed in the ſcale, it ſhows that the body weighs exactly five pounds: if it balances at 6, then it ſhows that the body weighs ſix pounds, &c. See the article STEEL-*Yard*. To this kind of lever may be reduced ſeveral kinds of inſtruments, as ſciſſars, ſnuffers, pincers, &c.

In levers of this kind, the fulcrum C muſt ſupport both the weight to be raiſed, and likewiſe that which raiſes it; ſo that the weight upon C muſt be the greater in proportion as the arm CB of the lever is ſhorter. Thus, if the arms are both equal, the fulcrum C muſt bear double the weight at A: if the one arm is double the length of the other, then it has only to bear the weight to be raiſed, and one half more; becauſe any weight at 2 will balance one double to itſelf at 1; but if removed to 10, the fulcrum will only have $1\frac{1}{10}$ to bear.

In ſome caſes, the weight to be raiſed is placed between the acting power and the fulcrum, as in fig. 28. This lever is more powerful than the other, and is likewiſe more eaſily ſupported, becauſe only part of the weight to be raiſed, and none of that which raiſes it, lies upon the fulcrum. Thus in fig. 28. let the extremity A of the lever AB reſt upon a fulcrum at *o*, and let the ſmall weight 1, by means of a ſtring put over the wheel or pin C, pull up the other extremity; this weight 1 will then counterpoiſe the large one 10, and very little additional force will be required to raiſe it up. It is alſo plain, that the whole weight to be raiſed being 10, the fulcrum ſuſtains only 9 of it, for the other 1 is ſuſtained by the ſtring BC. It is plain alſo, that a lever of this kind only ten feet long will raiſe as great a weight as another of the former kind eleven feet in length; nevertheleſs there is not any abſolute gain of power, becauſe the ſmall weight 1 muſt move through ten times as much ſpace as the large one; and thus the quantity of motion is exactly equal in both. To this kind of lever we may reduce oars, doors turning upon hinges, cutting knives fixed at the point of the blade, &c. From it alſo we ſee the reaſon why two men carrying a burden upon a pole may bear unequal ſhares of the weight; for the nearer any one of them is to the burden, the greater ſhare he bears; and if he goes directly under it, he muſt bear the whole. Hence, if two perſons of unequal ſtrength are to carry a burden in this manner, the weaker ſhould always be placed at the greateſt diſtance from it.

If in this lever the moving power be put in the place of the weight, it acts at a great diſadvantage; and a very great power will be requiſite to overcome a ſmall weight. The reaſon of this is plain from an inſpection of fig. 28; for it is the ſame thing whether we ſuppoſe the body 10 to be the moving power, or the weight to be raiſed; in either caſe, nine-tenths of it are ſpent upon the fulcrum at *o*; and the other tenth part at 10 will be able to do no more than balance the weight 1. Levers of this kind are only made uſe of when we wiſh to give a conſiderable degree of velocity to bodies: and hence the flies of clocks, mill-ſtones, &c. may be accounted levers of this kind; for in theſe the moving power is applied to a pinion near the centre of motion, and acts at a great diſadvantage; the muſcles of the arms or legs of a man, by their inſertion near the joints, likewiſe act as levers of this kind; and hence the power exerted by a muſcle is always much greater than the force it has to overcome.

In all caſes in which the lever is applied, it is neceſſary, in order to give it the greateſt advantage, that the moving power act in a direction exactly perpendicular to the lever itſelf. If this be not the caſe, it will be neceſſary to lengthen the lever in proportion to the obliquity. Thus in fig. 29. ſuppoſe the ſtraight lever AB to reſt on the fulcrum C, ſo that a weight of one pound may counteract 10; if the lever be bent in the direction AD, it will then be neceſſary to lengthen it ſomewhat in order to produce the ſame effect If bent in the direction CE, it muſt be farther lengthened, and ſtill farther if bent in the direction CF. The reaſon of this is, that when the weight acts on the bended lever ACF, ACE, and ACD, a part of its force is ſpent in giving, or attempting to give, a lateral motion to the fulcrum C; and the part thus loſt is exactly equal to the advantage gained by the greater length of the lever. To make a lever of a determinate length act always with the ſame power, it will be neceſſary to have ſome contrivance by which the moving power may act always perpendicularly to it; as by having two circular pieces of wood or other ſolid matter faſtened to the ends of it, round which the ropes may wrap themſelves when it is put in motion, ſuch as are repreſented by *ab* and BG in the figure.

Fig. 30. ſhows a kind of lever bent ſo that one part of it may form a right angle with the other. Here the prop or centre of motion is at the angular point C. P is a power acting upon the longer arm AC at F, by means of the cord DE going over the pulley G; and W is a weight of reſiſtance acting upon the end B of the ſhorter arm BC. If the power be to the weight as BC is to CF, they will remain in equilibrio. Thus ſuppoſe W to be five pounds acting at the diſtance of one foot from the centre of motion C, and P to be one pound acting at F five feet from the centre C, the power and weight will juſt balance each other. A hammer drawing a nail is a lever of this kind. In this lever the preſſure upon the fulcrum downwards is juſt equal to the weight to be raiſed; but there is likewiſe a lateral preſſure equal to the weight P; ſo that the centre of motion muſt have a double ſupport, otherwiſe the whole lever with the weight would be drawn towards the ſide in the direction BC.

If, as in fig. 31. and 32. the lever be bent ſo as to form two ſides of a ſquare, the weight to be raiſed will always be equal to that upon the fulcrum, in whatever place the fulcrum may

be put; but both will vary according to the diſtance from the angular point. Thus, if, as in fig. 31. the fulcrum be placed at the angular point A, the weight F appended to the extremity B of the arm AB will juſt counterpoiſe an equal weight E by means of the ſtring CDE put over the pin D, and drawn laterally by the arm AC. But if, as in fig. 32. the fulcrum be placed nearer to the extremity of the arm AC, as at 3, the caſe will then be very much altered, and one pound ſuſpended at the extremity B of the arm AB will counterpoiſe four at the extremity C of the other arm: the preſſure on the fulcrum will likewiſe be equal to the weight to be raiſed. Was the fulcrum placed at 2, then a weight of one pound at B would only counterpoiſe two pounds acting at C; and if it was placed at 1, then a weight of three pounds at B would be requiſite to counterpoiſe 4 at C.

It is worth notice, that levers of this kind cannot be exactly counterpoiſed by the power of ſtraight levers. Thus, in fig. 33. let any weight, as C, be appended to B, the extremity of the arm of the bent lever BA4. Let DE be a ſtraight lever, the force of which we deſign to oppoſe to that of the crooked lever. For this purpoſe let another weight F act upon the extremity D of this ſtraight lever by means of a ſtring put over the pin G. Let the two levers be connected together by means of the ſtring *b*3, and let a piece of wood or iron E4 be put between their two extremities: the two weights being now allowed to act, it is evident that the levers will be pulled in different directions; the ſtring *b*3 will be tightened, and the extremity E of the ſtraight lever DE will be preſſed towards 4, while the extremity 4 of the crooked lever will be preſſed towards E; by which means the two levers will oppoſe one another in every point of their action. There is not, however, any weight whatever applied to the ſtraight lever which can be made to counterbalance that at C, in ſuch a manner as to keep the bent lever ſteady. Let us firſt ſuppoſe the weights to be each one pound, and the ſtring to be placed as in the figure at *b*3. In this caſe the weight C pulls the crooked lever from *b* towards 3, with a force equal to 4, and the extremity 4 will be preſſed towards E with an equal degree of force. But in the ſtraight lever, though the point *b* be pulled in the direction 3*b* by a force of four pounds, the extremity E is preſſed the contrary way by a force equivalent only to three. Thus the weight C muſt preponderate, and that at F will aſcend. Let us next add to the weight F one third of a pound; by which means the preſſure from E towards 4 will be augmented to 4, and the two extremities of the levers will counteract each other: but now the preſſure in the direction 3*b* will be greater by one-third of a pound than it is in the direction *b*3; and of conſequence the weight F will prevail, the arm AB of the crooked lever and the weight appended to it being raiſed. If we attempt to mend matters by augmenting the weight F by not quite a third part, the extremities of the two levers will not balance each other, the preſſure from 4 to E will be greater than from E to 4; and in like manner the preſſure from 3 to *b* will be greater than from *b* to 3. Hence both levers will be pulled in a direction from D towards G, and the weight F will deſcend if the weights be properly adjuſted without any aſcent of the other. In ſhort, let us alter the weights as we will, or let us alter the poſition of the fulcrum as we will, it is eaſy to ſee that there is an abſolute impoſſibility that the two levers can counteract each other; becauſe the preſſure upon the fulcrum of the crooked lever will always be equal to that by its extremity 4; but in the ſtraight lever the preſſure upon the fulcrum muſt neceſſarily be greater than that of the extremity.

Theſe are all the varieties of the lever which can be ſuppoſed; it remains now only to ſhow the reaſon of its action, or why a ſmall weight when at reſt ſhould counterpoiſe a great one, motion or velocity being here to appearance out of the queſtion, as we cannot attribute any degree of motion to two bodies abſolutely at reſt. To do this in a clear and diſtinct manner has puzzled ſome of the greateſt mathematicians: that of Dr. Hamilton profeſſor of philoſophy in Dublin, founded upon the reſolution of forces, ſeems to be the moſt readily underſtood, and leaſt liable to objection. 'The moſt noted theorem in mechanics (ſays he) is this: "When two heavy bodies counterpoiſe each other by means of any machine, and are then made to move together, the quantities of motion with which one deſcends and the other aſcends perpendicularly will be equal." An equilibrium always accompanying this equality of motions, bears ſuch a reſemblance to the caſe wherein two moving bodies ſtop each other when they meet together with equal quantities of motion, that many writers have thought that the cauſe of an equilibrium in the ſeveral machines might be immediately aſſigned, by ſaying, that ſince one body always loſes as much motion as it communicates to another, two heavy bodies counteracting each other muſt continue at reſt, when they are ſo circumſtanced that one cannot deſcend without cauſing the other to aſcend at the ſame time, and with the ſame quantity of motion. For then, ſhould one of them begin to deſcend, it muſt inſtantly loſe its whole motion by communicating it to the other. This argument, however plauſible it may ſeem, I think is by no means ſatisfactory; for, when we ſay that one body communicates its motion to another, we muſt neceſſarily ſuppoſe the motion to exiſt firſt in the one, and then in the other; but in the preſent caſe, where the two bodies are ſo connected that one cannot poſſibly begin to move before the other, the deſcending body cannot be ſaid to communicate its motion to the other, and thereby make it aſcend: But whatever we ſhould ſuppoſe cauſes one body to deſcend, muſt be alſo the immediate cauſe of the other's aſcending; ſince, from the connection of the bodies, it muſt act upon them both together as if they were really but one. And therefore, without contradicting the laws of motion, I might ſuppoſe the ſuperior weight of the heavier body, which is in itſelf more than able to ſuſtain the lighter, would overcome the lighter, and cauſe it to aſcend with the ſame quantity of motion with which the heavier deſcends; eſpecially as both their motions, taken together, may be leſs than what the difference of the weights, which is here ſuppoſed to be the moving force, would be able to produce in a body falling freely.

'However, as the theorem above-mentioned is a very elegant one, it ought certainly to be taken notice of in every treatiſe of mechanics, and may ſerve as a very good index of an equilibrium in all machines: but I do not think that we can from thence, or from any one general principle, explain the nature and effects of all the mechanic powers in a ſatisfactory manner; becauſe ſome of theſe machines differ very much from others in their ſtructures, and the true reaſon of the efficacy of each of them is beſt derived from its particular ſtructure.

'The lever is conſidered as an inflexible line, void of weight, and moveable about a fixed point called its *fulcrum* or prop. The property of the lever, expreſſed in the moſt general terms, is this: "When two weights, or any two forces, act againſt each other on the arms of a lever, and are in equilibrio, they will be to each other inverſely as the perpendicular or ſhorteſt diſtances of their lines of direction from the fulcrum."

'This propoſition contains two caſes; for the directions of the forces may either meet in a point, or be parallel to each other. Moſt writers begin their demonſtration of this propoſition with the ſecond caſe, which ſeems to be the ſimpleſt, and from which the other may be deduced by the reſolution of forces. Archimedes, in his demonſtration, ſets out with a ſuppoſition the truth of which may reaſonably be doubted: for he ſuppoſes, that if a number of equal weights be ſuſpended from the arm of a lever, and at points equidiſtant from each

other, whether all theſe points be at the ſame ſide of the fulcrum, or ſome of them on the oppoſite ſide, theſe weights will have the ſame force to turn the lever as they would have were they all united and ſuſpended from a point which lies in the middle between all the points of ſuſpenſion, and may be conſidered as the common centre of gravity of all the ſeparate weights. Mr. Huygens, in his *Miſcellaneous obſervations on mechanics*, ſays, that ſome mathematicians have endeavoured, by altering the form of this demonſtration, to render its defects leſs ſenſible; though without ſucceſs. He therefore propoſed another proof, which is extremely tedious and prolix, and alſo depends on a poſtulatum, that, I think, ought not to be granted on this occaſion: it is this: "When two equal bodies are placed on the arms of a lever, that which is furtheſt from the fulcrum will prevail, and raiſe the other up." Now, this is taking it for granted, in other words, that a ſmall weight placed further from the fulcrum will ſuſtain or raiſe a greater one. The cauſe and reaſon of which fact muſt be derived from the demonſtration that follows, and therefore this demonſtration ought not to be founded on the ſuppoſed ſelf-evidence of what is partly the thing to be proved.

'Sir Iſaac Newton's demonſtration of this propoſition is indeed very conciſe; but it depends on this ſuppoſition, that when from the fulcrum of a lever ſeveral arms or radii iſſue out in different directions, all lying in the ſame vertical plane, a given weight will have the ſame power to turn the lever from whichever arm it hangs, provided the diſtance from its line of direction from the fulcrum remains the ſame. Now it muſt appear difficult to admit this ſuppoſition, when we conſider that the weight can exert its whole force to turn the lever only on that arm which is the ſhorteſt, and is parallel to the horizon, and on which it acts perpendicularly; and that the force which it exerts, or with which it acts perpendicularly, on any one of the oblique arms, muſt be inverſely as the length of that arm; which is evident from the reſolution of forces.

'Mr. Maclaurin, in his *View of Newton's Philoſophy*, after giving us the methods by which Archimedes and Newton prove the property of the lever, propoſes one of his own, which, he ſays, appears to be the moſt natural one for this purpoſe. From equal bodies, ſuſtaining each other at equal diſtances from the fulcrum, he ſhows us how to infer that a body of one pound (for inſtance) will ſuſtain another of two pounds at half its diſtance from the fulcrum; and from thence that it will ſuſtain one of three pounds at a third part of its diſtance from the fulcrum: and going on thus, he deduces, by a kind of induction, what the proportion is in general between two bodies that ſuſtain each other on the arms of a lever. But this argument, were it otherwiſe ſatisfactory, as it cannot be applied when the arms of the lever are incommenſurable, cannot conclude generally, and therefore is imperfect.

'There are ſome writers on mechanics, who, from the compoſition of forces, demonſtrate that caſe of the general propoſition relating to the lever, in which the directions of the forces are oblique to each other, and meet in a point: but I do not find that they have had any other way of proving the ſecond caſe, in which the directions of the forces are parallel, but by conſidering theſe directions as making an angle with each other, though an infinitely ſmall one, or as meeting at an infinite diſtance; which way of reaſoning is not to be admitted in ſubjects of this kind, where the proof ſhould always ſhow us, directly from the laws of motion, why the concluſion muſt be true, in ſuch manner that we might ſee clearly the force of every ſtep from the firſt principles down to the concluſion, which we are prevented from doing when any ſuch arbitrary and inconſiſtent ſuppoſition is introduced.

'From thus conſidering the various proofs that have been given of this fundamental propoſition in mechanics, we may ſee the reaſon why many ſubſequent writers have appeared diſſatisfied with the former demonſtrations, and have looked for new ones: I ſhall now propoſe two methods of demonſtrating it, merely from the compoſition and reſolution of forces. The propoſition may be expreſſed as follows:

"When three forces act upon an inflexible line, whether ſtraight or crooked, and keep it in equilibrio, any two of them will be to each other inverſely as the perpendicular diſtances of their lines of direction from that point to which the third force is applied."

'Let the three forces E, G, F, (fig. 34.) act upon three points A, B, D, in an inflexible line; and firſt let the directions of the forces E and F (which act on the ſame ſide of the line) meet in the point C. Then it is evident that the force, which is compounded of theſe two, muſt act upon the line A B D in the direction of a right line that paſſeth through the point C: conſequently the force G, which ſuſtains this compounded force, muſt be equal thereunto, and muſt act in a contrary direction; therefore the force G muſt act in the direction of the line C B. From the point B draw B H and B K perpendicular to the directions of the forces E and F, and draw B M and B N parallel to theſe directions, forming the parallelogram B M C N; then, ſince theſe three forces are in equilibrio, they muſt be to each other reſpectively as the ſides and diagonal of this parallelogram to which their directions are parallel; therefore E is to F as CM to CN or MB, that is, (becauſe the ſides of a triangle are as the ſines of the oppoſite angles) as the ſine of the angle MBC, or its alternate one BCN, to the ſine of the angle BCM; but making CB the radius, BK is the ſine of the former angle, and BH of the latter; therefore E is to F as BK to BH; ſo that the forces E and F are to each other inverſely as the perpendicular diſtances of their lines of direction from the point B, on which the third force G acts. Now to compare the forces F and G together: From the point A, on which the third force acts, draw AB and AL perpendicular to the directions of the forces G and F; then, as was ſaid before, F is to G as MB is to CB; but MB is to CB as AB to AL; becauſe, making CA the radius, AB is the ſine of the angle MCB, and AL is the ſine of the angle MCN, or CMB its ſupplement, to two right ones; therefore the forces F and G are to each other inverſely as the perpendicular diſtances of their lines of direction from the point A, on which the third force E acts; and thus the firſt caſe of the propoſition is proved, in which the forces act againſt each other in oblique directions.

'We muſt now conſider what parts of the forces E and F act againſt the force G in directions parallel to GC; for it is ſuch parts only that really oppoſe the force G, and keep it in equilibrio; and from thence we ſhall ſee what proportion two forces muſt have to each other when they are in equilibrio, and act in parallel directions. Let the three forces act upon the points A, B, and D, (fig. 35.); let them be in equilibrio, and their lines of direction meet in the point C, as in the preceding caſe; then, if the points A, B, and D, are not in a right line, draw the line AD meeting BC in P, and from P draw PN and PM parallel to the directions of the forces E and F; through the points A and D draw parallel lines to BC; and through B draw a perpendicular to theſe lines, meeting them in H and K; from the point M draw MO parallel to AD, and meeting BC in O. Now the three forces E, G, and F, that are in equilibrio, will be to each other reſpectively as the ſides of the triangle CMP, as in the preceding caſe; but the force E, which is denoted by the line MC, may be reſolved into two forces acting in the directions MO and OC; the former of theſe only urges the point A towards D, and the latter acts in direct oppoſition to the force G; in like manner the force F, which is denoted by the line PM, may be reſolved into two forces acting in the directions OM and PO, the former of which only urges

the point D towards A, and the latter acts in direct oppoſition to the force G: now it is evident that the force G, which is denoted by the line PC, is ſuſtained only by thoſe parts of the forees E and F, which act againſt it, in directions parallel to BC, and are denoted by the lines OC and PO, which, taken together, are equal to PC; for the other parts of the forees E and F, which are denoted by MO, are loſt, being equal, and contrary to each other: if, therefore, inſtead of the forees F and E, we ſuppoſe two other forees, R and L, to act on the points D and A, in directions parallel to BC, and to keep the force G in equilibrio, it follows from what has been proved, that R and L, taken together will be equal to G, and that theſe three forees will be to each other reſpectively as the lines PO, OC, and PC; therefore R will be to L as PO to OC, (that is, as AM to MC, or as AP to PD,) or HB to BK: conſequently the forces R and L are to each other inverſely as the perpendicular diſtanees of their lines of direction from the point B, to which the third force is applied. Now to compare the forees R and G together; ſince the forces R and L may be denoted by BH and BK, and are both together equal to G, that foree will be denoted by the whole line KH, and therefore R will be to G as BH to KH; ſo that theſe forces are alſo to each other inverſely as the perpendicular diſtances of their lines of direction from the line of direction of the third force L; and thus the ſecond caſe of the propoſition is proved, in which the forces act againſt each other in parallel directions. If the point in the inflexible line, to which one of the forces is applied, ſhould become a fixed point, or *fulcrum*, round which the line may turn, it is evident that the other two forces will continue in equilibrio, as they were before; and therefore the property of the lever, in all caſes, is manifeſtly proved by this ſuppoſition.

'The centre of gravity of a body is ſaid to be that point which being ſuſtained, or prevented from deſcending, the body will continue at reſt. From hence it follows, that when a body hangs freely from a ſingle point and continues at reſt, its centre of gravity will lie perpendicularly under the point of ſuſpenſion; for in that ſituation only it will be ſuſtained, and can deſcend no lower.

'From this property, which agrees likewiſe to the common centre of gravity of two bodies joined together by an inflexible right line, and which may then be conſidered as one, I ſhall ſhow that their centre of gravity is a point in the line that joins them together, ſo ſituated that the diſtances of the two bodies from it are to each other inverſely as their weights. This theorem concerning the poſition of the common centre of gravity of two bodies, which is a very noted one in mechanics, I have never ſeen demonſtrated otherwiſe than by inferring it from the general property of the lever: but I think the method I ſhall now propoſe of deducing it directly from the definition of the centre of gravity, is the moſt conciſe as well as the moſt natural, and beſides it will afford us a very eaſy way of demonſtrating the property of the lever.

'Let the two bodies A and B (fig. 36.) be joined by an inflexible right line paſſing through their centres of gravity, and let them be ſuſpended from the fixed point or pin at P, by the threads AP and BP, ſo that they may hang freely in ſuch a poſition as their joint gravity will give them. When theſe bodies continue at reſt, their common centre of gravity muſt lie directly under the point of ſuſpenſion, or in the perpendicular line PL, conſequently it muſt be at the point C, the interſection of the lines PL and AB; the poſition of which point, in the line AB, will be determined by finding out the proportion between the ſegments CA and CB. If the inflexible line was not interpoſed between theſe bodies, they would move till their threads coincided with the perpendicular line PL: ſince therefore they are kept aſunder by this line, they muſt urge it with certain forces in oppoſite directions; and theſe urging forces muſt be equal, ſince the line on which they act continues at reſt: and therefore the force with which each body urges the other in the direction of this line, may be denoted by the ſame letter U, and we may denote the weights of the two bodies reſpectively by the letters A and B. Now the body A is acted upon by three forces, viz. by its weight A in the direction PC, by the foree U with which the other body urges it in the direction CA, and by the reaction of the pin in the direction AP; and ſince theſe three forces are in equilibrio, and keep the body at reſt, they are to each other reſpectively as the ſides of the triangle PCA; therefore A is to U, as PC to CA. In like manner, the body B is urged by three forces, *viz.* its weight B in the direction PC, the urging force U in the direction CB, and the reaction of the pin in the direction BP, which forces are to each other as the ſides of the triangle PCB; therefore U is to B, as CB to PC; and therefore A is to B, as CB to CA; conſequently the weights of the bodies A and B are to each other directly as their diſtances from the point C, which lies directly under the point of ſuſpenſion, and is therefore their common centre of gravity.

'When two bodies are connected by an inflexible line, and this line is ſupported by a prop ſo that their centre of gravity cannot deſcend, the bodies muſt continue to reſt, and will be in equilibrio. Therefore it is eaſy to ſee how, from the theorem now demonſtrated, we may prove the property of the lever in that caſe where the directions of the forees are parallel; and from thence the other caſe, in which the directions are oblique to each other, may be deduced by the reſolution of forces, as is uſually done. And this is the ſecond method by which I ſaid the general property of the lever might be ſtrictly demonſtrated.

'The lever is the moſt ſimple of all the mechanic powers; and to it may be reduced the balance and the *axis in peritrochio*, or axle and wheel: Though I do not conſider the balance as a diſtinct mechanic power, becauſe it is evidently no other than a lever fitted for the particular purpoſe of comparing the weights of bodies, and does not ſerve for raiſing great weights, or overcoming reſiſtances, as the other machines do.'

Though this demonſtration will no doubt be abundantly clear to mathematical readers, yet to others leſs verſed in that ſcience its appearance will no doubt be ſomewhat obſcure and perplexed. The following we ſubjoin as leſs intricate.

Let AB, fig. 37, repreſent a ſtraight rod of wood or iron, faſtened at the extremity A, at right angles to another piece of the ſame, and kept ſteady by two pins C and D. If a weight be put upon the extremity H of the upright rod AH, it will preſs down that, and along with it the horizontal rod AB, ſo that every point in the rod will move with the whole force of the weight. Thus, whether we ſuppoſe an obſtacle to be placed at the extremity B, at the point 2, or at 1, in the horizontal rod AB, it will have exactly the force of the weight placed at H to overcome. Suppoſing then that the weight would make the whole deſcend from A to E in one ſecond; then it is plain that the whole power exerted by the rod in its deſcent would be expreſſed by the parallelogram ABEF. But if, inſtead of ſuppoſing the line AB to be the full length repreſented in the figure, we ſuppoſe it to be only half that length, and cut off at 1, then the power of the weight would be repreſented by the parallelogram A 1 E 1. Were it ſtill farther ſhortened, by being cut off at 2, then the power would be repreſented by the parallelogram A 2 E 2; and each of theſe parallelograms, however unequal they may be as repreſented upon paper, would in reality be equal when the experiment was made, becauſe in no caſe could the weight deſcend with a greater force than its own. Suppoſe next the weight to be taken off from H, and put upon B, and the rod AB to be moveable upon the centre

A; the whole power of the weight then would be expreſſed by the triangle ABG, equal to the parallelogram ABEF; but as every point of the lever muſt bear the whole impulſe of the weight as before, it is plain, that as we approach towards the centre, that power is compreſſed into leſs and leſs ſpace. Thus, when the weight is deſcended from B to G, though the large triangle ABG be equal to the parallelogram ABEF, yet the ſmaller triangle A 1 1 is equal only to one half of the parallelogram A 1 E 1, which repreſents the power. The whole power being therefore compreſſed into half the ſpace, muſt of neceſſity be double to what it was in the former caſe. In like manner, the triangle A 2 *b*, is only equal to one half of the parallelogram A 2 *a b*; and this parallelogram itſelf is only half the ſpace repreſenting the whole power of the weight. In this caſe, therefore, the power is confined within one fourth part of the ſpace which it naturally has, and for that reaſon muſt be four times as great.

§ 2. *Of the Wheel and Axle, or Axis in Peritrochio.*

This power acts entirely on the principles of the lever, and has therefore ſometimes been called a perpetual lever. In it the power is applied to the circumference of a wheel by means of a rope or otherwiſe, the weight to be raiſed being faſtened to a rope which winds round the axis. It is repreſented fig. 38. pl. 17. where AB is the wheel, EDF its axis, P the moving power, and W the weight to be raiſed by means of the rope K coiling itſelf about the axis. It is plain, then, from an inſpection of the figure, that when the large wheel has made one revolution, the weight P will have deſcended through a ſpace equal to the circumference, and as much of the cord I, by which it is ſuſpended, will be wound off. On the other hand, the weight W will have aſcended only through a ſpace equal to the circumference of the axle, and juſt ſo much of the rope K will be wound up upon it. As the circumference of the wheel, therefore, is to that of the axis, ſo will the velocity of the moving power be to that of the weight to be raiſed, and of conſequence ſuch will be the force of the machine: thus, if the circumference of the wheel be eight, ten, twelve, or any number of times as large as that of the axle, one pound applied to the circumference will counterbalance eight, ten, twelve, or more pounds, applied to the axle, and a ſmall addition will raiſe it up.

The engines called *cranes*, for raiſing great weights, are no other than wheels of this kind. Sometimes they are moved by handles S, S, &c. placed on the circumference of the wheel, which is turned by men's hands, as is ſhown fig. 38. Sometimes the wheel is hollow, and furniſhed with ſteps, on which a man, who is incloſed in the wheel, continually fets his feet, as if he was aſcending a ſtair; and thus the wheel yielding to his weight turns round, and coils up the rope which raiſes the weight about its axis. When the crane is to be turned by men's hands, it may advantageouſly have cogs all round the circumference, in which a ſmall trundle may be made to work, and be turned by a winch.—Thus the power of the man who works it will be greatly increaſed; for his ſtrength will be augmented as many times as the number of revolutions of the winch exceeds that of the axle D, when multiplied by the exceſs of the length of the winch above the length of the ſemidiameter of the axle, added to the ſemidiameter or half the thickneſs of the rope K, by which the weight is drawn up. Thus, ſuppoſe the diameter of the rope and axle taken together to be 12 inches, and conſequently half their diameters to be 6 inches, ſo that the weight W will hang at ſix inches perpendicular diſtance from below the centre of the axle; let us ſuppoſe the wheel AB, which is fixed on the axle, to have 80 cogs, and to be turned by means of a winch ſix inches long, fixed on the axis of a trundle of eight ſtaves or rounds, working in the cogs of the wheel. Here it is plain that the winch and trundle would make ten revolutions for one of the wheel AB, and its axis D, on which the rope K winds in raiſing the weight W: and the winch being no longer than the ſum of the ſemidiameters of the great axle and rope, the trundle could have no more power on the wheel than a man could have by pulling it round by the edge, becauſe the winch would then have no greater velocity than the edge of the wheel has, which is ſuppoſed to be ten times the velocity of the riſing weight; ſo that in this caſe the acquiſition of power would be as 10 to 1. But if the length of the winch be 12 inches, the power gained will be as 20 to 1; if 18 inches, which is a ſufficient length for any man to work with, the acquiſition of power will be as 30 to 1; becauſe the velocity of the handle would be 30 times as great as that of the riſing weight, and the abſolute force of any machine is exactly in proportion to the velocity of the weight raiſed by it. We muſt always remember, however, that juſt as much time is loſt in working the machine as there is power gained by it; for none of the mechanical powers are capable of gaining both power and velocity at the ſame time.

In all cranes, it is neceſſary to have a racked wheel, repreſented by G, on one end of the axle, with a catch H to fall into its teeth; which will at any time ſupport the weight, and keep it from deſcending, if the workman ſhould happen to let ſlip his hold. For want of this precaution, terrible accidents have ſometimes happened to people incloſed in cranes, by their inadvertently miſſing a ſtep.

§ 3. *Of the Pulley.*

The pulley is a ſingle wheel of wood, braſs or iron, moveable upon an axis, and incloſed in a kind of caſe called its *block*, which admits of a rope to paſs freely over the circumference of the pulley, in which alſo there is uſually a groove to keep the rope from ſliding, the axis being generally fixed in the block. In ſome pulleys the block is fixed; in others moveable, and riſes with the weight. Both theſe kinds are repreſented, fig. 39. AA ſhows a fixed pulley, with its block *b*. Over the wheel a ſtring BB paſſes, to the extremities of which are fixed the two weights W and P. This pulley, however, though it changes the direction of a power, yet does not gain any advantage; for one of the weights muſt always deſcend as much as the other aſcends, of conſequence their velocities muſt always be equal; and when this is the caſe, there can be neither increaſe nor decreaſe of power. A ſingle fixed pulley, therefore, though it may compare the weight of two bodies together, cannot be accounted in any reſpect a mechanical power. But if with a fixed pulley we combine a moveable one, or one in which the block ariſes along with the wheel, we gain an increaſe of one half. Thus if a weight W hangs at the lower end of the moveable block P of the pulley D, and the cord GF goes under the wheel, it is plain that the half G of the cord bears one half of the weight W, and the half F the other. The hook H; therefore, which ſuſtains the half G of the cord, muſt therefore bear one half of the weight; and if the cord at F be drawn up, ſo that the pulley may be raiſed from D to C, the ſtring will be extended to its whole length, all but that which goes under the wheel of the pulley D; but the weight or power P by which the ſtring is thus drawn up, will have moved twice as far as the weight W which is drawn up: whence we ſee that only one pound at P will be requiſite to counterpoiſe two pounds at W. If the upper and fixed block contain two pulleys, and the lower one U contain alſo two, the advantage gained by this combination will be as 4 to 1. Thus, if one end of the ſtring KMOQ be fixed to a hook at I, and the ſtring paſſes over the pulleys N and R, and under thoſe L and P, the weight T of one pound will balance a weight W of four pounds, ſuſpended by a hook from the

moveable block, making allowance for the weight of the block itſelf. In like manner will the pulleys give an advantage of 4 to 1 when diſpoſed as at X and Y; but in all caſes the ſame relation between velocity and power is preſerved as in the lever and axis in peritrochio, viz. if the power balances twice its own weight, it muſt move or have a tendency to move through twice the ſpace; if it balances four times its weight, then it muſt have a tendency to move through four times the ſpace that the other does. Pulleys are of great uſe in practical mechanics, as by their means great weights may be raiſed to any height much more expeditiouſly than by any other method, and the ſmallneſs of their weight makes them very convenient for carriage. At ſea they are uſed for hoiſting the ſails and yards, ſtraitening ropes, &c. Archimedes, by means of a machine compoſed of pulleys, is ſaid to have drawn a ſhip along the ſtrand, in the preſence of Hiero king of Syracuſe; but this is ſcarcely to be credited, on account of the great friction which attends this kind of machines. The friction ariſes from three cauſes: 1. The diameter of the axis bearing a conſiderable proportion to that of the wheels. 2. Their rubbing againſt their blocks, or againſt one another. 3. The ſtiffneſs of the rope that goes over and under them. All theſe cauſes muſt neceſſarily be augmented, in proportion to the weight we have to overcome; and when we conſider the immenſe reſiſtance which a ſhip muſt make, with the ſtrength and ſtiffneſs of the ropes neceſſary to overcome it, we can ſcarce ſuppoſe the ſtrength of any individual equal to the taſk. Pulleys have often been uſed by inhuman tyrants, in conſtructing machines for torturing the objects of their cruelty.

The pulley has by ſome writers been reduced to the lever as well as the wheel and axis; in which method they conſider the fixed pulley as a lever of the firſt, and the moveable pulley as one of the ſecond kind; but it is juſtly obſerved by Profeſſor Hamilton, that the pulley cannot be with any propriety reduced to a lever; becauſe, though both the moveable and immoveable pulleys ſhould be taken away, the ropes would have to ſuſtain the ſame weight that they do with the pulleys; nay, the very ſame advantages would be gained by the mere uſe of pins, without any wheels, were not the friction very great even upon the ſmootheſt pins that could be made uſe of. It is, indeed, merely to avoid this reſiſtance on the pins that wheels are made uſe of at all. The beſt method of computing the power and explaining the reaſon of the effects of pulleys, is by conſidering that every moveable pulley hangs by two ropes equally ſtretched, each of which bears one half of the weight; and therefore, when the ſame rope goes round a number of fixed and moveable pulleys, ſince all its parts on each ſide of the pulleys are equally ſtretched, the whole weight muſt be equally divided amongſt all the ropes by which the moveable pulleys hang; conſequently, if the power which acts on one rope be equal to the weight divided by the number of ropes, that power will ſuſtain the weight.

A very conſiderable improvement in the conſtruction of pulleys has been made by Mr. James White, who has obtained a patent for his invention, and of which the following deſcription is given by the inventor. Fig. 68, in Plate 19, ſhows the machine, conſiſting of two pulleys Q and R, one fixed and the other moveable. Each of theſe has ſix concentric grooves, capable of having a line put round them, and thus acting like as many different pulleys, having diameters equal to thoſe of the grooves. Suppoſing then each of the grooves to be a diſtinct pulley, and that all their diameters were equal, it is evident that if the weight 144 were to be raiſed by pulling at S till the pulleys touched each other, the firſt pulley muſt receive that length of line as many times as there are parts of the line hanging between it and the lower pulley. In the preſent caſe, there are 12 lines, b, d, f, &c. hanging between the two pulleys, formed by its revolution about the ſix upper and ſix lower grooves. Hence as much line muſt paſs over the uppermoſt pulley as is equal to twelve times the diſtance of the two. But, from an inſpection of the figure, it is plain that the ſecond pulley cannot receive the full quantity of line by as much as is equal to the diſtance betwixt it and the firſt. In like manner, the third pulley receives leſs than the firſt by as much as is the diſtance between the firſt and third; and ſo on to the laſt, which receives only one twelfth of the whole. For this receives its ſhare of line *n* from a fixed point in the upper frame, which gives it nothing; while all the others in the ſame frame receive the line partly by turning to meet it, and partly by the line coming to meet them.

Suppoſing now theſe pulleys to be equal in ſize, and to move freely as the line determines them, it appears evident, from the nature of the ſyſtem, that the number of their revolutions, and conſequently their velocities, muſt be in proportion to the number of ſuſpending parts that are between the fixed point above-mentioned and each pulley reſpectively. Thus the outermoſt pulley would go twelve times round in the time that the pulley under which the part *n* of the line, if equal to it, would revolve only once; and the intermediate times and velocities would be a ſeries of arithmetical proportionals, of which, if the firſt number were 1, the laſt would always be equal to the whole number of terms. Since then the revolutions of equal and diſtinct pulleys are meaſured by their velocities, and that it is poſſible to find any proportion of velocity on a ſingle body running on a centre, viz. by finding proportionate diſtances from that centre, it follows, that if the diameters of certain grooves in the ſame ſubſtance be exactly adapted to the above ſeries (the line itſelf being ſuppoſed inelaſtic, and of no magnitude), the neceſſity of uſing ſeveral pulleys in each frame will be obviated, and with that ſome of the inconveniencies to which the uſe of the pulley is liable.

In the figure referred to, the coils of rope by which the weight is ſupported are repreſented by the lines *a*, *b*, *c*, &c.; *a* is the *line of fraction*, commonly called the fall, which paſſes over and under the proper grooves, until it is faſtened to the upper frame juſt above *n*. In practice, however, the grooves are not arithmetical proportionals, nor can they be ſo; for the diameter of the rope employed muſt in all caſes be deducted from each term; without which the ſmaller grooves, to which the ſaid diameter bears a larger proportion than to the larger ones, will tend to riſe and fall faſter than they, and thus introduce worſe defects than thoſe which they were intended to obviate.

The principal advantage of this kind of pulley is, that it deſtroys lateral friction, and that kind of ſhaking motion which are ſo inconvenient in the common pulley. "And leſt (ſays Mr. White) this circumſtance ſhould give the idea of weakneſs, I would obſerve, that to have pins for the pulleys to run on, is not the only nor perhaps the beſt method; but that I ſometimes uſe centres fixed to the pulleys, and revolving on a very ſhort bearing in the ſide of the frame, by which ſtrength is increaſed, and friction very much diminiſhed; for to the laſt moment the motion of the pulley is perfectly circular: and this very circumſtance is the cauſe of its not wearing out in the centre as ſoon as it would, aſſiſted by the ever increaſing irregularities of a gullied bearing. Theſe pulleys, when well executed, apply to jacks and other machines of that nature with peculiar advantage, both as to the time of going and their own durability; and it is poſſible to produce a ſyſtem of pulleys of this kind of ſix or eight parts only, and adapted to the pockets, which, by means of a ſkain of ſewing-ſilk, or a clue of common thread, will raiſe upwards of an hundred weight.

§ 4. *Of the Inclined Plane.*

This power is repreſented, pl. 17. fig. 40. and the advantage gained by it is exactly in the proportion of the length of the plane to the perpendicular height of it. Thus, let AB be a plane parallel to the horizon, and CD one inclined to it: ſuppoſe alſo the whole length CD to be three times as great as the perpendicular height GfF; in this caſe, the cylinder E will be ſupported upon the plane CD, and kept from rolling down upon it, by one-third part of its weight. Were the length of the plane four times its height, it would be prevented from rolling down by one-fourth part of its weight. The force with which a rolling body deſcends upon an inclined plane will be to that with which it would deſcend by the power of gravity, as the height of the plane is to the length of it.—For, ſuppoſe the plane AB (fig. 41.) to be parallel to the horizon, the cylinder C will keep at reſt upon any part of the plane on which it is laid. If the plane be ſo elevated, as in fig. 42. that its perpendicular height D be equal to one half of its length AB, then the cylinder will roll down with half its weight; for it would require a power (acting in the direction AB) equal to half its weight to keep it from rolling. If the plane be elevated ſo as to be perpendicular to the horizon, as in fig. 43. the cylinder C will deſcend with its whole force of gravity, becauſe the plane contributes nothing to the ſupport or hindrance of it; for which reaſon it muſt require a power equal to the whole force of its gravity to keep it from deſcending.

If, as in fig. 44. the cylinder C be made to turn upon ſlender pivots in the frame D, which is furniſhed with a hook, with a line G faſtened to it; if this line go over the fixed pulley H, and have its other end tied to the hook in the weight I; if the weight of the body I be to the weight of the cylinder C, added to that of its frame D, as the perpendicular height of the plane LM is to its length AB; the weight will juſt ſupport the cylinder, and a ſmall force will make it either aſcend or deſcend. In the time that the cylinder moves from A to B, it muſt riſe through the whole height of the plane ML, and the weight will deſcend from H to K, through a ſpace equal to the whole length of the plane AB. If the plane be now made to move upon rollers or wheels, as in fig. 45. and the cylinder be ſupported upon it, the ſame power will draw the cylinder up the plane, provided the pivots of the wheels be ſmall, and the wheels themſelves pretty large. For let the machine ABC, equal in height and length to ABM, fig. 44. be furniſhed with four wheels, of which two are ſeen at D and E, the third being under C, while the fourth is concealed by the board *a*. Let the cylinder F be laid upon the lower end of the inclined plane CB, and the line G be extended from the frame of the cylinder about ſix feet, parallel to the plane CB. and fixed in that direction to a hook in the wall, which will keep the cylinder from rolling off the plane. Let one end of the line H be tied to a hook at C in the machine, and the other to a weight K, the ſame which drew the cylinder up the plane before. If this line be put over the fixed pulley I, the weight K will draw the machine along the horizontal plane L, and under the cylinder F; and when the machine has been drawn the whole length CB, the cylinder will be raiſed to *d*, equal to the perpendicular height AB above the horizontal part at A.

The inclined plane, conſidered as a mechanical power, may eaſily be reduced to the lever; for the power acquired by it is always in the proportion of the length to the height, in the ſame manner as the power acquired by a lever is in the proportion of the long arm to the ſhort one. To compute or ſhow the reaſon of the power of an inclined plane, therefore, we have only to conſtruct a lever, the long arm of which is equal to the length of the plane, and the ſhort arm to the height of it; then, whatever weight put upon the long arm counterpoiſes another put upon the ſhort one, will alſo keep the ſame weight from rolling down the inclined plane.

To the inclined plane belong alſo the wedge, and all cutting inſtruments which act as wedges, as knives, hatchets, &c. From the theory of the inclined plane alſo combined with that of falling bodies, we deduce ſome of the moſt remarkable properties of the pendulum. See Pendulum.

§ 5. *Of the Wedge.*

This may be conſidered as two equally inclined planes DEF and CEF, pl. 18. fig. 46. joined together at their baſes eEFO: DC is the whole thickneſs of the wedge at its back AB D, where the power is applied; EF is the depth or height of the wedge; DF the length of one of its ſides, equal to CF the length of the other ſide; and OF is its ſharp edge, which is entered into the wood or other matter to be ſplit, by the force of a hammer or mallet ſtriking perpendicularly upon its back. Thus, AB, fig. 47. is a wedge driven into the cleft CED of the wood FG.

When the wood does not cleave at any diſtance before the wedge, there will be an equilibrium between the power impelling the wedge downward, and the reſiſtance of the wood acting againſt the two ſides of the wedge: if the power be to the reſiſtance as half the thickneſs of the wedge at its back is to either of its ſides, and if the power be increaſed ſo as to overcome the friction of the wedge, and the reſiſtance ariſing from the coheſion of the wood, the wedge will be driven in, and the wood ſplit. But when the wood ſplits, as it commonly does, before the wedge, the power impelling the latter will not be to the reſiſtance of the wood as half the thickneſs of the wedge is to one of its ſides, but as half its thickneſs is to the length of the other ſide of the cleft, eſtimated from the top or acting part of the wedge; for, if we ſuppoſe the wedge to be lengthened down to the bottom of the cleft at E, the ſame proportion will hold; namely, that the power will be to the reſiſtance, as half the thickneſs of the wedge is to the length of either of its ſides; or, which is the ſame thing, as the whole thickneſs of the wedge is to the length of both its ſides.

To prove this, let us ſuppoſe the wedge is divided lengthwiſe into two equal parts; in which caſe, it will become two equally inclined planes, one of which, as *abc* fig. 48. may be made uſe of for ſeparating the moulding *cd* from the wainſcot AB. It is evident, that when this half wedge has been driven its whole length *ac* between the wainſcot and mouldings, its inſide *ac* will be at *cd*, and the moulding will be ſeparated to *g* from the wainſcot. But, from what has been already ſhown concerning the inclined plane, it appears that, to have an equilibrium between the power impelling the half wedge and the reſiſtance of the moulding, the former muſt be to the latter as *ab* to *ac*, that is, as the thickneſs of the back which receives the ſtroke is to the length of the ſide againſt which the moulding acts. Since, therefore, the power upon the half wedge is to the reſiſtance againſt its ſide as the half back *cb* is to the whole ſide *ac*, it is plain that the power upon the whole wedge, where the whole thickneſs is double the half-back, muſt be to the reſiſtance of both its ſides as the thickneſs of the whole back is to the length of both ſides of the cleft, when the wood ſplits at any diſtance before the wedge: for, when the wedge is driven quite into the wood, and the latter ſplits at ever ſo ſmall a diſtance before it, the top of the wedge then becomes the acting part, becauſe the wood does not touch it any where elſe. And ſince the bottom of the cleft muſt be conſidered as the place where the whole reſiſtance is accumulated, it is plain, from the nature of the lever, that the farther the power is from the reſiſtance, the greater advantage it acts with.

Some have ſuppoſed, that the power of the wedge was in

the proportion of the thickneſs of it to the length of one of its ſides; but from what has already been advanced, it is plain that this cannot be the caſe. The wedge, as has already been ſhown, is compoſed of two inclined planes, each of which has a perpendicular height of only one half the thickneſs of the wedge. As the power of the inclined plane therefore is always as the length to its perpendicular height, it is evident that the power of each of theſe inclined planes of which the wedge is compoſed muſt be as the length of one ſide to half the thickneſs; and conſequently the power of both muſt be as the length of both ſides is to the whole thickneſs.

The power of the wedge is exceedingly great, inſomuch that not only wood but rocks may be ſplit by it, which could ſcarce be done by any of the other powers: but in this it is aſſiſted by percuſſion of the hammer which drives it, and ſhatters the ſtone in a manner that could ſcarcely be done by any ſimple preſſure. Wedges as well as pulleys have alſo been uſed as inſtruments of torture.

§ 6. *Of the Screw.*

This is the ſtrongeſt of all the mechanical powers, though it cannot be accounted a ſimple one, as no ſcrew can be made uſe of without a lever or winch to aſſiſt in turning it. We may ſuppoſe it made by cutting a piece of paper into the form of an inclined plane or half wedge, and then wrapping it round a cylinder, as in fig. 49. From this figure it is evident that the winch which turns the cylinder muſt move once round in the time that the paper deſcribes one ſpiral; and, conſequently, if any weight or greater power of reſiſtance were applied, the winch muſt turn once round in the time that the weight would move from one ſpiral thread to another, from d to c for inſtance. Hence the force of the ſcrew will be as the circumference of the circle defined, by the lever or winch by which it is turned, is to the diſtance between the threads of the ſcrew itſelf. Thus, ſuppoſing the diſtance of the threads to be half an inch, and the length of the winch twelve inches, the circle deſcribed by the extremity of it where the power acts will be nearly 76 inches, or about 152 times the diſtance between the threads; whence a ſingle pound acting at the end of ſuch a winch would balance 152 at the extremity of the ſcrew; and as much more as can overcome the friction would turn the winch and raiſe up the weight.

Fig. 50. repreſents a machine for exhibiting the force of the ſcrew. Let the wheel C have upon its axis a ſcrew *ab*, working in the teeth of the wheel D, which ſuppoſe to be 48 in number. It is plain that every time the ſcrew *ab* and wheel C are turned round by the winch A, the wheel D will be moved one tooth by the ſcrew; and therefore in 48 revolutions of the winch, the wheel D will be turned once round. If then the circumference of a circle deſcribed by the hand of the winch A be equal to the circumference of a groove *e* round the wheel D, the velocity of the handle will be 48 times as great as the velocity of any given point in the groove. Conſequently, if the line G goes round the groove *e*, and has a weight of 48 pounds hung to it below the pedeſtal EF, a power of one pound at the handle will balance that weight. If the line G goes round the axle I inſtead of the groove of the wheel D, the force of the machine will be as much increaſed as the circumference of the groove *e* is greater than that of the axle; which ſuppoſing to be ſix times, then one pound at A will balance 288 pounds ſuſpended by the line at the axle.

The ſcrew is of very extenſive uſe in mechanics, its great power rendering it more eligible for compreſſing bodies together than any of the reſt, and the great diſparity betwixt the velocity of the handle and that of the threads of the ſcrew rendering it proper for dividing ſpace into an almoſt infinite number of parts. Hence, in the conſtruction of many mathematical inſtruments, ſuch as teleſcopes, where it is neceſſary to adjuſt the focus to the eyes of different people, the ſcrew is always made uſe of in order to move the eye-glaſs a very little nearer or farther away from the object glaſs. In the 71ſt volume of the Philoſophical Tranſactions, a new method of applying the ſcrew, ſo as to make it act with the greateſt accuracy, is deſcribed by Mr. Hunter, ſurgeon. The following are the general principles upon which this method depends:

1. That the ſtrength of the ſeveral parts of the engine be adjuſted in ſuch a manner to the force they are intended to exert, that they ſhall not break under the weight they ought to counteract, nor yet encumber the motion by a greater quantity of matter than is neceſſary to give them a proper degree of ſtrength.

2. That the increaſe of power by means of the machine be ſo regulated, that while the force we can exert is thereby rendered adequate to the effect, it may not be retarded in procuring it more than is abſolutely neceſſary.

3. That the machine be as ſimple as is conſiſtent with other conditions.

4. It ought to be as portable, and as little troubleſome as poſſible in the application.

5. The moving power muſt be applied in ſuch a manner as to act to the greateſt advantage; and that the motion ultimately produced may have that direction and velocity which is moſt adapted to the execution of the ultimate deſign of the machine.

6. Of two machines, equal in other reſpects, that deſerves the preference in which the friction leaſt diminiſhes the effect propoſed by the whole. To attain all theſe advantages in any machine is perhaps impoſſible; but in the application of the ſcrew, the following method promiſes to be attended with ſeveral of them: Let AB (fig. 51.) be a plate of metal, in which the ſcrew CD plays, having a certain number of threads in an inch, ſuppoſe 10. Within the ſcrew CD there is a female ſcrew, which receives the ſmaller ſcrew DE of 11 threads in an inch. This ſcrew is kept from moving about with the former by means of the apparatus at AFGB. But if the handle CKL be turned ten times round the ſcrew, CD will advance an inch upwards; and if we ſuppoſe the ſcrew DE to move round along with CD, the point E will advance an inch. If we now turn the ſcrew DE ten times backward, the point E will move downwards $\frac{10}{11}$ths of an inch, and the reſult of both motions will be to lift the point E $\frac{1}{11}$th of an inch upwards. But if, while the ſcrew CD is turned ten times round, DE be kept from moving, the effect will be the ſame as if it had moved ten times round with CD, and been ten times turned back; that is, it will advance $\frac{1}{11}$ of an inch. At one turn, therefore, it will advance upwards $\frac{1}{11} \times \frac{1}{10} = \frac{1}{110}$ of an inch. If now the handle be ſix inches long, the power to produce an equilibrium muſt be to the weight as 1 to $110 \times 6.2832 \times 6 = 4146.912$. Thus the force of Mr. Hunter's ſcrew is greatly ſuperior to that of the common one; for, in order to have as great a power on the plan of the latter, it muſt have 110 threads in an inch, which would render it too weak to reſiſt any conſiderable violence.

With regard to the ſecond general maxim above laid down, Mr. Hunter conſiders both kinds of ſcrews as equally applicable, only that the more complicated ſtructure, and conſequently greater expence of his ſcrew, renders it convenient to uſe the common ſcrew where only a ſmall increaſe of power is neceſſary, and his improved one where a great power is wanted. By ſhortening the handle alſo, the whole machine is rendered more portable and leſs troubleſome in the uſing.

To anſwer the fifth intention, both ſeem to be equally proper; but for the ſixth, the preference muſt be given to ſuch as beſt anſwer the particular purpoſe propoſed. Thus, if the ſcrew DE be deſigned to carry an index which muſt turn round

at the ſame time that it riſes upward, the common ſcrew is preferable; though our author alſo propoſes a method by which his ſcrew may anſwer the ſame purpoſe: with this view a ſtill ſmaller ſcrew ought to play within the ſcrew DE, and be connected with the ſcrew CD, ſo as to move round along with it. It muſt have, according to the foregoing proportions, 111 threads in an inch: and they muſt lie in a contrary direction to thoſe of CD; ſo that when they are both turned together, and CD moves upwards, this other may move downwards. At one turn this will move upwards $\frac{1}{12210}$th part of an inch, and at the ſame time will move in a circular direction; but the accuracy required in conſtructing ſuch ſcrews, even though made with fewer threads than thoſe juſt mentioned, would probably be too great for practice. In many caſes, however, ſcrews upon Mr. Hunter's principles may be of conſiderable uſe.

The theory of the ſcrew is eaſily deduced from that of the inclined plane and lever; for the threads of the ſcrew in fact form a continued inclined plane, the height of which is the diſtance betwixt the two threads, and the length is the circumference of the cylinder. Hence, without any lever, the ſcrew would have a conſiderable power, were it not for the great friction of the parts upon one another; and this friction would be much more increaſed by the perpendicular action of a weight on the top of the cylinder than by the horizontal action of a lever.

§ 7. *Other Methods of accumulating Power, which do not properly come under the Denomination of any of the mechanical Powers already deſcribed.*

From the account already given of the ſix mechanical powers, it is evident that they can do no more than accumulate, or, if we may uſe the expreſſion, *compreſs*, any degree of velocity into a ſmall ſpace. The velocity thus compreſſed becomes what we call *power*, and is capable of again impreſſing the original degree of velocity upon a body of an equal or nearly equal ſize to the firſt which originally impreſſed it; but in every caſe the abſolute quantity of motion, or of power, remains the ſame without a poſſibility of augmentation or diminution by levers, ſcrews, pulleys, or wedges. It follows, therefore, that if by any method we can preſerve for a certain time a ſmall quantity of motion, that will at the end of the time ſpecified amount to an aſtoniſhing power, which we could ſcarce at firſt have imagined to proceed from ſo ſmall a cauſe. Thus, though a man cannot raiſe a ton weight from the ground at once, he is eaſily capable of raiſing 100 pounds at once from the ground, and this for a conſiderable number of times in ſucceſſion. It is plain, therefore, that in a very ſhort time a man could in this manner raiſe the ton weight, if it were divided into 20 parts, as effectually as by a lever or other machine; though the fatigue conſequent upon ſtooping down and raiſing up his body ſo often would no doubt make the toil much greater. Even by means of a lever, however, before a man could raiſe a ton weight one foot from the ground, with the trouble of exerting a force equal to 100 pounds, he muſt have a lever 20 or 21 feet in length, and exert a conſtant force of 100 pounds, while he goes up through a ſpace of 20 feet, or pulls down a rope through that ſpace. The lever, therefore, only accumulates the power exerted in pulling or carrying the weight of 100 pounds through 20 feet, and diſcharges it all upon the ſpace of one foot; whence it is plain, that any other thing which could do this would raiſe the ton weight as effectually as the lever.

One method of accumulating a great power is by ſuſpending a very heavy body by a chain or ſtrong rope of conſiderable length. This body may be put in motion by a very ſmall degree of power more than is requiſite for bending the rope, and will acquire a vibratory motion like a pendulum: by continuing the impulſe as the body returns, it will continually acquire greater and greater force, the arches through which it moves becoming continually larger, until at laſt it might be made to overcome almoſt any obſtacle: and upon this principle the battering rams of old were conſtructed, the power of which has been already mentioned: nevertheleſs the power of one ſtroke of this engine never could exceed the accumulated power of the impulſes given to it in order to produce that ſtroke, or even quite equal it, becauſe the ſtiffneſs of the rope, and the reſiſtance of the air, muſt always take off ſomething from it.

Another method of accumulating force is by means of a very heavy wheel or cylinder, moveable about an axis. A ſmall force will be ſufficient to put this wheel in motion; and, if long continued, will accumulate in ſuch a manner as to produce ſuch effects in raiſing weights and overcoming reſiſtances, as could not by any means be accompliſhed by the application of the original moving force. On this ſubject Mr. Atwood has demonſtrated, that a force of 20 pounds applied for 37 ſeconds to the circumference of a cylinder of 10 feet radius, and weighing 4713 pounds, would, at the diſtance of one foot from the centre, give an impulſe to a muſket-ball equivalent to what it receives from a full charge of gun-powder. The ſame effect would be produced in ſix minutes and ten ſeconds by a man turning the cylinder with a winch one foot long, in which he conſtantly exerted a force of 20 pounds. In this caſe, however, as well as the former, there is not any abſolute accumulation of power; for the cylinder has no principle of motion in itſelf, and cannot have more than it receives.

This accumulation of motion, however, in heavy wheels, is of great ſervice in the conſtruction of machines for various purpoſes, rendering them greatly more powerful and eaſy to be worked by animals, as well as more regular and ſteady, when ſet in motion by water or any inanimate power. Hence the uſe of flies, ballaſt-wheels, &c. which are commonly ſuppoſed to increaſe the power of a machine, though in reality they take ſomething from it, and act upon a quite different principle.—In all machines in which flies are uſed, a conſiderably greater force muſt at firſt be applied than what is neceſſary to move the machine without it, or the fly muſt have been put in motion ſome time before it is applied to the machine. It is this ſuperfluous power which is collected by the fly, and ſerves as a kind of reſervoir from which the machine may be ſupplied when the animal ſlackens his efforts. This, we muſt obſerve, will always be the caſe with animals, for none are able to exert a great power with abſolute conſtancy; ſome intervals of reſt, even though almoſt imperceptible, are requiſite, otherwiſe the creature's ſtrength would in a ſhort time be entirely exhauſted. When he begins to move the machine he is vigorous, and exerts a great power; in conſequence of which he overcomes not only the reſiſtance of the machine itſelf, but communicates a conſiderable degree of power to the fly. The machine, when moving, yields for a time to a ſmaller impulſe; during which time the fly itſelf acts as a moving power, and the animal recovers the ſtrength he had loſt. By degrees, however, the motion of the machine decreaſes, and the animal is obliged to renew his efforts. The velocity of the machine would now be conſiderably increaſed, were it not that the fly now acts as a reſiſting power, and the greateſt part of the ſuperfluous motion is lodged in it, ſo that the increaſe of velocity in the machine is ſcarcely perceptible. Thus the animal has time to reſt himſelf until the machine again requires an increaſed impulſe, and ſo on alternately.—The caſe is the ſame with a machine moved by water, or by a weight; for, though the ſtrength of theſe does not exhauſt itſelf like that of an animal, yet the yielding of the parts of the machine renders the impulſe much leſs after it begins to move: hence its velocity

is accelerated for ſome time, until the impulſe becomes ſo ſmall that the machine requires an increaſe of power to keep up the neceſſary motion. Hence the machine ſlackens its pace, the water meets with more reſiſtance, and of conſequence exerts its power more fully, and the machine recovers its velocity. But when a fly is added to the other parts, this acts firſt as a power of reſiſtance, ſo that the machine cannot acquire the velocity it would otherwiſe do. When it next begins to yield to the preſſure of the water, and the impulſe of courſe to ſlacken, the fly communicates part of its motion to the other parts; ſo that, if the machine be well made, there is very little difference in the velocity perceptible. The truth of what is here advanced will eaſily be ſeen, from conſidering the inequality of motion in a clock when the pendulum is off, and how very regularly it goes when regulated by the pendulum, which here acts as a fly.

Flies are particularly uſeful in any kind of work which is done by alternate ſtrokes, as the lifting of large peſtles, pumping of water, &c. In this caſe the weight of the wheel employed is a principal object; and the method of calculating this is to compare it with the weight to be raiſed at each ſtroke of the machine. Thus, ſuppoſe it required to raiſe a peſtle 30 pounds weight to the height of one foot 60 times in a minute: Let the diameter of the fly be ſeven feet, and ſuppoſe the peſtle to be lifted once at every revolution of the fly; we muſt then conſider what weight paſſing through 22 feet in a ſecond will be equivalent to 30 pounds moving through one foot in a ſecond. This will be $30 \div 22$, or $1\frac{4}{11}$ pounds. Were a fly of this kind to be applied, therefore, and the machine ſet a-going, the fly would be juſt able to lift the peſtle once after the moving power was withdrawn; but by increaſing the weight of the fly to 10, 12, or 20 pounds, the machine when left to itſelf would make a conſiderable number of ſtrokes, and be worked with much leſs labour than if no fly had been uſed, though no doubt at the firſt it would be found a conſiderable incumbrance to the motion. This is equally applicable to the action of pumps; but the weight which can be moſt advantageouſly given to a fly has never yet been determined by mechanics. It is certain, however, that the fly does not communicate any abſolute increaſe of power to the machine; for, if a man or other animal is not able to ſet any mechanical engine in motion without a fly, he will not be able to do it though a fly be applied, nor will he be able to keep it in motion though ſet a-going with a fly by means of a greater power. This may ſeem to be contradicted by the example of a common clock; for, if the pendulum be once ſtopped, the weight is not able to ſet it in motion again, though it will keep it going when once put in motion by an external power. This, however, depends not upon any inſufficiency of the weight, but on the particular mechaniſm of the crown wheel; which is ſuch, that when once the pendulum is ſtopped, it would require a much greater weight than that commonly applied to ſet it in motion; and if the uſual weight was to act fairly, it would be more than ſufficient to move all the machinery, and make the pendulum vibrate alſo with much greater force than it does.

§ 8. *Of Friction.*

The doctrine of friction, according to Mr. Ferguſon, may be ſummed up in the following manner: 1. When one body inſiſts on another upon a horizontal plane, it preſſes it with its whole weight; which being equally reacted on, and conſequently the whole effect of its gravity deſtroyed by the plane, it will be abſolutely free to move in any horizontal direction by any the leaſt power applied thereto, provided both the touching ſurfaces be perfectly ſmooth. 2. But ſince we find no ſuch thing as perfect ſmoothneſs in the ſurfaces of bodies, but an evident roughneſs or unevenneſs of the parts in their ſurface, ariſing from their poroſity and peculiar texture, it is eaſy to underſtand, that when two ſuch ſurfaces come together, the prominent parts of one will in ſome meaſure fall into the concave parts of the other; and therefore, when an horizontal motion is attempted in one, the fixed prominent parts of the other will give more or leſs reſiſtance to the moving ſurface, by holding and detaining its parts; and this is what we call *friction*. 3. Now ſince any body will require a force proportional to its weight to draw it over a given obſtacle, it follows, that the friction ariſing to the moving body will always be in proportion to its weight only, and not the quantity of the ſurface by which it bears upon the reſiſting plane or ſurface. Thus, if a piece of wood four inches wide and one thick be laid upon another fixed piece of the ſame wood, it will require the ſame weight to draw it along, whether it be laid on its broad or narrow ſide. 4. For though there be four times the number of touching particles on the broad ſide *(cæteris paribus)*, yet each particle is preſſed with but $\frac{1}{4}$th of the weight that thoſe are on the narrow ſide; and ſince four times the number, multiplied by $\frac{1}{4}$th of the weight, is equal to $\frac{1}{4}$th of the number multiplied by four times the weight, it is plain the reſiſtance is equal in both caſes, and ſo requires the ſame force to overcome it. 5. The reaſon why friction is proportional to the weight of the moving body is, becauſe the power applied to move the body muſt raiſe it over the prominent parts of the ſurface on which it is drawn; and this motion of the body, as it is not upright, ſo it will not require a power equal to its whole weight; but being in the nature of the motion on an inclined plane, it will require only a part of its own weight, which will vary with the various degrees of ſmoothneſs and aſperity. 6. It is found by experiment, that a body will be drawn along by nearly $\frac{1}{3}$d of its weight; and if the ſurfaces be hard and well poliſhed, by leſs than a third part; whereas, if the parts be ſoft or ragged, it will require a much greater weight. Thus alſo the cylinder of wood AB, pl. 18. fig. 54. if very ſmooth, and laid on two well poliſhed ſupporters CD (having been firſt oiled or greaſed), and then charged with the weight of two pounds in the two equal balls GH, it will require an additional weight x, equal to about a third part of the two pounds, to give motion to or overcome the friction of the ſaid cylinder. 7. Now this additional weight, as it cauſes a greater weight of the cylinder, will likewiſe increaſe the friction; and therefore require the addition of another weight y, equal to the third part of its own weight: for the ſame reaſon, the weight y will require another z, a third part leſs; and ſo on *ad infinitum*. Hence, ſuppoſing the friction to be preciſely a third of the weight, the firſt weight with all the additional ones, viz. 2, $\frac{2}{3}$, $\frac{2}{9}$, $\frac{2}{27}$, &c. will be a ſeries of numbers in geometrical progreſſion decreaſing. Now the ſum of all theſe terms, except the firſt, is found, by a well-known theorem in arithmetic, to be equal to one pound. So that if the weight of the cylinder be inconſiderable, the readieſt way to overcome the friction would be to double the power G, or H, at once. 8. But though we may, at a medium, allow a third part of the weight with which any ſimple machine is charged for the friction ariſing from thence, yet this is very precarious, and ſeldom is the caſe: for if ABCD, fig 55. be a piece of braſs of ſix ounces, and EFGH be alſo a plate of braſs, and both the ſurfaces well ground and poliſhed, the weight P of near two ounces will be required to draw along the body AC alone; but if AC be loaded with 6, 8, or 10 lb. then a ſixth part of the weight will be ſufficient to draw it along the plane. On the other hand, if the plane be covered with a linen or woollen cloth, then a third or half part, and ſometimes more, will be requiſite to draw it along on the plane. 9. Yet notwithſtanding the difficulty and uncertainty attending the eſtimation of the quantity of friction, it is ſtill a moſt uſeful and neceſſary inquiry, how and by what

means the friction of any machine may be diminiſhed? In order to this, we muſt conſider friction mechanically, or as a force acting againſt a power applied to overcome it. Thus ſuppoſe AB, fig. 56. an upright ſtem or ſhaft, turning freely in the ſocket B fixed in the table or plane IKLM; and AC, DE, two arms fixed in the ſaid ſhaft, the latter of which, DE, has three pins going into a ſocket in the middle of heavy weights, F, G, or H, in ſuch a manner, that when a power applied at C moves the lever AC, it cauſes the lever DE to protrude or thruſt along the weights at F, G, or H, in a circular manner upon the table. 10. Now ſince we ſuppoſe the weight, all the while it is in motion, is freely and wholly ſupported by the plane, it follows, that all the reſiſtance it can give to the power applied to C, is only what ariſes from its friction on the plane. What this friction is, will be found by applying the weight at G, ſo that BG be equal to AC; for then the power applied to C, acting in a tangent to the circle CRS, that ſhall juſt move the weight G, will be equal to its friction. But if the weight be applied at F, becauſe BF is greater than AC, the ſame power at C, as before, will not move it, by reaſon its force is here increaſed, by having a greater velocity than the power; as on the other hand, if placed at H, a leſs power at C ſhall move it, becauſe of its having there leſs velocity than the power, as is evident from the properties of the lever. 11. Hence we underſtand, that though the weight of a machine remains the ſame; yet the friction may be diminiſhed, by contriving that the parts on which it moves and rubs ſhall have leſs velocity than the power which moves it: thus, if the cylinder AB (fig. 54) were to move on the two ſmall pins or gudgeons E, F, the friction would be abated in the proportion of the diameter of the cylinder to that of the pins. 12. The friction on theſe gudgeons is ſtill farther diminiſhed by cauſing them to move on the circumference of a wheel: thus, let F be the gudgeon of the cylinder, revolving on the wheel CDE (fig. 57.), the velocity of the wheel's circumference will be the ſame with that of the gudgeon: but the velocity of the wheel's axis AB (which is now to be conſidered as the rubbing part) is leſs than that of the wheel, in proportion as its diameter is leſs than that of the wheel: for example, if the friction of the cylinder moving on its ſurface be $\frac{1}{3}$d part of the weight, and the gudgeon be to the cylinder as 1 : 10, they will reduce the friction to $\frac{1}{30}$th part; and if, again, the axis of the wheel be to the wheel as 1 : 10, the wheel will reduce the friction to $\frac{1}{300}$th part; and if the axis of this wheel be laid on the perimeter of another wheel, the friction will be reduced to a ſtill leſſer part of the weight; ſo that you may proceed in this manner to diminiſh the friction *ad infinitum*; and wheels applied in this manner are called *friction-wheels*. 13. Beſides what has been already ſaid, ſomewhat farther is neceſſary to diminiſh the friction of wheel-carriages. It was before obſerved, that friction aroſe chiefly by lifting the body over the prominent parts of the plane on which it is moved: now if we can contrive to move the body along without lifting or ſuſtaining its weight, we ſhall move it without much friction; and this may be done by laying the body on any moveable circular ſubject, as rollers, wheels, &c.: becauſe the aſperities of its ſurface will lay hold on thoſe of the roller, and move it likewiſe; and it is as evident, that when the body is drawn againſt the prominent parts of the roller, they immediately give way, and make no reſiſtance. By this circular motion of the roller, its prominent parts below do only deſcend and move upon or over, and are not drawn againſt, the fixed prominent parts of the plane, and ſo receive no reſiſtance from them. Hence the body is conveyed along without being lifted up, in the ſame manner as a wheel is moved by a pinion without any conſiderable reſiſtance.

SECT. III. *Of the Combinations of the Mechanical Powers.*

FROM what has been already laid down concerning the mechanical powers in particular, we have ſeen that none of them is capable of augmenting the abſolute force of any acting ſubſtance; and from thence we may juſtly conclude, that no combination of them can do ſo. In fact, theſe combinations are very often detrimental, and occaſion a great loſs of power by friction. This is the great obſtacle in mechanics, and muſt always be greater in complex than in ſimple machines; and therefore the latter are always to be preferred, excepting where conveniency requires ſome degree of complication. The lever being the ſimpleſt machine, and that attended with leaſt friction, is always to be uſed where it is requiſite to raiſe weights for a ſmall way. It may likewiſe be uſed with propriety where bodies are to undergo a long continued degree of preſſure, and where they yield but little. For this purpoſe the lever ought to be of the ſecond kind, repreſented fig. 28, where one end being fixed at A, a weight may be put upon the other extremity B, and the body to be preſſed put at 1, 2, or any of the intermediate diviſions, according to the degree of preſſure it is deſigned to undergo. This has the advantage of giving a long and very equable preſſure, and is a very advantageous method of preſſing cheeſe, or other things which do not require a very great exertion of force. Where this is requiſite we muſt employ wedges or ſcrews; but both theſe have the diſadvantage of ſlackening their preſſure on the leaſt yielding of the materials to be preſſed. Wedges therefore require to be almoſt conſtantly driven, and ſcrews to be turned by a lever, in order to produce a conſtant preſſure. In oil mills the preſſure is produced by wedges, which are conſtantly driven by great mallets lifted up by the force of the mill. Oil of ſweet almonds is made by means of a preſs driven by a ſcrew, and turned by a long lever aſſiſted by a capſtan.

Where it is neceſſary to have a conſiderable weight raiſed to ſome height, the pulley is the moſt uſeful power, but the friction is extremely great; the axis in peritrochio combined with a ſingle pulley will anſwer the purpoſe extremely well, and with leſs friction than any machine compoſed of pulleys alone. The machines called *cranes* are generally combinations of theſe two; and are very much uſed, eſpecially by the commercial people, for raiſing goods out of ſhips, drawing them up into warehouſes, and for lowering them down. In theſe operations we muſt obſerve, that lowering goods is much more dangerous than raiſing them, on account of the vaſt increaſe of velocity which bodies acquire every moment by the power of gravity. In the conſtruction of cranes, therefore, it is abſolutely neceſſary to attend to this circumſtance, and to guard againſt accidents. The following are recommended by Mr. Ferguſon: fig. 52, in plate 18, ſhows one crane well calculated for the purpoſes juſt mentioned. When the rope H is hooked to the weight K, a man turns the winch A, on the axis whereof is the trundle B, which turns the wheel C, on whoſe axis D is the trundle E, which turns the wheel F with its upright axis G, on which the great rope HH winds as the wheel turns; and going over a pulley I, at the end of the arm *d* of the gib *cde*, it draws up the heavy burden K; which being raiſed to a proper height, as from a ſhip to the quay, is then brought over the quay by pulling the wheel Z round by the handles *z*, *z*, which turns the gib by means of the half wheel *b* fixed on the gib-poſt *cc*, and the ſtrong pinion *a* fixed on the axis of the wheel Z. This wheel gives the man that turns it an abſolute command over the gib, ſo as to prevent it from taking any unlucky ſwing, ſuch as often happens when it is only guided by a rope tied to its arm *d*; and people are frequently hurt, ſometimes killed, by ſuch accidents.

The great rope goes between two upright rollers *i* and *k*, which turn upon gudgeons in the fixed beams *f* and *g*; and as the gib is turned towards either ſide, the rope bends upon the roller next that ſide. Were it not for theſe rollers, the gib

would be quite unmanageable; for the moment it were turned ever ſo little towards any ſide, the weight K would begin to deſcend, becauſe the rope would be ſhortened between the pulley I and axis G; and ſo the gib would be pulled violently to that ſide, and either be broken to pieces, or break every thing that came in its way. Theſe rollers muſt be placed ſo that the ſides of them, round which the rope bends, may keep the middle of the bended part directly even with the centre of the hole in which the upper gudgeon of the gib turns in the beam *f*. The truer theſe rollers are placed, the eaſier the gib is managed, and the leſs apt to ſwing either way by the force of the weight K.

A ratchet-wheel Q is fixed upon the axis D, near the trundle E; and into this wheel falls the catch or click R. This hinders the machine from running back by the weight of the burden K, if the man who raiſes it ſhould happen to be careleſs, and to leave off working at the winch A ſooner than he ought to do.

When the burden K is raiſed to its proper height from the ſhip, and brought over the quay by turning the gib about, it is let down gently upon the quay, or into a cart ſtanding thereon, in the following manner: A man takes hold of the rope *tt* (which goes over the pulley *v*, and is tied to a hook at S in the catch R), and ſo diſengages the catch from the ratchet-wheel Q; and then, the man at the winch A turns it backward, and lets down the weight K. But if the weight pulls too hard againſt this man, another lays hold of the handle V, and by pulling it downward draws the gripe U cloſe to the wheel Y, which by rubbing hard againſt the gripe hinders the too quick deſcent of the weight; and not only ſo, but even ſtops it at any time if required. By this means, heavy goods may be either raiſed or let down at pleaſure, without any danger of hurting the men who work the engine.

When part of the goods are craned up, and the rope is to be let down for more, the catch R is firſt diſengaged from the ratchet-wheel Q, by pulling the cord *t*; then the handle *q* is turned half-round backward, which, by the crank *n n* in the piece *o*, pulls down the frame *h* between the guides *m* and *m* (in which it ſlides in a groove), and ſo diſengages the trundle B from the wheel C: and then the heavy hook β at the end of the rope H deſcends by its own weight, and turns back the great wheel F with its trundle E and the wheel C; and this laſt wheel acts like a fly againſt the wheel F and hook β, and ſo hinders it from going down too quick: whilſt the weight X keeps up the gripe U from rubbing againſt the wheel Y, by means of a cord going from the weight over the pulley *w* to the hook W in the gripe; ſo that the gripe never touches the wheel unleſs it be pulled down by the handle V.

When the crane is to be ſet at work again for drawing up another burden, the handle *q* is turned half round forwards; which, by the crank *n n*, raiſes up the frame *h*, and cauſes the trundle B to lay hold of the wheel C; and then, by turning the winch A, the burden of goods K is drawn up as before.

The crank *n n* turns pretty ſtiff in the mortiſe near *o*, and ſtops againſt the farther end of it when it has got juſt a little beyond the perpendicular; ſo that it can never come back of itſelf; and therefore the trundle B can never come away from the wheel C until the handle *q* be turned half round.

The great rope runs upon rollers *pp* in the lever LM, which keep it from bending between the axle at G and the pulley I. This lever turns upon the axis N by means of the weight O, which is juſt ſufficient to keep its end L up to the rope; ſo that, as the great axle turns, and the rope coils round it, the lever riſes with the rope, and prevents the coilings from going over one another.

The power of this crane may be eſtimated thus: Suppoſe the trundle B to have 13 ſtaves or rounds, and the wheel C to have 78 ſpur cogs; the trundle E to have 14 ſtaves, and the wheel F 56 cogs: then, by multiplying the ſtaves of the trundles, 13 and 14, into one another, their product will be 182; and by multiplying the cogs of the wheels, 78 and 56, into one another, their product will be 4368; and dividing 4368 by 182, the quotient will be 24: which ſhows that the winch A makes 24 turns for one turn of the wheel F and its axle G, on which the great rope or chain HIH winds. So that if the length or radius of the winch A were only equal to half the diameter of the great axle G, added to half the thickneſs of the rope H, the power of the crane would be as 24 to 1: but the radius of the winch being double the above length, it doubles the ſaid power, and ſo makes it as 48 to 1: in which caſe, a man may raiſe 48 times as much weight by this engine as he could do by his natural ſtrength without it, making proper allowance for the friction of the working parts. Two men may work at once, by having another winch on the oppoſite end of the axis of the trundle under B, and ſo make the power ſtill double

If this power be thought greater than what may be generally wanted, the wheels may be made with fewer cogs in proportion to the ſtaves in the trundles; and ſo the power may be of whatever degree is judged to be requiſite. But if the weight be ſo great as will require yet more power to raiſe it (ſuppoſe a double quantity), then the rope H may be put under a moveable pulley, as δ, and the end of it tied to a hook in the gib at ε; which will give a double power to the machine, and ſo raiſe a double weight hooked to the block of the moveable pulley.

When only ſmall burdens are ſo raiſed, this may be quickly done by men puſhing the axle G round by the handſpokes *y, y, y, y*; having firſt diſengaged the trundle B from the wheel C: and then, this wheel will only act as a fly upon the wheel F; and the catch R will prevent its running back, if the men ſhould inadvertently leave off puſhing before the burden be unhooked from β.

Laſtly, when very heavy burdens are to be raiſed, which might endanger the breaking of the cogs in the wheel F; their force againſt theſe cogs may be much abated by men puſhing round the handſpokes *y, y, y, y*, whilſt the man at A turns the winch.

We have only ſhown the working parts of this crane, without the whole of the beams which ſupport them; knowing that theſe are eaſily ſuppoſed, and that if they had been drawn, they would have hid a great deal of the working parts from ſight, and alſo confuſed the figure.

Another very good crane is made in the following manner: AA (fig. 53) is a great wheel turned by men walking within it at H. On the part C of its axle BC the great rope D is wound as the wheel turns; and this rope draws up goods in the ſame way as the rope HH does in the above-mentioned crane, the gib-work here being ſuppoſed to be of the ſame ſort. But theſe cranes are very dangerous to the men in the wheel; for, if any of the men ſhould chance to fall, the burden will make the wheel run back and throw them all about within it; which often breaks their limbs, and ſometimes kills them. The late ingenious Mr. Padmore of Briſtol (whoſe contrivance the fore-mentioned crane is), obſerving this dangerous conſtruction, contrived a method for remedying it, by putting cogs all around the outſide of the wheel, and applying a trundle E to turn it; which increaſes the power as much as the number of cogs in the wheel is greater than the number of ſtaves in the trundle: and by putting a ratchet-wheel F on the axis of the trundle (as in the above-mentioned crane), with a catch to fall into it, the great wheel is ſtopt from running back by the force of the weight, even if all the men in it ſhould leave off walking. And by one man working at the winch I, or two men at the oppoſite winches when needful, the men in the wheel are much aſſiſted, and much greater weights are raiſed,

than could be by men only within the wheel. Mr. Padmore put alſo a gripe-wheel G upon the axis of the trundle, which being pinched in the ſame manner as deſcribed in the former crane, heavy burdens may be let down without the leaſt danger. And before this contrivance, the lowering of goods was always attended with the utmoſt danger to the men in the wheel; as every one muſt be ſenſible of who has ſeen ſuch engines at work. And it is ſurpriſing that the maſters of wharfs and cranes ſhould be ſo regardleſs of the limbs, or even lives, of their workmen, that, excepting the late Sir James Creed of Greenwich, and ſome gentlemen at Briſtol, there is ſcarce an inſtance of any who has uſed this ſafe contrivance.

We ſhall deſcribe here four new cranes invented and made by Mr. Gottlieb in London, who deſcribes them as quite new in their principles, and more ſimple and uſeful than any hitherto contrived. Fig. 59 is a repreſentation of a crane adapted for a large warehouſe, where heavy goods are wanted to be drawn up from a cart or quay. One of this conſtruction has lately been erected in Mr. Camden's ſugar-houſe, Old Gravel-lane, London. Its operation is as follows: The horſe yoked below at A turns the upright axis and the wheel B, which is about 6 feet in diameter; this turns a 3 feet wheel C, having an upright axis D through the floor turning with it, and carrying a 3 feet wheel E with perpendicular cogs. The wheel E turns two pinions F and G, the former of 8 inches in diameter, and the latter of 5 inches diameter, both fixed upon one axis. The pinion G turns a 3 feet wheel H, to which are fixed the barrel I and wheel W. The rope K winds round the barrel, and comes over the ſheiff-wheel L in the upper ſtory, and the pulley M in the gib-head drawing up the goods ſuſpended at the hook N.

By a mark made upon the rope at I, the man ſuperintending the crane knows when the goods are raiſed enough for landing into the room: he then immediately puſhes aſide the upright piece O, diſengages the lever P from it; and by putting it downwards, the action of the quarter pinion at Q raiſes up the pinion at G, and thereby unconnects it with the wheel H. To prevent the machinery now from running backwards, a ratchet-wheel R is fixed upon the wheel H, into which a click-catch S falls. This effectually prevents the wheels going backwards by the weight at N while the man above is employed in landing the goods. When the goods are brought into the ſtore-room, the hook N is thrown out, and the man below, from the uſual call, runs to the handle U, ſlides the pinion T into the wheel H, then turns back the ratchet-wheel R, and puſhes back the click S, then ſlides back again the pinion T; and the wheel H and barrel I being thus at liberty, the hook N and rope run down by their own gravity, and freſh goods are attached: then again, from the uſual call, the man puſhes up the lever P, fixes it at O, places the click S into the teeth of the ratchet-wheel; and the whole machinery is again in action from the horſe below, that keeps conſtantly going, without being ſtopped at every ſhort interval of the landing, ſtoring, &c.

When the goods are to be carted off, and required to be let down only, it is performed without the horſe, and in the following manner: The pinion G is diſengaged from the wheel H by the lever P as before, and the pinion V of the fly-wheel is ſlipped into the teeth of the 2 feet wheel W. The goods being ſuſpended at N, will act by the rope upon the wheel W and pinion V, thereby turning round the fly-wheel X: while the goods are thus deſcending, the man preſſes upon the lever Y, and bears againſt the wheel, making ſuch a reſiſtance as to be ſufficient to allow the goods to deſcend with as gentle a degree of motion as may be neceſſary. The hook N being taken from the goods, the man goes to the wheel W, and with his hands turns it round, which winds up the cord and hook in readineſs for more goods, and ſo on as before. The pinions T and V in this caſe are ſlipped out of the wheels H and W.

As the horſe at A may likewiſe be uſed to turn other mill-work from a connection made with the main-wheel, and ſuppoſing that the crane is not wanted at the ſame time, it is readily diſengaged by turning of the winch at Z; which, by the pinion *a* below, working into the teeth of the bar, and the wheel C which turns upon it, quite unconnects the wheel C from the crane.

It is therefore evident, from what has been deſcribed, that this crane can be managed by two men only, and occaſionally without a horſe, when very heavy goods are not raiſed. All the neceſſary beams for fixing the machinery by, could not be repreſented in the figure without obſcurity and confuſion; but theſe being omitted, will not to the moſt ordinary mechanic render the general conſtruction of the crane difficult to underſtand.

A new portable *cellar-crane* is repreſented in fig. 60. which is very uſeful to wine-merchants, brewers, &c. in drawing up and letting down caſks full of wine, beer, &c. It ſaves the trouble and inconvenience of horſes, and in many places can be uſed where horſes could not. AA are two wooden props about 6 feet in height, and jointed together like a ruler at E. They are connected to each other by an iron round bar C and wooden bar at the bottom D. The iron prongs EE faſten the uprights ſteadily to the edge of the cellar; F is the axis round which two ropes are coiled, the ends of which are faſtened to the two clamps GG. On the axis F is fixed the iron wheel H of 3 feet in diameter: in the teeth of this works the pinion I of about 6 or 7 inches in diameter, and is turned by the handle at K.

It is evident by a bare inſpection of the figure, that when the two ropes are ſlipt over the ends upon the barrel, either at the top or bottom of the cellar, by turning of the winch K towards or from you, the barrel can be ſafely and expeditiouſly taken out or lowered down. When the crane is done with, it ſhuts up by unſcrewing the nut at B, taking the wheel and axis away out of the loops at L, and folding the ſides at A together like a jointed rule; it may then be taken away in the cart or dray, or taken in the men's hands.

Fig. 61. repreſents a portable *ſtone-crane* mounted in a wooden frame and ſtage, which is judged to be very uſeful for loading and unloading carts with large heavy ſtones. It is moveable to any part of a ſtone-yard or ground; the frame is ſufficiently wide for a cart to draw under the crane, and at any time it may be taken to pieces. The frame AAAA is made of wood, is about 9 or 10 feet high, and about 9 feet ſquare. The wheels BB are of iron, and are about 3 feet in diameter, and the pinion D, that is fixed to the axis of the firſt wheel B, 8 inches in diameter; on the axis of the ſecond wheel B, the axis round which the rope coils is fixed. Now the ſtones being corded and hooked at the end of the rope, it is very evident that the man at C will either raiſe or lower them as may be neceſſary, according as he turns the winch towards or from him, and in a ſafe and very eaſy manner.

Fig. 62 is a repreſentation of a *crane-carriage* which Mr. Gottlieb conceives to be very uſeful in moving large ſtones in quarries, where carts and horſes cannot be conveniently or at all managed. Its principle is evidently clear from a bare view of the figure. It conſiſts only of two ſets of crane-wheels applied to the two ſets of wheels belonging to the carriage; ſo that two men, one at each winch AA, turning the pinions and wheels round, ſhall act upon the carriage wheels and move it along. By their both turning forwards or backwards, the carriage goes accordingly; but if they turn contrary ways, the carriage will be turned round, or partly ſo, as may be wanted. The pinion B is 6 inches in diameter, which turns

the wheel C of 3 feet diameter, on the axis of which is fixed the pinion D of 1 foot diameter, which works into 2 wheels E, E, of 3 feet 6 inches diameter, that are fixed upon the carriage-wheels, and give motion to the whole machine.

The friction of the axle-trees of these machines may be considerably diminished, by applying an improved axle-tree invented by Mr. Gottlieb, which he calls the *anti-attrition axle-tree*, and for which he has a patent. It is formed from a steel roller, from 4 to 6 inches long, turning within a groove cut in the iron part of the axle; and the advantages discovered by experiments made by Mr. Gottlieb will be seen by the small table subjoined. A section of this axle-tree is represented in pl. 19. fig. 65. where *a* is the axle-tree, *b* the groove, *c* the roller, *d* the cavity between the lower part of the tree and the box *e*. In figs. 66, 67, *f* represents the oil-vessel supplying it with oil, *g* the tube to convey the oil by, *h* the straps of ditto, *i* the fastening screws. Figs. 63, 64, give a side view of the axle. The comparative advantages of this anti-attrition axle-tree are stated thus:

	Old axle-tree.		Anti-attrition.	
	lb.	oz.	lb.	oz.
Coaches - - -	60	0 only	19	0
Chariots, post-chaises, &c.	49	1	17	6
Single horse chaises and chairs	31	7	6	8
Waggons - - -	78	0	33	0
Drays for beer - -	138	0	48	0

One general maxim to be kept in mind by all mechanics is, that whatever a machine gains in power it loses in time, even supposing friction were entirely out of the question. It must likewise be remembered, that in almost all cases where a machine gains by complication, it will lose one third by mere friction, unless its parts are made with an accuracy not to be expected. In some cases, however, a great power must be had; and in these we must have recourse to the most simple machines, which will lose only time, and but little power by friction; for the complicated ones waste both time and power to a great degree. There is not perhaps a better method of procuring a very great power than by combining a screw with a toothed wheel which acts as an axis in peritrochio, as is represented in pl. 18. fig. 50; for by making the threads of the screw pretty close, and the diameter of the wheel large, we may increase the power almost to any degree we please, without any considerable increase of friction. In this case, where it can conveniently be done, it is better to increase the diameter of the wheel than to add another, for this augments the power without any sensible augmentation of the friction; and it is absolutely necessary to have the axle as small as can be made of sufficient strength to bear the weight. Archimedes is said to have boasted that he could move the earth, provided he could find a place to stand on; and Bishop Wilkins, that he could pull the strongest oaks up by the roots by means, of a single horse-hair. But abstracting from the impossibility in the case of Archimedes, it does not appear that the bishop could more easily have fulfilled his task, on account of the immense friction of the machine he must have employed, and the stiffness of the great ropes which must have been bent in order to accomplish his purpose. To perform feats of this kind, a lever seems more likely than any thing; but the vast room it takes up, and the excessive length requisite to make it act with sufficient force, together with the vast weight it must necessarily have if made of the requisite strength, must easily convince us that all such extravagant boasts are vain, and that wherever great effects are to be accomplished a great power must originally be applied.

It is necessary here, before we dismiss the subject of cranes, to describe those delineated in pl. 88. vol. ii. We shall begin with that of Mr. White, who obtained a premium for this invention from the Society of Arts, &c.

The excellencies of this crane are, 1. Its simplicity; consisting of a mere wheel and axle. 2. Its only friction being that on the two gudgeons of the shaft; and one of these supports the weight of the wheel and of the workman nearly in the direction of its point. 3. Its durability on account of the foregoing properties. 4. Its security; for it cannot move but at the pleasure of the man who works it. 5. Its admitting of a variety of different powers, and this advantage also being obtained without the least alteration of any part of the machine.

The following is an explanation of the engraved figure. A is a circular inclined plane, moving on a pivot underneath, and carrying round with it the axis E. A person walking on this plane, and pressing against the lever B, throws off the gripe D by means of an iron rod C; and thus admits the plane and its axis to move freely, and raise the weight G by the coiling of the rope F round the axis E.

To show more clearly the form of the lever and gripe, we have given in the plate a plan of the circular inclined plane. In this, when the lever B is in the situation in which it now appears, the spring or gripe D presses the periphery of the plane as shown by the double line, and the machine cannot move; but when the lever B is pressed out to the dotted line H, the gripe is also thrown off to the dotted line I, and the whole machine can then move. One end of a proper rope is fixed near the end of the lever, and the other end to one of the uprights, in order to prevent the lever moving too far when pressed by the man.

In the plate last referred to is also a representation of Mr. Dixon's *Contrivance for preventing accidents from wheel cranes*. Of this useful invention it is only necessary to give the following description. AA shows the axis or spindle of the walking-wheel. BB, two preservative wheels fixed on the axis, and having near their peripheries six pulleys, over which ropes run, that are fastened at their extremities to two segments of circles CC. These are united by a wooden bar D, which the men are to lay hold on, as expressed in the figure, and suspend themselves by in case of danger.

Sect. IV. *Of Wheel-carriages.*

WHEEL-CARRIAGES in general signify all kinds of machines furnished with wheels for drawing great weights by means of the strength of animals or otherwise.

It is very probable, that in the infancy of the arts, sledges were used before wheels were invented, or at least before the application of them became very general. Homer mentions them as employed in bringing wood for the funeral of Patroclus; though it is not to be doubted that the Greeks at that time were acquainted with the use of wheels, as the same poet mentions them on all occasions when speaking of the war chariots of his heroes. It is possible, therefore, that by the country people, for inferior purposes, the sledge might be employed, while wheel-carriages were confined to those of superior rank, or used only for war-chariots. It is not long ago, indeed, since sledges were used for certain purposes in our own country, notwithstanding the number of wheel-carriages used in it from time immemorial. In some of the cold countries, where ice is met with in great quantity, and the ground is covered with frozen snow for a great part of the year, sledges are still used, and run upon the smooth surfaces of these bodies with as great ease as wheels run upon the ordinary ground. Upon very smooth ice, indeed, or upon any body perfectly smooth, wheels would not turn at all; for the only reason why they turn in the ordinary way, is the continual inequality they meet with. If we suppose the wheels to be carried in the air, it is plain that they would not turn, there being nothing to put any part

in motion more than another; and the ſame would be the caſe if we could ſuppoſe ice, or any other body, to be ſo ſmooth that it would give as little reſiſtance as air. On common roads, however, the wheels meet with obſtructions at the bottom, which retard that part; and in conſequence of this the upper part moves forward, and a circulating motion immediately begins to take place. By means of this circulatory motion the friction becomes very much leſs than what it would be if the weight were drawn along the ground upon a ſledge, inſomuch that, according to the computation of Dr. Helſham, a four-wheeled carriage may be drawn with five times as much eaſe as one that ſlides upon the ſame ſurface as a ſledge.

The ſtructure of wheel-carriages is ſo generally known, that it is needleſs to deſcribe them. In the conſtruction of them, however, there are ſeveral particulars to be obſerved, which may render one method of conſtruction preferable to another, though there may be a general ſimilarity between one carriage and another. In order to aſcertain the moſt proper method for conſtructing them, it will firſt be neceſſary to conſider the obſtacles which occur to their motion. Theſe are,

1. *The vis inertiæ of matter.*—This, though for a conſiderable time ſuppoſed to be a principle of mere *inactivity*, or *reſiſtance* to any change of ſtate from motion to reſt in material bodies, is now almoſt exploded. Mr. Anſtice, in a late treatiſe on wheel-carriages, ſuppoſes the philoſophers who maintain the exiſtence of ſuch a principle to have miſtaken Sir Iſaac Newton and other great men. According to him, they meant no more by the *vis inertiæ* of matter than a mere paſſiveneſs in it, by which it was diſpoſed to abide in that ſtate, either of reſt or motion, in which it originally was; "whereby it alters not its ſtate but in proportion to the quantity of power exerted againſt it. Thus, ſhould a body of any given weight or quantity of matter, moving with a certain degree of velocity, ſtrike another body at reſt of the ſame weight, it would communicate half its motion to that body, and they would move together with the ſame velocity as the firſt; but this proceeds from no principle of the body at reſt to reſiſt motion, it does not deſtroy in the other more than it receives from it; therefore no motion is loſt, it is only divided; and the two, after diviſion, have a power equal to that of the one before it, with the whole velocity of motion. Indeed, when we conſider that the leaſt degree of motion in any body, however ſmall, will communicate ſome degree of it to the largeſt in the univerſe; and that, on the contrary, none but an equal degree of impetus can deprive a body of actual motion, and that immediately oppoſed to it; add to this, that ſince all matter within the reach of our obſervation, and by analogy we have reaſon to think it, is in actual and rapid motion, impreſſed on it by its great Creator, and co-exiſtent with it; we may conclude, that if matter do not affect, it is more liable to motion than to reſt."

2. *Friction.* By this is meant the quantity of motion deſtroyed by bodies ſliding over one another, and which is in proportion to the weights laid upon them. See Sect. II. § 8.

Friction depends not only upon the preſſure made on the moving bodies, but on the inequalities on the ſurfaces upon which they move. For, as the ſurfaces of even the moſt highly poliſhed bodies have ſome inequalities, whenever two of them are preſſed together, the inequalities of the one muſt enter, and in ſome degree accommodate themſelves to thoſe of the other; and as the forms of theſe inequalities are of infinite variety, it is impoſſible to give any general deſcription which can exactly anſwer to every one of them.

Mr. Anſtice ſuppoſes the varieties only to be of two kinds, which he thinks may not be very diſſimilar to any that occur. 1. Let us imagine two ſliding ſurfaces, when viewed through a microſcope, to preſent ſuch an appearance as is repreſented in fig. 69. pl. 19. in which A is the ſliding body to be moved in the direction C D over the fixed body B. To effect this, it is evident, that either the teeth muſt be violently broken off, or a power applied to them ſufficient to make them ſlide upon each other on the principles of the inclined plane; in which caſe the friction muſt always be in proportion to the weight of the ſlider, and that with which it is loaded, without regard to the length or breadth of the bearing ſurface: for, if only one pound reſted upon one tooth, there would be no more but that pound to be lifted. If the pound reſted upon two teeth, there would only be half a pound to be lifted over each, and ſo on to any number; but if we ſuppoſe the teeth to be of ſuch a ſhape that they cannot act as inclined planes, let them be ever ſo ſtrong, we muſt calculate the friction in a different manner.

Let ſurfaces of this kind be repreſented by fig. 70. In which caſe it is evident, that inſtead of depending on the weight or preſſure only, it will be in proportion to the number and ſtrength of the teeth ſo locked together; or, in other words, on the length and breadth of the rubbing ſurfaces. On this ſuppoſition, the weight of the ſlider will have little or no effect in breaking the teeth, or hindering its being done by the power applied in the longitudinal direction; but if one tooth is to be broken, it will be neceſſary to apply twice that power to break two, thrice the power to break three, &c. Hence it is evidently impoſſible to form any general rule concerning the friction which takes place on this principle. As experience, however, has ſhown that two bricks, or other bodies of that kind, are almoſt as eaſily drawn along a table when placed ſide by ſide, as when laid upon each other, it ſeems probable that ſuch a locking of parts ſeldom occurs; and when it does, the obſtacles are ſoon broken down. Yet it is certain, that ſome ſuch thing muſt take place on all occaſions, otherwiſe the wearing of bodies which rub upon one another could not happen.

From what has been ſaid it muſt appear plain, that if a ſlider be laid upon an horizontal plane, it muſt remain at reſt; though by a very ſmall force, ſuch as is barely ſufficient to overcome the friction, it will be ſet in motion: becauſe, on a plane quite horizontal, the motion of any body does not remove it in the leaſt farther from the point to which it is attracted by the force of gravity. If the plane be inclined to the horizon, then, beſides the power neceſſary to overcome the friction, it will be neceſſary to have one ſufficient alſo to overcome that of gravity, by which it is determined to roll down the plane; the proportion of which is aſcertained under Sect. II. § 4. The difficulty of raiſing great weights in this manner, however, where the aſcent is ſteep, and the ways rough, muſt neceſſarily be ſo great, that ſledges could not be uſed with any advantage, and therefore wheels are indiſpenſable.

The advantage of wheels over ſledges may be further underſtood from the following conſiderations: 1. A ſledge, in ſliding over a plane, ſuffers a friction equivalent to the diſtance through which it moves; but if we apply to it an axle, the circumference of which is ſix inches, and that of the wheels eighteen feet, it is plain, that moving the carriage eighteen feet over the plane, the wheels will make but one revolution; and as there is no ſliding of parts between the plane and the wheels but only a mere change of ſurface, no friction can take place there, the whole being transferred to the nave acting on the axle, ſo that the only ſliding of parts has been betwixt the inſide of the nave and the axle; which, if they fit one another exactly, is no more than ſix inches: and hence it is plain, that the friction muſt be reduced in the proportion of one to thirty-ſix. Another advantage is alſo gained, by having the ſurfaces confined to ſuch a ſmall extent; by which means they may be more eaſily kept ſmooth, and fitted to each other. The only inconvenience is the height of the wheel, which muſt in all caſes be added to that of the carriage itſelf.

It has been a matter of no little conſideration, whether the

wheels of a carriage ought to be ſmall or large; and this ſubject Mr. Anſtice has treated in a very particular manner. He obſerves, that in the overcoming of ſuch obſtables as are commonly met with in roads, wheels act as mechanical powers, and therefore the ſize of the wheel muſt be regulated upon the principles of theſe powers. Thus, let the circle OTAGL, fig. 71, repreſent a wheel of four feet diameter, placed on the level PQ, and oppoſed in that line by the obſtacle O, which is ſuppoſed to be 7.03 inches in height; the line in which the carriage is drawn being CT, parallel to the plane PQ. In this caſe the effort applied to the carriage is communicated to the nave of the wheel where it touches the axle. This part, therefore, repreſents the part of the lever to which the power is applied, and is the point C in the figure. As the turning point is that where the wheel touches the obſtacle, that muſt repreſent the fulcrum of the lever; whence that arm of the lever will be repreſented by CO, which may be ſuppoſed a ſpoke of the wheel: and as the upright ſpoke CL is in the line which bears the whole weight from the axle, and in which it is to be lifted; hence that part of the circumference of the wheel which is between the fulcrum and the upright ſpoke bearing on it, muſt repreſent the arm of the lever which is to raiſe the weight. In this caſe neither the weight nor the power act at right angles to their reſpective arms of the lever; ſo that we muſt repreſent their powers by the imaginary lines MO and ON. As the length of OM, therefore, is to that of ON; ſo is the proportion required to the weight to balance it on the obſtacle, when riſing over it; and as in this caſe the arms are equal, it is plain that the powers muſt be ſo likewiſe. Every obſtacle, therefore, exceeding this height, which is as 7.03 to 48, will require a power acting parallel to the plane greater than the weight drawn; and every obſtacle whoſe height bears a ſmaller proportion to that of the nave, muſt be overcome by a ſmaller power.

Again, let a wheel of four feet diameter be repreſented by the circle in fig. 72. and ſuppoſed to be moved along the plane PQ, and an obſtacle of twelve inches height be placed before it, the real lever will then be repreſented by the lines LOC: which being reduced to the imaginary ones MON, ſhows that the power is greater than the weight. By the ſame rule, if an obſtacle of three inches be placed in the way of a wheel, as in fig. 73 the power required to move the wheel will be conſiderably leſs than the weight, though it is plain that the proportion of power muſt always be according to the ſize of the wheel, the height of the obſtacle, and the direction in which the carriage is drawn. For inſtance, if the line of traction in fig. 73 be raiſed into the direction CS, the power required to move the carriage over it will be to the real weight as the line CO is to the line ON; and by thus altering the direction, we gain as much as the length of the line CO exceeds that of ON.

This view of the manner in which the wheels of carriages act, will ſerve to elucidate the queſtion, whether large or ſmall wheels are preferable for carriages? Let the circle fig. 74. repreſent a wheel of two feet diameter, and the obſtacle in its way 7.03 inches in height; then will the true lever be repreſented by the lines COL, to be reduced to the imaginary ones MON. In this caſe, the power required to draw the carriage muſt be to its weight as NO is to OM, which is more than double, and thus the advantage of large wheels over ſmall ones is evident. In this, however, as in all other caſes where wheels act as mechanical powers, we muſt remember, that the ſame doctrine applies to them as to the powers themſelves when uſed in any other manner, viz. that as much as we gain in power we loſe in time; and therefore, though a wheel of twice the diameter may be raiſed over an obſtacle of any given height with twice the eaſe that would be required for one of once the diameter, yet the large wheel would require twice the time to move over it that the ſmall one does.

Hitherto we have conſidered the carriage as being drawn in a direction parallel, or nearly ſo, to the plane on which the wheels move, which line is ſuppoſed to be horizontal: but the caſe will be different when we ſuppoſe them to move upon an inclined plane; for then, even though the line of traction be parallel to the aſcending plane, and though the wheels act as levers, we ſhall find that the action of the weight will increaſe with the power gained by the increaſe of ſize in the wheels; and, conſequently, that the increaſed ſize of the latter will be of no farther uſe than that of diminiſhing the friction, in the ſame manner as is done upon horizontal planes.

To illuſtrate this, ſuppoſe the larger circle in fig. 75. to repreſent a wheel of four feet diameter, and the ſmaller circle a wheel of only two, both of which are made to aſcend the inclined plane LM, by powers applied in the directions GI and ES parallel to the elevation of the plane, which is 45 degrees; it will then be found, that by deſcribing the lever as in the former caſe, though the arm of the lever to which the power is applied be double the length in the large wheel that it is in the ſmall, the other is augmented in the ſame proportion. Neither will the powers be augmented by varying the direction of the line of traction: for, while theſe are kept parallel to one another, their relative powers muſt always keep the ſame proportion to one another. The reaſon is obvious, viz. that when wheels of any dimenſion aſcend or deſcend inclined planes of any regular elevation, the fulcrum of the lever contained in the wheels muſt be determined by that part of the wheel which touches the plane, and which muſt always be of a proportionate height both in large and ſmall wheels. It is otherwiſe, however, with the fulcrum marked out by perpendicular or irregular obſtacles upon the plane itſelf; for large wheels will always have the advantage over ſmall wheels when theſe are preſented, for the reaſons already given. Indeed, when the wheel impinges perpendicularly upon an obſtacle as high as the line of traction, it is plain that it cannot be drawn over it by any power whatever, unleſs the direction of the latter be altered.

From theſe conſiderations, our author draws the following concluſions: 1. That in a carriage placed upon a horizontal plane, nothing more is required to produce motion than to overcome the friction which takes place between it and the plane. 2. By the application of wheels to a carriage, the friction is leſſened in the proportion of the diameters of the axles and hollow parts of the naves to thoſe of the wheels. 3. In the draught of a carriage without wheels up a regular plain aſcent, the friction muſt not only be overcome, but there is a power likewiſe to be applied ſufficient to lift ſuch a proportion of the weight of the carriage as the perpendicular part of the aſcending plane bears to that portion of the plane. 4. If wheels of any ſize be applied to the carriage in ſuch circumſtances, they have only the advantage of leſſening the friction; for, though they really act as levers, yet as each arm of the lever is lengthened in proportion to the increaſe of ſize in the wheels, the power can be no farther augmented than as the aſcent may act as a mechanical power for raiſing up the wheels, carriage, &c. to the top. 5. Large wheels have the advantage over ſmall ones in overcoming obſtacles, becauſe they act as levers in proportion to their various ſizes. 6. The line of traction, or that in the direction of which the carriage is drawn, ſhould always, if poſſible, be parallel to that in which the plane lies; for, when this is the caſe, the arm of the lever to which the power is applied will bear the longeſt proportion poſſible to the other. This always takes place when the line of traction is perpendicular to that ſpoke of the wheel which points to the obſtacle. As it may not always be poſſible, however, to alter the direction of the line of traction to this poſition, it will be moſt proper to fix upon ſome medium be-

twixt that which commonly occurs and that which requires the greateſt exertion to overcome the obſtacle; that is, betwixt a level line and one riſing perpendicular to the ſpoke of the wheel which points to the obſtacle it is likely to meet with. The greater attention ought to be paid to this laſt, that all wheels, but eſpecially ſmall ones, are liable to ſink into the ground over which they paſs, and thus produce a conſtant obſtacle to their own progreſs. The line of traction, it muſt alſo be obſerved, is not an imaginary one drawn from that part of the animal to which the traces or chains are attached, to the axle of the wheel, but the real direction of the traces to whatever part of the carriage they are attached; for the effort will be inſtantly communicated in the ſame direction from one part of the carriage to all the reſt, by reaſon of the whole being faſtened together and in one piece.

Hitherto we have conſidered the whole weight of the carriages as bearing perpendicularly againſt the axles of the wheels: but as this cannot be done in chairs, carts, and other carriages having only two wheels, it will be neceſſary to have their centres, or tranſverſe lines of gravity, as near to the ground as poſſible. To underſtand this, it muſt be premiſed, that the centre of gravity is that point of any body which if ſuſpended will keep all the parts of the body at reſt, let the body be placed in any ſituation we pleaſe. Thus the centre of gravity in a wheel or circle is the centre of the circumference, provided the ſubſtance of it be equably ponderous throughout. In like manner, the real centre of a globe coincides with the centre of gravity, provided the matter of which it is compoſed be equably ponderous. In a ſquare, whether ſuperficial or ſolid, the centre of gravity will be a point equally diſtant from all its ſides; ſo that, if the ſubſtance be equably heavy, it will be impoſſible to turn it into any poſition in which there will not be as much matter upon one ſide of the centre as upon the other: and in like manner, every figure, however irregular, has ſome point round which if it be turned, as much matter will always be upon one ſide as on the other.

If now any body be ſupported by a tranſverſe line paſſing not through the centre of gravity itſelf, but either above or below it, the body can only be kept in equipoiſe while that line remains directly above or below the point; for, if the body is moved forwards, as in two-wheeled carriages moving down hill, a greater part of the weight will be thrown forwards over the line of ſuſpenſion than what remains behind it; and conſequently this ſuperfluous part muſt be borne by the animal which draws it. In aſcending any height, juſt the reverſe takes place; for thus a portion of the weight is thrown backwards, and will tend to lift up the animal altogether. The conſequence of this is, not only that the creature muſt proceed with great pain, but that the friction on the nave and axle will be augmented by laying upon them a part of the animal's weight alſo. If the body be ſuſpended above the centre of gravity, the effect, though the ſame in the main, will be reverſed in the aſcent and deſcent of an hill, as long as the body is firmly attached to the ſhafts; but ſhould the whole weight be ſuſpended under the axle, independent of the ſhafts altogether, then it will always, whether aſcending, deſcending, or moving horizontally, have the ſame effect as if hung directly by it.

Our author next proceeds to treat of a generally received opinion, that the diſadvantages attending carriages ſuſpended either above or below the centre of gravity are augmented by the height of the wheels. The reaſon given for this opinion is, that the hinder part of the load in aſcending an hill, being thrown back, will overhang that part of a large wheel which touches the plane, much more than when a ſmaller wheel is uſed. Mr. Anſtice, however, obſerves, that all the diſadvantage, in either caſe, is expreſſed by the weight which, from its action upon the axle, tends to lift the animal, which muſt always be the ſame whether the wheels are high or low. Thus, in fig. 76. pl. 20. let a carriage be repreſented with two wheels of four feet diameter, aſcending a plane of 35° elevation from the level L E. Let fig. 77. repreſent a carriage exactly in the ſame circumſtances with the former, only that the wheels are ſix feet in diameter. Let C be the centre of gravity, and S P the line of gravity parallel to the central line A R, the line of ſupport or ſuſpenſion: in each of theſe the body is thrown ſo far back by its poſition, that the ſpace G S and A R is taken from before the line of gravity, and added to the part behind it. Hence a certain part of the animal's weight muſt be exerted upon the ſhafts, in order to balance that of the carriage, which is thus thrown back, and which, as is evident from the figures, muſt be the ſame in both carriages, though the wheels of the one ſo much exceed thoſe of the other in ſize, and the point T, where the wheel touches the plane, is much farther from the line of ſuſpenſion in the large wheel than in the ſmall one.

To remedy the inconvenience which muſt ariſe from placing the centre of gravity in the carriage low enough with reſpect to the wheels, it will be beſt to apply three or four wheels, placing them in ſuch a manner that the line of gravity may always fall between the wheels, in whatever ſituation the carriage may probably be placed. Thus if the body A, fig. 78, be placed on four wheels, the axles of which are at B and C, it will be entirely ſupported between them, though more by C than B, even though the carriage ſhould be aſcending an hill as ſteep as H I, viz. 50 degrees, which cannot ever happen in practice. Even in this caſe the animal would have no occaſion to make exertions for preſerving the balance of the carriage, though, had it been ſupported only by the axles of two wheels at S, far the greater part of the weight of the carriage would have been thrown behind, and the equilibrium could not have been preſerved without the greateſt difficulty. Hence it is plain, that the greater the diſtance betwixt the axles of three or four wheels applied to a carriage, the leſs liable will it be to have the line of gravity thrown out of its proper direction; but as this diſtance greatly augments the difficulty in turning a carriage, ſome medium is to be obſerved in this as well as other things.

What has been juſt now obſerved with regard to the preſerving the balance of a carriage longitudinally, applies equally to the preventing it from being overturned laterally upon uneven roads, or ſuch as have one ſide much higher than the other. In order to this, we muſt take care to keep the line of gravity ſo far within the body of the carriage, that it cannot be thrown out of it by any ordinary declivity of the road upon one ſide more than another. In the preſent caſe, however, as the wheels are not moveable on an axle in a lateral direction, we muſt conſider the points of ſuſpenſion to be thoſe where the wheels touch the ground. Thus, let fig. 79. repreſent the croſs ſection of a carriage moving upon two wheels; let C be its centre of gravity: it is plain, that in the poſition there repreſented, each of the points A and B ſuſtains an equal ſhare of the weight, and muſt do ſo as long as the carriage moves upon level ground: but if it be drawn along a road one ſide of which is higher than the other, ſuch as is repreſented fig. 80. then the centre of gravity, and conſequently the whole weight of the carriage, will bear upon the point of the wheel B, with this additional inconvenience, that the preſſure does not lie perpendicularly, but ſomewhat obliquely, by which the wheel is in great danger of being broken. To avoid inconveniencies of this kind, the points of bearing upon the wheels are removed to a greater diſtance than the exact perpendicular, and this is called *diſhing* the wheels; the good effects of which are evident from the figure. The wheels are diſhed by inſerting the ſpokes into the naves in ſuch a manner that they may decline every way from the carriage. Some diſadvantages,

however, attends this contrivance; for the carriage thus takes up more room upon the road, which makes it more unmanageable; and when it moves upon plane ground, the ſpokes not only do not bear perpendicularly, by which means their ſtrength is leſſened, but the friction upon the nave and axle is made unequal, and the more ſo the more that the wheels are diſhed. To obviate theſe inconveniences, ſome have bent downwards the ends of the axles; but thus the good effects of the diſh are entirely loſt, for the wheels are thereby thrown erect, and the breadth of the diſh doubly increaſed on the upper part of the carriage.

The practice of bending forward the ends of the axle is ſtill worſe; for thus the wheels are thrown out of that parallel direction which they ſhould always preſerve on the ground, and it likewiſe increaſes the friction both on the ſhoulders of the axles, and likewiſe on the ground; for the wheels, by rolling in this poſition, would ſoon come together if not prevented by the ſhoulders of the axles; whence in every revolution they muſt rub with conſiderable force upon the ground.

The power of wheels can only be augmented in two ways. 1. By increaſing the length of that arm of the lever to which the power is applied; and, 2. By diminiſhing the friction betwixt the nave and axle. The former is only a temporary expedient, in caſe of any obſtacle which cannot be ſurmounted in the ordinary way. It is accompliſhed, by transferring the action of the animal's power from the centre to the upper part of the circumference of the wheel: thus the power of the lever will be nearly doubled, as is ſhewn from fig. 71. for if the power be applied to the wheel at A, then the arm of the lever would be repreſented by the dotted line A O inſtead of C O; and the former being nearly twice as long as the latter, their powers muſt be in the ſame proportion. It is evident, however, that this mode of applying the animal's power can only be uſeful in any ſudden emergency; for, were we to attempt to reduce it into practice by winding a rope or chain about the circumference of the wheel, the animal muſt move twice as faſt as the carriage. See this alſo exemplified in pl. 18. fig. 58, where the moving power is repreſented by the weight P; the wheel E F turning between two toothed planes A B and C D. Thus, while one of the ſmall diviſions *ca*, *ae*, &c. moves forward its own length, the plane A muſt do the ſame, while the centre, by the motion of which only that of the wheel can be meaſured, moves but through half the ſpace.

2. With reſpect to friction-wheels or rollers, the caſe is different; and we may apply theſe in as great numbers, and in as great a variety of ways as we pleaſe, without fear of inconvenience. The beſt method of applying them, according to Mr. Anſtice, is to have the wheels and axle fixed to one another, ſo that both may turn together. Two friction-wheels a little overlapping each other, muſt then be fixed on each ſide of the body of the carriage, ſo that it may bear on the axle in the interſection of the wheels, as is repreſented in fig. 81. pl. 20. Here ABCD repreſents the body of the carriage, the large circle one of the wheels fixed to the axle E. The circumference of each of the friction-wheels F and G is ſuppoſed to be three feet, and that of their axles three inches. As the large wheel then revolves by the motion of the carriage, and thus transfers the friction from its circumference to its axle; ſo the friction of the axle itſelf is now transferred from the circumference of the friction-wheels to their axles. Every revolution of the great wheel, therefore, during which it paſſes over 18 feet of ground by means of the motion of the axle, puts the leſſer wheels round one ſixth part of their circle; and conſequently their axles are moved through the ſame part of their circumference, the friction being thus reduced to that upon this ſmall part; which being no more than half an inch, becomes 432 times leſs than it would have been on the large wheel without any motion on an axle, and 12 times leſs by means of the friction-wheels than without them. The axles on both ſides indeed are in motion, but the calculation muſt be made as if only one moved; for, the greater number of wheels there are, the more will the friction be divided among them.

An objection of conſiderable weight ariſes to this method of fixing the wheels and axles together, that thus the wheels are prevented from moving with different velocities as they ought to do, when the carriage moves out of a right line; but this may be obviated by leaving the friction-wheels looſe upon their axles, by which means they will be at liberty to move with different velocities, at the ſame time that they will have the advantages of friction-wheels always as to one wheel of the carriage, and generally as to both. The whole contrivance, however, ſeems likely to be entirely ſuperſeded by the following one of Mr. Gamett of Briſtol, who has obtained a patent for it. The general principle on which he proceeds is this: Between the axle and nave a hollow ſpace is left to be filled up by ſolid equal rollers nearly touching each other. Theſe are furniſhed with axles inſerted into a circular ring at each end, by which their relative diſtances are preſerved; and they are kept parallel by means of wires faſtened to the rings between the rollers, and which are riveted to them.

To underſtand the effect of this machinery we muſt conſider, that if, when plane ſurfaces move with a roller between them, if the under one be fixed, the upper plane will put the rollers forward but with half the quantity of its own motion. This is owing to the reaction of the ſtationary plane, which cauſes the roller to move backward upon itſelf as much as the other cauſes it to move forward upon itſelf. Thus, let C D, fig. 82. be a fixed ſurface, and A B a moveable one, with a roller E between them; if B be moved forward to G, it will cauſe the roller to move to F, which is but half the diſtance that A B has moved; becauſe it has rolled in a retrograde direction as far againſt the ſurface B A as it has gone forward upon the other. This is entirely owing to the reſiſtance it meets with from C D; for, if it did not touch that ſurface, but was attached by any other means to A B, it would be carried along with it through the whole ſpace without any rolling motion. Hence it is clear, that if a roller be placed between the axle and nave of a wheel, and the latter be turned round, the roller will move with a retrograde motion upon the axle; and in order to carry it quite round, the nave muſt be turned as much beyond a whole revolution as is equal on its inner circumference to the whole circumference of the axle. To exemplify this, let A B C D, fig. 83 repreſent the nave of the wheel E, the inner circumference of which is 18 inches, and the axle ſo ſmall that it may be conſidered as a point. Let F and G be two rollers cloſely fitted between them: if then the wheel be turned round, the rollers will alſo be carried along with it round the point which we conſider as an axle; for there can neither be rolling nor friction againſt a mere point. But if the axle be of any ſenſible ſize, for inſtance one inch circumference, then muſt each roller move round by the motion of the nave againſt it, and the reſiſtance of the angle on the oppoſite ſide. But, in order to do this, it muſt roll in a retrograde direction upon the nave, and conſequently the latter muſt go as far beyond a revolution as is equal to the circumference of the axle upon it, before the roller can go once round the axle, which in this caſe is by one 18th part of the circumference. Should the circumference of the axle be nine inches, and that of the inner part of the nave remain as before, the wheel muſt perform one revolution and an half before the roller could be moved once round, and ſo on in the ſame proportion: but as the circumference of an axle muſt always be leſs than the inner part of a nave turning upon it with rollers between them, it never can amount to two revolutions of the wheel round the axle, however nearly it may approach to it; for no ſegment of a circle can ever be a ſtraight line.

It will now be apparent, that if ſeveral rollers be placed all round between the nave and axle, whichever way the wheel be turned there cannot be any real friction, but merely a rolling of the rollers. If likewiſe theſe rollers be all of one ſize, and very nicely fitted to the cavity, they will keep their places without ſhifting, and very effectually anſwer the purpoſe of deſtroying friction. As ſuch rollers, however, were very liable to be diſplaced by accident, the uſe of them was neglected, till Mr. Gimett ſuggeſted the improvement already mentioned, and which is repreſented in fig. 84. Here ABCD repreſents a piece of metal to be inſerted into the nave of a wheel, of which E is the axle, and 1, 1, 1, &c. rollers of metal having axes inſerted into the brazen circle which paſſes through their centres; and both circles being riveted together by means of bolts paſſing between the rollers from one ſide of the nave to the other; and thus they are always kept ſeparate and parallel. By this method, indeed, ſome friction unavoidably takes place betwixt the axles of the rollers and their ſockets in the braſs rings; but as the quantity of friction depends principally on the force by which the rubbing ſurfaces are preſſed upon each other, and as in this caſe there is but the ſlight preſſure occaſioned by thoſe accidental circumſtances which would bring the rollers together, the friction muſt be too trifling to be noticed.

Thus far with regard to wheel-carriages in general. We muſt now make ſome remarks on the methods of drawing them, and the conſtruction of particular carriages.—Men, by reaſon of their upright form, are by no means fitted for horizontal draughts; but animals who go upon all fours are remarkably ſo. In Britain, horſes are commonly made uſe of; but mules, oxen, ſheep, and dogs, in other parts of the world. In all animals, however, the capacity for drawing a load depends upon their weight as well as their abſolute ſtrength. Thus it may happen, that a very heavy horſe will draw a load, which a lighter though ſtronger one could not move; and this will always happen, when the weaker horſe exceeds the other in weight more than he is exceeded by him in ſtrength. It is well known that the weight, as far as it goes, reacts upon the horſe, and pulls him back as much as he pulls it forward, until the exertions of the muſcles of the animal, reſiſted by the ſolid ground, overcome the reſiſtance of the load upon the moveable wheels, and it goes forward in proportion to the exceſs of the one power over the other. If the horſe were put upon a moveable plane, and attempted to draw a load upon the ſolid ground, inſtead of pulling it forward he would pull himſelf back.—The horſe has two ſources of power in drawing a load, viz. his ſtrength and weight. The former is the ſource of velocity; and as we find the actual power of any inanimate body in motion by multiplying the velocity into its quantity of matter, ſo do we find the power of a horſe to draw a load, by conſidering his weight as well as abſolute ſtrength. There are even many inſtances in common practice, where it is uſeful to increaſe the weight of an horſe or other animal: and therefore when horſes are employed to draw mills, it is uſual to put a ſmall load upon their backs in order to increaſe their abſolute momentum. Where the animals are equal in ſtrength and momentum, however, the only difference that can take place in the weights they draw muſt ariſe from the convenience or inconvenience of the carriages to which they are yoked, or of the roads upon which they walk. A load breaſt-high is much more eaſily drawn than one which is dragged along the ground, becauſe the power of the animal is then exerted directly againſt it; and this holds good whether the horſes go up or down hill. In deſcending, indeed, as the load is then higher with regard to the horſe than when it is on a plane, he will conſequently pull it with the greater force; but in this caſe, its own gravity conſpires with the draught, and will likewiſe help the load to deſcend; ſo that in this caſe the animal has an opportunity of exerting his greateſt power when there is the leaſt neceſſity, nay, when it is often inconvenient.

In all carriages with four wheels, the two fore ones are made of a much ſmaller ſize than the hind ones, both for the ſake of turning more eaſily, and likewiſe that there may be no danger of cutting the braces; but were both the fore and hind wheels to be of the ſame height, the carriage would be drawn with much greater eaſe. It is imagined indeed by the drivers of carriages, that the high hind wheels puſh on the fore wheels: but this is evidently abſurd; for the fore-wheels muſt turn as many times round oftener than the large ones as the latter exceed them in ſize. Thus, if we ſuppoſe the circumference of the large wheels to be 18 feet, and that of the ſmall ones only *ſix*, it is evident that the latter muſt turn round three times for once that the large ones turn round. Suppoſing the carriage therefore to be loaded equally on both axles, it is plain that by the greater friction upon the fore-axle than the other, it muſt wear out much ſooner, and that as much as the fore-wheels are ſmaller than the hind ones. But it is the univerſal practice of thoſe converſant in loading and driving carriages, to put a much greater load upon the fore than the back axle. Thus the friction not only becomes greateſt where it ought to be leaſt, but the ſmall wheels muſt neceſſarily ſink deeper into the ground than the large ones, which they are at any rate inclined to do from their ſize. The only danger in laying the greateſt load upon the hind axle is, when the carriage goes up a very ſteep aſcent; but in the few caſes in which this may happen, a ſmall temporary weight laid upon the pole betwixt the horſes would prevent all danger of overſetting.

To confirm theſe reaſonings by experiment, let a ſmall model of a waggon be made, with its fore-wheels $2\frac{1}{2}$ inches in diameter, and its hind-wheels $4\frac{1}{2}$; the whole model weighing about 20 ounces. Let this little carriage be loaded any how with weights, and have a ſmall cord tied to each of its ends, equally high from the ground it reſts upon; and let it be drawn along a horizontal board, firſt by a weight in a ſcale hung to the cord at the fore-part; the cord going over a pulley at the end of the board to facilitate the draught, and the weight juſt ſufficient to draw it along. Then turn the carriage, and hang the ſcale and weight to the hind-cord, and it will be found to move along with the ſame velocity as at firſt: which ſhows that the power required to draw the carriage is all the ſame, whether the great or ſmall wheels are foremoſt; and therefore the great wheels do not help in the leaſt to puſh on the ſmall wheels in the road.

Hang the ſcale to the fore-cord, and place the fore-wheels (which are the ſmall ones) in two holes, cut three eighth parts of an inch deep in the board; then put a weight of 32 ounces into the carriage over the fore-axle, and an equal weight over the hind-one: this done, put 44 ounces into the ſcale, which will be juſt ſufficient to draw out the fore-wheels: but if this weight be taken out of the ſcale, and one of 16 ounces put into its place, if the hind-wheels are placed in the holes, the 16 ounce weight will draw them out; which is little more than a third part of what was neceſſary to draw out the fore-wheels. This ſhows, that the larger the wheels are, the leſs power will draw the carriage, eſpecially on rough ground.

Put 64 ounces over the axle of the hind-wheels, and 32 over the axle of the fore-ones, in the carriage; and place the fore-wheels in the holes: then put 38 ounces into the ſcale, which will juſt draw out the fore-wheels; and when the hind-ones come to the hole, they will find but very little reſiſtance, becauſe they ſink but a little way into it.

But ſhift the weights in the carriage, by putting the 32 ounces upon the hind-axle, and the 64 ounces upon the fore-one; and place the fore-wheels in the holes: then, if 76 ounces be put into the ſcale, it will be found no more than ſufficient

to draw out theſe wheels; which is double the power required to draw them out when the lighter part of the load was put upon them; which is a plain demonſtration of the abſurdity of putting the heavieſt part of the load in the fore-part of the waggon.

Every one knows what an outcry was made by the generality, if not the whole body, of the carriers againſt the broad-wheel act; and how hard it was to perſuade them to comply with it, even though the government allowed them to draw with more horſes, and carry greater loads than uſual. Their principal objection was, that as a broad-wheel muſt touch the ground in a great many more points than a narrow wheel, the friction muſt of courſe be juſt ſo much the greater; and conſequently there muſt be ſo many more horſes than uſual to draw the waggon. It is believed that the majority of people were of the ſame opinion; not conſidering, that if the whole weight of the waggon and load in it bears upon a great many points, each ſuſtains a proportionably leſs degree of weight and friction, than when it bears only upon a few points: ſo that what is wanting in one is made up in the other; and therefore will be juſt equal under equal degrees of weight, as may be ſhown by the following plain and eaſy experiment.

Let one end of a piece of pack-thread be faſtened to a brick, and the other end to a common ſcale for holding weights: then, having laid the brick edgewiſe on a table, and let the ſcale hang under the edge of the table, put as much weight into the ſcale as will juſt draw the brick along the table. Then taking back the brick to its former place, lay it flat on the table, and leave it to be acted upon by the ſame weight in the ſcale as before, which will draw it along with the ſame eaſe as when it lay upon its edge. In the former caſe, the brick may be conſidered as a narrow wheel on the ground; and in the latter, as a broad wheel. And ſince the brick is drawn along with equal eaſe, whether its broad ſide or narrow edge touch the table, it ſhows that a broad wheel might be drawn along the ground with the ſame eaſe as a narrow one (ſuppoſing them equally heavy), even though they ſhould drag, and not roll, as they go along.

As narrow wheels are conſtantly ſinking into the road, they not only prove very deſtructive to the highways over which the carriages move; but, by reaſon of this very ſinking, they muſt be accounted as going continually up hill in ſome degree, even when drawn upon plain ground. Theſe inconveniences are obviated by the uſe of broad wheels; and indeed the utility of theſe is ſo obvious, that it ſeems ſurpriſing how the uſe of narrow wheels is on any occaſion permitted by the legiſlature. The wheels ordinarily uſed for waggons are nine inches broad; but of late a practice has been introduced of uſing rollers 16 inches broad; by which the inconveniencies of the narrow wheels are removed, and the greateſt weights may be drawn over the very worſt roads, not only without making them worſe, but greatly to their improvement. It has been objected, that broad wheels ſoon accumulate in clayey roads ſo much matter that it would ſoon equal an ordinary load; but, not to mention that ſuch roads ought to have no exiſtence in a country where ſuch ſums are annually paid for their reparation, it is evident, that paſſing heavy rollers over them is the only method to give that firmneſs to clay which is neceſſary for its ſupporting the animals who walk over it; and indeed many of the roads in this country, by reaſon of the continual poaching by wheels and feet of horſes, &c. become throughout a great part of the year almoſt impaſſable by people on foot. The legiſlature appear to be very ſenſible of the advantages derived from theſe rollers, and accordingly allow ſuch carriages as are furniſhed with them to go toll-free.

In the Tranſactions of the Royal Iriſh Academy for 1788, we meet with ſome curious obſervations on the ſubject of wheel-carriages, by Mr. Lovell Edgeworth. This gentleman informs us, that he was preſent in London in 1773, at a ſet of experiments tried in order to determine the comparative advantages of low and high wheels. The apparatus for theſe experiments was conſtructed with the greateſt accuracy. The carriages themſelves were made by the beſt workmen in London, and they were drawn along a ſmooth table by ſilk ſtrings of ſmall diameters put over a pulley nicely conſtructed, and fitted up in ſuch a manner as to have ſcarce any friction. On applying a weight to the end of the ſtring which paſſed over the pulley, little difference appeared in the velocities with which the carriages paſſed along the table, whether the wheels were high or low; but what appeared ſurpriſing was, that when obſtacles were put in their way, ſometimes the high and ſometimes the low wheels had the advantage, according to the different ſhapes and ſizes of the obſtacles. "It appears at firſt view (ſays Mr. Edgeworth), that the force which drew theſe carriages was employed only in overcoming the friction of the axle-tree, or in lifting the weight over the obſtacle. But I ſuſpected at the time, and have ſince been convinced, that an obſtruction of another ſort exiſted more conſiderable than either of theſe which I have mentioned, and which has not to my knowledge been taken notice of by any writer upon mechanics."

This obſtruction is no other than the *vis inertiæ* of matter, which has ſo much engaged the attention of philoſophers, and the non-entity of which, in diſtinction from the power of gravity, ſeems now to be pretty generally admitted. The argument uſed for its exiſtence by Mr. Edgeworth is as follows: "After a carriage has been once ſet in motion upon a ſmooth road with any given velocity, its motion, ſo long as that velocity is continued, is neither retarded nor promoted by the *vis inertiæ*; but whenever it paſſes over any height, not only the weight of the carriage muſt be lifted up, but the *vis inertiæ* of that weight muſt be overcome in a new direction; and as much velocity muſt be communicated to it in that new direction as will enable it to riſe to the height of the obſtacle while it paſſes over its baſe. When an obſtacle is of ſuch a ſize and ſhape that a wheel of ſix feet diameter muſt ſtrike the top of it at once, and not roll from the bottom upwards, and when its ſhape will permit a ſmaller wheel to touch it during its whole aſcent, as there is more time allowed for overcoming the *vis inertiæ* of its weight in the latter caſe than in the former, the ſmaller wheel may be drawn forward by a leſs power than the larger, notwithſtanding the advantage of a lever, which is in favour of the larger wheel."

To determine this, our author made uſe of an inclined plane five or ſix feet long and one foot high, placed on a ſmooth horizontal floor. He then aſſumed the diſtance to which the carriage was driven on the floor by the velocity acquired in deſcending the plane, as a meaſure of the force with which it could overcome any obſtacle placed in its way; and conſequently the diminution of the diſtance was the meaſure of the reſiſtance itſelf. Not ſatisfied with this apparatus, however, he ſcrewed a circle of iron three feet three inches in diameter upon a ſolid floor. In the centre of this circle he erected an upright axis or roller upon two pivots, one reſting in a ſocket of braſs upon the floor, the other in a bridge raiſed acroſs the machine. Around the axis was wound a ſmall ſilk cord, with a ſcale and weights faſtened to it, which paſſed over a pulley into an adjoining ſtair caſe, and turned the axis with a determined velocity. An horizontal arm of wood extended from the axis to the circumference of the inner circle, and to the extremity of the arm was faſtened a piece of ſteel in form of the axle-tree of a carriage, having a wheel upon it, which by the motion of the axis was carried round upon its edge like the ſtone of a tanner's mill. The arm was furniſhed with

an hinge, by means of which the wheel could rife up and pafs over any obftacle which ftood in its way. Above this was another arm, having on its extremity a tin vane, which by its refiftance to the air regulated the motion of the machine. On putting weights into the fcale, it was found that eight or ten turns were neceffary to give the wheel an uniform velocity, which was preferved in all the experiments, any refiftance thrown in the way being overcome by an addition of weight, and confequently this addition being always an accurate meafure of the refiftance.

On loading the wheel fo as to weigh about four pounds, it acquired a velocity of ten feet in a fecond by nearly five pounds and an half; but on placing in its way an obftacle only a quarter of an inch high, fix pounds and an half were required to caufe the wheel to pafs over it. Two fuch obftacles required fourteen pounds and an half; but on fubftituting two obftacles of the fame height, but making an inclined plane three quarters of an inch long, it required only two pounds to overcome their refiftance. "The difference therefore (fays he) between two and fourteen, muft be attributed to the *vis inertiæ*; for, the velocities of the carriage and the heights of the obftacles remaining the fame, the only difference that exifts is, that in the one cafe the wheel has much more time to furmount the obftacle than in the other, and confequently had much lefs *vis inertiæ*."

On this piece of reafoning, however, it is impoffible to avoid making the following remark, *viz.* that nothing happens but what ought to do fo upon the common principles of mechanics. One obftacle, when upright, required fix pounds and an half to overcome it; but when an inclined plane three times the length was added to it, it ought then to have been overcome by a third part of the power, that is, by fomething more than two pounds; and the reafon why fomething lefs than the third part was required, feems to have been the advantage the wheel had by acting as a lever; as has been already obferved on the principles of Mr. Anftice. There is not therefore the leaft occafion to apply to a *vis inertiæ*, or any obfcure principle, for a folution of what may fo eafily be folved upon the common principles of mechanics and gravity.

Mr. Edgeworth concludes his obfervations with fome remarks on the ufe of fprings, which are found greatly to facilitate the draught of carriages. "Whatever (fays he) permits the load to rife gradually over an obftacle without obftructing the velocity of the carriage, will tend to facilitate its draught; and the application of fprings has this effect to a very conficerable degree; the fame weight of four pounds being drawn over the fame obftacles, when fprings were put between the load and the carriage, by four pounds inftead of 14. This remarkable difference points out the great advantage of fprings in rough roads; an advantage which might be obtained for heavy waggons, as well as for other carriages, by a judicious application of the fame means.

"It appears from the Memoirs of the French Academy, that the idea of applying fprings to carriages had occurred to M. Thomas in the year 1703; who has given a drawing of a carriage conftructed upon this principle many years before it was attempted to be put in execution. So little expectation had he of fucceis, that he expreisly mentions it as a theory which could not be reduced to practice: he had, however, no notion of applying fprings to facilitate the draught, but merely for the convenience of the rider; and I apprehend that it is not at preient commonly imagined that fprings are advantageous for this purpofe: nor would it at firft fight appear credible, that, upon a rough paved road, fuch as are common in Cheihire and other parts of England, a pair of horfes could draw a carriage mounted upon fprings with greater eafe and expedition than four could draw the fame carriage if the fprings and braces were removed, and the carriage bolted faft down to the perch."

Mr. Edgeworth made alfo fome experiments with high and low, long and fhort, carriages, in order to determine which was the moft advantageous, but could not recollect the particular refults of each experiment. He was, however, aflured, that the preference lately given in England to high carriages is ill-founded; and that though in fmooth roads the height of the carriage is a matter of indifference, yet in rough roads it is very difadvantageous. The length of carriages alfo, if their weight be not increafed, is a matter of indifference, except in very uneven roads, and where there are deep ruts; long carriages being preferable in the former cafe, and fhort ones in the latter.

The reafon why fprings fo much facilitate the draught of carriages feems to be, not only that they allow the wheels to pafs more gradually over the obftacles, as Mr. Edgeworth fays, but that by their elafticity they make the carriage bound upwards every moment for a fmall way. Thus its gravity is for that moment in a great meafure counteracted, and the progreffive motion which it has already acquired is at liberty to act more freely in pufhing it forward; for, were it poffible very fuddenly to take away the horfes from a carriage mounted on fprings, and moving with conficerable velocity, it would continue for fome time to move of itfelf; the weight in this cafe acting as a fly upon any mechanical engine, by means of which the machine accumulates a certain quantity of power, and will keep itfelf in motion for a conficerable time after the hand is taken away from it. The weight of all carriages indeed has fome effect of this kind, otherwife the draught would require an intolerable exertion of ftrength; and it is to be obferved, that this tendency to proceed in the direction in which it is once fet a-going, is remarkable in all great quantities of matter, and very perceptible even when weights are pulled directly upward; for, in raifing great weights by a crane, the burden is lifted with conficerably more eafe when near the top than at bottom, even after making every neceffary allowance for the weight of the rope, &c.

By means of wheels, fome people have contrived carriages to go without horfes, or any other moving power than what was given by the paffengers, by the wind, &c. One of thefe is repreiented by ABCD, fig. 85. pl. 20. It is moved by the footman behind it; and the fore-wheels, which act as a rudder, are guided by the perfon who fits in the carriage. Between the hind-wheels is placed a box, in which is concealed the machinery that moves the carriage. AA, fig. 86, is a fmall axis fixed into the box. B is a pulley, over which runs a rope, whofe two ends are faftened to the ends of the two levers or treddles C D, whofe other ends are fixed in fuch manner in the piece E, which is joined to the box, that they can eafily move up and down. F, F, are two flat pieces of iron that are joined to the treddles, and take the teeth of the two wheels H, H, which are fixed on the fame axis with the hind wheels of the carriage, I, I.

It is evident, that when the footman behind preffes down one of the treddles, fuppofe C, with his foot, he muft bring down one of the pieces of iron F, and conifequently turn the wheel H that is next to it; and at the fame time, by means of the rope that goes over the pulley, he muft raife the other treddle D, together with its piece F, which being thrnft down will turn the other wheel II; and fo alternately: and as the great wheels are fixed on the fame axis, they muft neceffarily move at the fame time. It is eafy to conceive, that if the ends of the treddles next E, inftead of being placed behind the carriage, were turned the oppofite way, fo as to come under the feet of the perfon who fits in it, he might move

it with equal, or even greater facility, than the footman, as it would then be charged with the weight of one perſon only.

A machine of this kind will afford a ſalutary recreation in a garden or park, or on any plain ground; but in a rough or deep road muſt be attended with more pain than pleaſure.

Another contrivance for being carried without draught, is by means of a ſailing chariot or boat fixed on four wheels, as AB, fig. 87; which is driven before the wind by the ſails CD, and guided by the rudder E. In a chariot of this kind, the wheels ſhould be farther aſunder, and the axle-trees longer, than in other carriages, to prevent overturning.

A machine of this ſort was conſtructed in the laſt century by Stephinus, at Scheveling in Holland, and is celebrated by many writers. Its velocity with a ſtrong wind is ſaid to be ſo great, that it would carry eight or ten perſons from Scheveling to Putten, which is 42 Engliſh miles diſtant, in two hours.

Carriages of this kind are ſaid to be frequent in China; and in any wide, level country, muſt be ſometimes both pleaſant and profitable. The great inconvenience attending this machine is, that it can only go in the direction the wind blows, and even not then unleſs it blow ſtrong: ſo that, after you have got ſome way on your journey, if the wind ſhould fail, or change, you muſt either proceed on foot or go back. Some remedy for this inconvenience will be found in the next contrivance. The Hollanders have, or had, ſmall veſſels, ſomething of this kind, that carry one or two perſons on the ice, having a ſledge at bottom inſtead of wheels: and being made in the form of a boat, if the ice break the paſſengers are ſecured from drowning.

To ſail againſt the wind: Let ABCD, fig. 88, be the body of a ſailing chariot: M the maſt, to which are fixed the wings or ſails EFGH; the two firſt of which, E F, are here ſuppoſed to be expanded by the wind; R is the rudder by which it is guided. Therefore the wind driving the ſails round, with the maſt M, and the cog-wheel K, take the teeth placed perpendicular to the ſides of the two fore wheels of the carriage, and conſequently keep it in continual motion.

The body of this machine ſhould not be large, nor placed very high, not only to prevent overturning, but that its motion may not be thereby impeded; for the velocity will be in proportion to the force of the wind on the ſails to that on the body of the machine. Therefore, if they be both equal, it will ſtand ſtill; or if the force on the body be greateſt, it will go backwards; unleſs there be a contrivance to lock the wheels. The upper part of the machine next A, may be made to take off when the wind is contrary; and there may be another ſet of ſails placed between the two hind-wheels, which will conſiderably increaſe its velocity. But after all, for general uſe, a common carriage muſt be preferable; for this cannot be expected to go up a moderate aſcent without great difficulty; nor down a declivity, when there is a ſtrong wind, without danger; and even on level ground, if the road be in any degree rough, its progreſs muſt be very ſlow, attended both with difficulty and danger. In an open country, however, where there is a large tract of level and ſmooth ground, and frequent ſtrong winds, a machine of this ſort will certainly be very convenient; and in moſt countries, when made of a ſmall ſize, may be uſeful to young people, by affording them a pleaſant and healthful exerciſe.

A carriage, the body of which is incapable of being overturned, may be made as follows: The body muſt conſiſt of a regular hollow globe, as AB, fig. 89, at the bottom of which is to be an immoveable weight, and which muſt be proportioned to the number of perſons or the load the machine is intended to carry. Round the globe muſt go two horizontal iron circles D, E, and two others F, G, that are perpendicular to the former. All theſe circles muſt be made exactly to fit the globe, that it may move freely in every direction. The two horizontal circles are to be joined on each ſide by a perpendicular bar, one of which is expreſſed in the figure by HI. All theſe irons ſhould be lined with leather, to prevent unneceſſary friction. The body of the carriage may be either of leather or hard wood; but the latter will be moſt eligible, as leaſt liable to wear. The wheel on each ſide is to be faſtened to the perpendicular bar by means of a handle K that keeps it ſteady. Now the body of this machine moving freely in the iron circles every way, the centre of gravity will always lie at C; therefore in whatever poſition the wheels are, or even if they overturn, the body of the carriage will conſtantly remain in the ſame perpendicular direction.

At L is placed a pin, round which is a hollow moveable cylinder: this pin moves up and down in the groove MN, that it may not impede the perpendicular motion of the circles, at the ſame time that it prevents the body of the machine from turning round in a horizontal direction. O is one of the windows, P the door, and QR the ſhafts to this machine.

When a carriage of this ſort is intended for a ſingle perſon, or a light weight, it may be hung on ſwivels, in the ſame manner as the rolling lamp or the ſea-compaſs, which will make its horizontal motion ſtill more regular: and when it is deſigned to carry ſeveral perſons, by adding another perpendicular bar on each ſide, between the two horizontal circles, it may be placed on four wheels. The body of this machine ſhould be frequently oiled or greaſed, not only to prevent any diſagreeable noiſe that may ariſe from its rubbing againſt the circles, but to prevent unneceſſary wear in the ſeveral parts.

This carriage is not intended for ſmooth roads, or a regular pavement; there, certainly, thoſe of the common conſtruction are much preferable; nor ſhould a carriage totally free from irregular motion be ſought after by thoſe who are in perfect health: but there are many perſons, ſubject to different diſorders, who, by being obliged to travel over rough roads in the common carriages, ſuffer tortures of which the healthful have no idea; to all theſe, therefore, and to every one who is forced to travel through dangerous roads, a carriage of this ſort muſt doubtleſs be highly deſirable.

As this deſign may appear to ſome perſons, on a ſuperficial view, impracticable, we ſhall here inſert an account of a ſimilar carriage, which we have taken from the firſt volume of the Abridgement of the Philoſophical Tranſactions, by Lowthorp. There is not, however, any deſcription of the manner in which that machine was conſtructed. The account is as follows: "A new ſort of calaſh deſcribed by Sir R. B. This calaſh goes on two wheels; carries one perſon; is light enough. Though it hangs not on braces, yet it is eaſier than the common coach. A common coach will overturn if one wheel go on a ſuperficies a foot and a half higher than the other; but this will admit of the difference of three feet and one-third in height of the ſuperficies, without danger of overturning. We choſe all the irregular banks, and ſides of ditches, to run over; and I have this day ſeen it, at five ſeveral times, turn over and over, and the horſe not at all diſordered. If the horſe ſhould be in the leaſt unruly, with the help of one pin you diſengage him from the calaſh without any inconvenience *(a contrivance of this ſort may be eaſily added to the foregoing deſign)*. I myſelf have been once overturned, and knew it not till I looked up and ſaw the wheel flat over my head: and if a man went with his eyes ſhut, he would imagine himſelf in the moſt ſmooth way, though at the ſame time there be three feet difference in the height of the ground of each wheel."

SECT. V. *Of Mills.*

MILL, in the proper ſenſe of the word, ſignifies a machine

for grinding corn, though, in a more general ſenſe, it is applied to all machines which have an horizontal circulatory motion. Mills are diſtinguiſhed by particular names, ſometimes taken from the powers by which they are moved, and ſometimes from the uſes to which they are applied. Hence they are called hand-mills, horſe-mills, water-mills, fulling-mills, wind-mills, corn-mills, levigating-mills, boring-mills, &c.

The moſt ſimple of theſe is the *hand-mill*, repreſented fig. 90. pl. 20. where A and B repreſent the two ſtones between which the corn is ground, and of which the upper one A turns round, but the lower one (B) remains fixed and immoveable. The upper ſtone is five inches thick, and 21 inches broad; the lower one ſomewhat broader. C is a cog-wheel, having 16 or 18 cogs, which go into the trundle F, having nine ſpokes fixed to the axis G, the latter being firmly inſerted into the upper ſtone A, by means of a piece of iron. H is the hopper into which the corn is put; I the ſhoe to carry it by little and little through a hole at K, in betwixt the ſtones, where being ground into meal, it comes out through the eye at L. Both ſtones are incloſed in a circular wooden caſe, of ſuch a ſize as will admit the upper one to run freely within it. The under ſurface of the upper ſtone is cut into grooves, as repreſented at Q, which enable it to throw the meal out at the eye L more perfectly than could be done if it was quite plain. Neither of them is entirely flat, the upper one being ſomewhat concave, and the under one convex. They nearly touch at the edges, but are at ſome diſtance in the middle, in order to let the corn go in between them. The under ſtone is ſupported by ſtrong beams, not repreſented in the figure; the ſpindle G ſtands on the beam MN, which lies upon the bearer O. One end of this bearer reſts upon a fixed beam, and the other has a ſtring fixed to it, and going round the pin P, by the turning of which the timbers O and MN may be raiſed or lowered, and thus the ſtones put nearer, or removed farther from each other, in order to grind fine or coarſe. When the corn is to be ground, it muſt be put into the hopper by little at a time. A man turns the handle D, and thus the cog-wheel and trundle are carried round alſo together with the ſtone A. The axis G is angular at K; and, as it goes round, ſhakes the ſhoe I, and makes the corn fall gradually through the hole K. The upper ſtone going round grinds it, throwing out the meal, as already ſaid, at the eye L. Another handle, if thought proper, may be put at the other end of the handle E. The ſpindle muſt go through both ſtones, in order to reach the beam MN, and the hole through which it paſſes is faſtened with leather or wood, ſo that no meal can paſs through. Mr. Emerſon, from whom this account is taken, obſerves, that "it is a pity ſome ſuch mills are not made at a cheap rate, for the ſake of the poor, who are much diſtreſſed by the roguery of the millers."

The conſtruction of a *horſe-mill* differs not from that of the hand-mill juſt deſcribed, excepting that, inſtead of the handle D, the ſpindle is furniſhed with a long horizontal lever and cogged wheel, which turns the trundle and ſtones, as already mentioned. The ſtones are much heavier than in the hand-mill.

The mills moſt commonly in uſe for grinding corn are water-mills, the conſtruction of which is not eſſentially different from that of the hand or horſe-mills. The lower mill-ſtone, as already mentioned, is fixed, but the upper one moveable upon a ſpindle. The oppoſite ſurfaces of the two ſtones are not flat, but the one convex and the other concave, though in a very ſmall degree. The upper ſtone, which is ſix feet in diameter, is hollowed only about an inch in the middle, and the other riſes three quarters of an inch. They approach much nearer each other at the circumference, and the corn begins to be ground about two thirds of the radius diſtant from the circumference, and there it makes the greateſt reſiſtance, the ſpace between the two ſtones being in that place only about two-thirds or three-fourths of the thickneſs of a grain of corn: but as theſe ſtones, as well as thoſe of the hand-mill or horſe-mill, can be ſeparated a little from each other, the meal may be made fine or coarſe in them, as well as in the two former mills.

In order to cut and grind the corn, both the upper and under ſtones have furrows cut in them, as is obſerved in the hand mill. Theſe are cut perpendicularly on one ſide, and obliquely upon the other, by which means each furrow has a ſharp edge, and by the turning of the ſtones, the furrows meet like a pair of ſciſſars, and by cutting the corn make it grind the more eaſily. They are cut the ſame way in both ſtones when they lie upon their backs, by which means they run croſswiſe to each other when the upper one is inverted and turned round; and this greatly promotes the grinding of the corn, great part of which would be driven onward in the lower furrows, without being ground at all if both lay the ſame way. When the furrow becomes blunt and ſhallow by wearing, the running ſtone muſt be taken off, and the furrows cut deeper in both by means of a chiſel and hammer. Thus, however, by having the furrows cut down a great number of times, the thickneſſes of both ſtones are greatly diminiſhed; and it is obſerved, that in proportion to the diminution of the thickneſs of the upper ſtone, the quantity of flour alſo diminiſhes.

By means of the circular motion of the upper ſtone, the corn is brought out of the hopper by jerks, and recedes from the centre towards the circumference by the centrifugal force; and being entirely reduced to flour at the edges when the ſtones nearly touch one another, it is thrown at laſt out at the hole called the eye, as already mentioned. In Scotland, it is frequent to have the ſtones without any furrows, and only irregularly indented with ſmall holes, by means of an iron inſtrument. Stones of this kind laſt a much ſhorter time than thoſe with furrows, the latter being fit for uſe for 30 or 40 years, while the former ſeldom or never laſt more than ſeven. The under mill-ſtone is conſiderably thicker than the upper; and therefore, when both have been conſiderably worn by uſe, the lower one is frequently taken up, and the upper one put in its place, the former being converted into a running-ſtone.

Fig. 91. pl. 21. ſhows the conſtruction of a *common water-mill*, where AA is the large water-wheel, commonly about 17 or 18 feet diameter from *a*, the extremity of any float-board, to *b* the extremity of the oppoſite one. This wheel is turned round by the falling of the water upon the boards from a certain height, and the greater the height, provided the water runs in an uninterrupted ſtream, the ſmaller quantity will be ſufficient to turn the mill. This wheel is without the mill-houſe; but the wheel has an axle BB of conſiderable length, which paſſes through a circular hole in the wall, and has upon it a wheel D, of eight or nine feet diameter, having 61 cogs, which turn a trundle E of ten ſtaves or ſpokes; by which means the trundle, and conſequently the mill-ſtone, will make ſix revolutions, and one-tenth for every revolution of the wheel. The odd cog, commonly called the *hunting* cog, is added, that as every one comes to the trundle it may take the ſtaff behind that one which it took at the laſt revolution; and thus all the parts of the cogs and rounds which work upon one another will wear equally, and to equal diſtances from another, in a little time; by which means a true uniform motion will be produced through the whole work. The trundle is fixed upon an iron axis called the ſpindle, the lower end of which turns in a braſs pot fixed at F in the horizontal beam ST, called the *bridge-tree*; and the upper part of the ſpindle turns in a wooden buſh, fixed into the lower mill-ſtone, which lies upon beams in the floor YY. The top part of the ſpindle above the buſh is ſquare, and goes into a ſquare hole in a ſtrong iron croſs

abcd, fig. 92, called the *rynd*; under which, and close to the bulh, is a round piece of thick leather upon the ſpindle, which it turns round at the ſame time that it does the rynd. The latter enters into the grooves in the under ſurface of the running mill-ſtone G, fig. 91, and thus turns it round along with the trundle E, by means of the cog-wheel D. In the middle of the upper mill-ſtone is a large hole called the *eye*, through which the middle part of the rynd and upper part of the ſpindle may be ſeen; the ends being hid in the grooves below the ſtone. The end T of the bridge-tree TS, which ſupports the upper mill-ſtone G upon the ſpindle, is fixed into a hole in the wall; and the end S is let into the beam QR called the *brayer*; one end R of which remains fixed in a mortiſe, while the other end Q hangs by a ſtrong iron rod P, which goes through the floor YY, and has a ſcrew-nut on its top O; by the turning of which nut the end Q of the brayer is raiſed or depreſſed at pleaſure, along with the bridge tree TS and upper mill-ſtone. Thus the upper mill-ſtone may be raiſed as high from the under one, or let down as cloſe to it, as the miller pleaſes; by which means the meal or flour is made either coarſe or fine at pleaſure. The upper mill-ſtone G is incloſed in a round box H, which leaves a vacant ſpace of about an inch all round. On the top of this box ſtands a frame for holding the hopper *kk*, at which hangs the ſhoe I, by two lines faſtened to the hinder part of it, fixed upon hooks in the hopper, and by one end of the ſtring K to the fore part of it at *i*, the other end being twiſted round the pin L. As the pin is turned one way, the ſtring draws up the ſhoe cloſer to the hopper, and ſo leſſens the aperture between them; and as the pin is turned the other way, it lets down the ſhoe and widens the aperture. If it be drawn quite up to the hopper, no corn can fall out from the latter into the mill, and the quantity will be greater or leſs as the ſhoe is farther from the hopper or nearer to it. This happens by reaſon of the hopper being open at bottom, and the ſhoe at the forepart towards the end *i* over the middle of the eye of the mill-ſtone. There is alſo a ſquare hole in the top of the ſpindle, in which is put the feeder *e*, fig. 92. Thus the ſhoe is jogged three times in each revolution, and the corn runs conſtantly down from the hopper through the ſhoe into the eye of the mill-ſtone, where it falls upon the top of the rynd, and, by the motion of that and of the leather beneath, is introduced betwixt the ſtones, and by the violent motion of the upper one acquires a centrifugal force; and proceeding gradually from the eye of the mill-ſtone towards the circumference, is thrown at laſt out in flour, at the hole called the eye of the mill.

Some degree of nicety is requiſite in feeding the mill; for, if too great a quantity be poured into it, the ſtones are ſeparated from each other more than they ought to be, and their motion is alſo impeded; while, on the other hand, if it be fed too ſlowly, the ſtone moves with too great velocity, and the attrition of the two is apt to make them ſtrike fire. This matter is regulated by turning the pin L backwards or forwards as the miller thinks proper.

Sometimes, where plenty of water can be had, there are two trundles applied to the cog-wheel by means of a ſingle large one turned immediately by the perpendicular cog wheel, and carrying round with it an horizontal cogged wheel; on each ſide of which are placed the ſmaller trundles above mentioned carrying the ſtones. In like manner, the water-wheel may be made to drive fanners, boulting-mills, &c. but it muſt always be remembered, that by complicating machinery to a great degree, it becomes more ready to give way; and the frequent reparation of which it ſtands in need, will, by the delay of buſineſs, be found at laſt more expenſive than if ſeparate machines had been uſed.

The *wind mill* is furniſhed with an apparatus ſimilar to the water-mill, but neceſſarily differs in the external apparatus for applying the power. This is done by means of the two arms AB and CD, fig. 93, interſecting each other at right angles in E, and paſſing through the axis EF, and about 32 feet in length. On theſe yards are placed two ſails or vanes, in the ſhape ſometimes of parallelograms, and ſometimes of trapeziums, with parallel baſes; the greater whereof HI is about ſix feet, and the length of the ſmaller FG is determined by radii drawn from the centre E to I and H.

As the direction of the wind is very uncertain, it becomes neceſſary to have ſome contrivance for turning the ſails towards it, in order to receive its force in whatever way it may turn; and for this purpoſe two general methods are in uſe. In the one, the whole machine is ſuſtained upon a moveable arbor or axis, perpendicular to the horizon, and which is ſupported by a ſtrong ſtand or foot very firmly fixed in the earth; and thus by means of a lever the whole machine may be turned round as occaſion requires. In the other method, only the roof, which is circular, can be turned round by means of a lever and rollers, upon which the circular roof moves. This laſt kind of wind-mill is always built of ſtone, in the form of a round turret, having a large wooden ring on the top of it, above which the roof, which muſt likewiſe be of wood, moves upon rollers, as has been already mentioned. To effect this motion the more eaſily, the wooden ring which lies on the top of the building is furniſhed with a groove, at the bottom of which are placed a number of braſs truckles at certain diſtances, and within the groove is placed another ring, by which the whole roof is ſupported. The beams *ab* and *ae* are connected with the moveable ring, and a rope is faſtened to the beam *ab* in *b*, which at the other extremity is fitted to a windlaſs or axis in peritrochio; and this rope being drawn through the iron hook G, and the windlaſs turned round, the ſails and roof will be turned round alſo, in order to catch the wind in any direction. Both theſe methods of conſtruction have their advantages and diſadvantages. The former is the leaſt expenſive, as the whole may be made of wood, and of any form that is thought proper; while the other requires a coſtly building of ſtone: and the roof being round, the building muſt alſo be ſo, while the other can be made of any form, but has the inconvenience of being liable to be carried off altogether by a very high wind, of which an inſtance occurred not long ago in Eſſex.

Fig. 94 ſhows the internal mechaniſm of a *windmill*. AHO is the upper room; HoZ the lower one; AB the axle-tree paſſing through the mill; STVW the ſails covered with canvas ſet obliquely to the wind, and turning round in the order of the letters. CD is the cog-wheel, having about 48 cogs *a a a*, &c. which carry round the lantern EF, having eight or nine trundles *c c c*, &c. along with the axis GN. IK is the upper mill-ſtone, LM the lower one; QR is the bridge ſupporting the axis or ſpindle GN, which reſts upon the beams *cd*, XY, wedged up at *c*, *d*, and X. ZY is the lifting tree, which ſtands upright; *ab* and *ef* are levers, having Z and *e* as centres of motion; *fghi* is a cord, with a ſtone *i* wound about the pins *g* and *h*, and which thus ſerves as a balance or counterpoiſe. The ſpindle *t* N is fixed to the upper mill-ſtone IK by means of a piece of iron called the rynd, and fixed in the lower ſide of the ſtone, the whole weight of which reſts upon a hard ſtone fixed in the bridge QR at N. The trundle EF and axis G may be taken away; for it reſts its lower part by *t* in a ſquare ſocket, and the top runs in the edge of the beam *w*. By bearing down the end of the lever *fe* we raiſe *b*, which raiſes alſo ZY, and this raiſes YX, which lifts up the bridge QR, with the axis NG, and the upper ſtone IK; ſo that by this contrivance the ſtones may, as in a water-mill, be ſet at any diſtance. The lower ſtone is fixed upon ſtrong beams, and is broader than the upper one; the flour being conveyed through the tunnel *n o* into a cheſt. P is the hopper into which the

corn is put, and which runs along the ſpout *r* into the hole *t*, and ſo falls between the ſtones, where it is ground. The ſquare axis G *t* ſhakes the ſpout *r* as it turns round, and makes the corn run out; *r* is a ſtring going round the pin *s*, which ſerves to bring the ſpout nearer or let it go farther from the axis, and thus makes the corn to run faſter or ſlower according to the velocity of the wind. If the wind be very ſtrong, only part of the ſails S, T, V, W, is covered, or perhaps only one half of the two oppoſite ſails. Another cog-wheel B is placed towards the end B of the axle-tree, with a trundle and mill-ſtones like thoſe already deſcribed; ſo that when the wind is ſtrong, the mill may do twice the buſineſs it ordinarily does. When only one pair is to grind, the trundle EF and axis G*t* are taken out from the other: *xyl* is a girt of pliable wood, fixed at the end *x*; and the other end *l* is tied to the lever *km*, moveable about *k*; and the end *m* being put down, draws the girt *xyl* cloſe to the cog-wheel; and thus the motion of the mill may be ſtopped at pleaſure: *pq* is a ladder for aſcending to the higher part of the mill; and the corn is drawn up by means of a rope rolled about the axis AB.

Beſides theſe mills for grinding corn, one has lately been invented by a Mr. Winlaw for threſhing it out, and for which he has obtained a patent. It is repreſented fig. 95. AAAA repreſents the frame of the mill, B the cone, C a large iron wheel, D a regulating ſcrew, E a pinion, G the top curb ſurrounding the nut, H the fly.

Before the corn is put into this mill, it muſt undergo the operations of combing the bottoms of the ſheaves, and ſtripping the ears from the ſtraw. The former is performed by means of an hand-comb. The uſe is obvious, viz. to take out all the looſe ears, and ſtraw laid irregularly, which would otherwiſe be loſt, or impede the ſtripping of the ears. The comb for ſtripping the ears is made in the form of a croſs. The teeth are of an angular form, and ſet at convenient diſtances, ſo as to ſtrip the ears clean. If ſet too wide, they will paſs through without effect; and if too near together, they will not admit the ſtraw to go between them.

The grain is ſeparated from the chaff and ſtraw of the ear by the motion of the inner nut within the outward cone. The diſtance betwixt theſe is adjuſted by the regulating ſcrew D at the bottom; for, if this be ſcrewed up too far, the grain will be bruiſed; if too far lowered down, the grain will not be ſeparated. The dart marked upon the fly ſhows the direction in which the handle is to be turned, it being pointed as the handle is to be turned.

This mill was tried in the month of June 1785, in the preſence of a number of gentlemen, with great ſatisfaction to the ſpectators; and ſince that time has been uſed by a number of others, though it has not as yet come into general uſe. At the firſt trial there paſſed through the mill one buſhel of heads per minute, with very moderate labour to the man who turned it; and by experiment it was found, that four buſhels of ears yielded one buſhel of clean grain. Hence it appears, that the difference betwixt the expedition of the mill and the labour of the threſher is immenſely great; for, allowing that a man will threſh ſix buſhels per day at eight hours work, the mill will clear that quantity in 24 minutes, and that to much greater perfection than can be done by the flail, as it ſeparates every grain from the ear, which cannot but be accounted a very great ſaving; while much corn flies off by the flail, and a great deal is loſt by foul threſhing, either when performed by taſk or day-work. But by the uſe of the mill, all fraudulent practices muſt be prevented, the ſtraw preſerved in its original reed, and thus anſwer the purpoſes of thatching, &c. much better than when bruiſed under the flail; and every other purpoſe equally well. The ears may alſo be combed out with great expedition, as a lad without having practiſed was found to comb out a buſhel of ears in 20 minutes, which is at the rate of ſix buſhels of clean corn per day.—The ſaving by the uſe of this mill is calculated at 2½d. per buſhel. On a ſmaller ſcale the mill anſwers equally well for clover-ſeed, the flowers being firſt combed off from the ſtems; after which it will do as much work in three hours, as a man in the ordinary way can perform in a week; for a man cannot clean much above a buſhel in that time, which is the great reaſon of the high price of clover-ſeed. The mill will likewiſe anſwer for flax, canary, or any other ſeeds, or for ſeparating the huſks from rice, which in the preſent mode cannot be done without great labour and expence.

In all mills it is neceſſary that a conſiderable power be employed in order to accompliſh the intended purpoſe.—Water is the moſt common power, and indeed the beſt, as being the moſt conſtant and equable; while wind comes at ſome times with great violence, and at others is totally gone. Mills may alſo be moved by the force of ſteam, as were the Albion-mills at London; but the expence of fuel muſt undoubtedly prevent this mode of conſtructing mills from ever becoming general. In all caſes it is abſolutely neceſſary to make the moſt of the power that we can, by making it act to the greateſt advantage. Hence the beſt methods of conſtructing water and wind mills have been inveſtigated by thoſe who were moſt converſant in the principles of mechanics; and ſo difficult has been the inveſtigation, that the principles are not yet ſettled abſolutely without diſpute.

The *water mills* are of three kinds: *Breaſt-mills*, *Underſhot-mills*, and *Overſhot mills*. In the former, the water falls down upon the wheel at right angles, to the float-boards or buckets placed all round the wheel to receive it: if float-boards are uſed, it acts only by its impulſe; but if buckets, it acts alſo by the weight of water in the buckets in the under quarter of the wheel, which is conſiderable. In the underſhot wheel float-boards only are uſed, and the wheel is turned merely by the force of the current running under it, and ſtriking upon the boards. In the overſhot-wheel the water is poured over the top, and thus acts principally by its weight; as the fall upon the upper part of the wheel cannot be very conſiderable, leſt it ſhould daſh the water out of the buckets. Hence it is evident, that an under-ſhot mill muſt require a much larger ſupply of water than any other; the breaſt-mill the next, unleſs the fall is very great; and an over-ſhot mill the leaſt. Dr. Deſaguliers found, that a well-made overſhot mill would perform as much work as an underſhot one with one tenth part of the quantity of water required by the other.

In the 51ſt volume of the Philoſophical Tranſactions, Mr. Smeaton has conſidered at great length the beſt methods of conſtructing all theſe mills from machines and models made on purpoſe; but, conſcious of the inferiority of *models* to actual practice, did not venture to give his opinion without having ſeen them actually tried, and the truth of his doctrines eſtabliſhed by practice.

Having deſcribed the machines and models uſed for making his experiments, he obſerves, that, with regard to power, it is moſt properly meaſured by the raiſing of a weight; or, in other words, if the weight raiſed be multiplied by the height to which it can be raiſed in a given time, the product is the meaſure of the power raiſing it; and, of conſequence, all thoſe powers are equal whoſe products made by ſuch multiplication are equal: for if a power can raiſe twice the weight to the ſame height, or the ſame weight to twice the height, in the ſame time that another can, the former power will be double the latter; but if a power can only raiſe half the weight to double the height, or double the weight to half the height, in the ſame time that another can, the two powers are equal. This, however, muſt be underſtood only of a ſlow and equable motion, without acceleration or retardation; for, if the velocity be either very quickly accelerated or retarded, the *vis inertiæ*, in our author's opinion, will produce an irregularity.

To compute the effects of water-wheels exactly, it is neceſſary to know in the firſt place what is the real velocity of the water which impinges on the wheel. 2. The quantity of water expended in a given time: and, 3. How much of the power is loſt by the friction of the machinery.

1. With regard to the velocity of the water, Mr. Smeaton determined by experiments with the machinery deſcribed in the volume referred to, that with a head of water 15 inches in height, the velocity of the wheel is 8.96 feet in a minute. The area of the head being 105.8 inches, this multiplied by the weight of a cubic inch of water equal to .579 of an ounce avoirdupoiſe, gives 61.26 ounces for the weight of as much water as is contained in the head upon one inch in depth; and by further calculations derived from the machinery made uſe of, he computes that 264.7 pounds of water deſcend in a minute through the ſpace of 15 inches. The power of the water, therefore, to produce mechanical effects in this caſe will be 264.7×15, or 3970. From the reſult of the experiment, however, it appeared that a vaſt quantity of the power was loſt; the effect being only to raiſe 9.375 pounds to the height of 135 inches: ſo that the power was to the effect as 3970 to $9.375 \times 135 = 1266$, or as 10 to 3.18.

This, according to our author, muſt be conſidered as the greateſt ſingle effect of water upon an underſhot-wheel, where the water deſcends from an height of 15 inches; but as the force of the current is not by any means exhauſted, we muſt conſider the true proportion betwixt the power and effect to be that betwixt the quantity of water already mentioned and the ſum of all the effects producible from it. This remainder of power, it is plain, muſt be equal to that of the velocity of the wheel itſelf multiplied into the weight of the water. In the preſent experiment, the circumference of the wheel moved with the velocity of 3.123 feet in a ſecond, which anſwers to a head of 1.82 inches *; and this height being multiplied by 264.7, the quantity of water expended in a minute gives 481 for the power of the water after it has paſſed the wheel; and hence the true proportion betwixt the power and the effect will be as 3849 to 1266; or as 11 to 4.

As the wheel revolved 86 times in a minute, the velocity of the water muſt be equal to 86 circumferences of the wheel; which, according to the dimenſions of the apparatus uſed by Mr. Smeaton, was as 86 to 30, or as 20 to 7.—The greateſt load with which the wheel would move was 9lb. 6 oz.; and by 12 lb. it was entirely ſtopped. Whence our author concludes, that the impulſe of the water is more than double of what it ought to be according to theory: but this he accounts for by obſerving, that in his experiment the wheel was placed not in an open river, where the natural current, after it has communicated its impulſe to the float, has room on all ſides to eſcape, as the theory ſuppoſes, but in a conduit, to which the float being adapted, the water cannot otherwiſe eſcape than by moving along with the wheel. It is obſervable, that a wheel working in this manner, as ſoon as the water meets the float, receiving a ſudden check, it riſes up againſt the float like a wave againſt a fixed object, inſomuch that, when the ſheet of water is not a quarter of an inch thick before the float, yet this ſheet will act upon the whole ſurface of a float whoſe height is three inches: and conſequently, was the float no higher than the thickneſs of the ſheet of water, as the theory alſo ſuppoſes, a great part of the force would have been loſt by the water daſhing over the float.

Mr. Smeaton next proceeds to give tables of the velocities of wheels with different heights of water; and from the whole deduces the following concluſions: 1. The virtual or effective head being the ſame, the effect will be nearly as the quantity of water expended. 2. The expence of water being the ſame, the effect will be nearly as the height of the virtual or effective head. 3. The quantity of water expended being the ſame, the effect is nearly as the ſquare of the velocity. 4. The aperture being the ſame, the effect will be nearly as the cube of the velocity of the water. Hence, if water paſſes out of an aperture in the ſame ſection, but with different velocities, the expence will be proportional to the velocity; and therefore, if the expence be not proportional to the velocity, the ſection of the water is not the ſame. 5. The *virtual* head, or that from which we are to calculate the power, bears no proportion to the head water; but when the aperture is larger, or the velocity of the water leſs, they approach nearer to a coincidence: and conſequently, in the large openings of mills and ſluices, where great quantities of water are diſcharged from moderate heads, the head of water, and virtual head determined from the velocity, will nearly agree; which is alſo confirmed by experience. 6. The moſt general proportion betwixt the power and effect is that of 10 to 3; the extremes 10 to 3.2, and 10 to 2.8. But it is obſervable, that where the power is greateſt, the ſecond term of the ratio is greateſt alſo: hence we may allow the proportion ſubſiſting in great works to be as three to one. 7. The proportion of velocity between the water and wheel is in general about 5 to 2. 8. There is no certain ratio between the load that the wheel will carry at its *maximum*, and what will totally ſtop it; though the proportions are contained within the limits of 20 to 19, and 20 to 15; but as the effect approaches neareſt to the ratio of 20 to 15, or of 4 to 3 when the power is greateſt either by increaſe of velocity or quantity of water, this ſeems to be the moſt applicable to large works; but as the load that a wheel ought to have, in order to work to the beſt advantage, can be aſſigned by knowing the effect that it ought to produce, and the velocity it ought to have in producing it, the exact knowledge of the greateſt load it will bear is of the leaſt conſequence in practice.

Mr. Smeaton, after having finiſhed his experiments on the underſhot mills, reduced the number of floats, which were originally 24, to 12; which cauſed a diminution in the effect, by reaſon that a greater quantity of water eſcaped between the floats and the floor than before: but on adapting to it a circular ſweep of ſuch a length, that one float entered into the curve before the other left it, the effect came ſo near that of the former, as not to give any hopes of advancing it by increaſing the number of floats beyond 24 in this particular wheel.

Our author next proceeds to examine the power of water when acting by its own gravity in turning an overſhot wheel: "In reaſoning without experiment (ſays he), one might be led to imagine, that however different the mode of application is, yet that, whenever the ſame quantity of water deſcends through the ſame perpendicular ſpace, the natural effective power would be equal, ſuppoſing the machinery free from friction, equally calculated to receive the full effect of the power, and to make the moſt of it: for, if we ſuppoſe the height of a column of water to be 30 inches, and reſting upon a baſe or aperture of one inch ſquare, every cubic inch of water that departs therefrom will acquire the ſame velocity or momentum from the uniform preſſure of 30 cubic inches above it, that one cubic inch let fall from the top will acquire in falling down to the level of the aperture: one would therefore ſuppoſe that a cubic inch of water let fall through a ſpace of 30 inches, and there impinging upon another body, would be capable of producing an equal effect by colliſion, as if the ſame cubic inch had deſcended through the ſame ſpace with a

* Theſe calculations are founded upon the known maxim in hydroſtatics, that the velocity of ſpouting water is nearly the ſame with that which an heavy body would acquire by falling from an height equal to that of the reſervoir, and is proved by the riſing of jets nearly to the height of their reſervoirs.

lower motion, and produced its effects gradually. But, however concluſive this reaſoning may ſeem, it will appear in the courſe of the following deductions, that the effect of the gravity of deſcending bodies is very different from the effect of the ſtroke of ſuch as are non-elaſtic, though generated by an equal mechanical power."

Having made ſuch alterations in his machinery as were neceſſary for overſhot wheels, our author next gives a table of experiments with the apparatus ſo altered. In theſe the head was 6 inches, and the height of the wheel 24 inches; ſo that the whole deſcent was 30 inches; the quantity of water expended in a minute was $96\frac{1}{3}$ pounds; which, multiplied by 30 inches, gives the power = 2900: and, after making the proper calculations, the effect was computed at 1914; whence the ratio of the power to it comes to be nearly as 3 to 2. If, however, we compute the power from the height of the wheel only, the power will be to the effect nearly as 5 to 4.

From another ſet of experiments the following concluſions were deduced:

1. The effective power of the water muſt be reckoned upon the whole deſcent; becauſe it muſt be raiſed to that height in order to be able to produce the ſame effect a ſecond time. The ratios between the powers ſo eſtimated and the effects at a *maximum*, differ nearly from 4 to 3, and from 4 to 2 Where the heads of water and quantities of it expended are the leaſt, the proportion is nearly from 4 to 3; but where the heads and quantities are greateſt, it comes nearer to that of 4 to 2; ſo that by a medium of the whole the ratio is nearly as 3 to 2. Hence it appears, that the effect of overſhot wheels is nearly double to that of underſhot ones; the conſequence of which is, that non-elaſtic bodies, when acting by their impulſe or colliſion, communicate only a part of their original impulſe, the remainder being ſpent in changing their figure in conſequence of the ſtroke. The ultimate concluſion is, that the effects as well as the powers are as the quantities of water and perpendicular heights multiplied together reſpectively.

2. By increaſing the head, it does not appear that the effects are at all augmented in proportion; for, by raiſing it from 3 to 11 inches, the effect was augmented by leſs than one-ſeventh of the increaſe of perpendicular height. Hence it follows, that the higher the wheel is in proportion to the whole deſcent, the greater will be the effect; becauſe it depends leſs upon the impulſe of the head, and more upon the gravity of the water in the buckets: and if we conſider how obliquely the water iſſuing from the head muſt ſtrike the buckets, we ſhall not be at a loſs to account for the little advantage that ariſes from the impulſe thereof, and ſhall immediately ſee of how little conſequence this is to the effect of an overſhot wheel. This, however, as well as other things, muſt be ſubject to limitation; for it is neceſſary that the velocity of the water ſhould be ſomewhat greater than the wheel, otherwiſe the latter will not only be retarded by the ſtriking of the buckets againſt the water, but ſome of the power will be loſt by the daſhing of the water over the buckets.

3. To determine the velocity which the circumference of the wheel ought to have in order to produce the greateſt effect, Mr. Smeaton obſerves, that the more ſlowly any body deſcends by the force of gravity when acting upon any piece of machinery, the more of that force will be ſpent upon it, and conſequently the effect will be the greater. If a ſtream of water falls into the bucket of an overſhot wheel, it will be there retained till the wheel diſcharges it by moving round; and, of conſequence, the ſlower the wheel moves, the more water it will receive; ſo that what is loſt in velocity is gained by the greater preſſure of water upon the buckets. From the experiments, however, it appears, that when the wheel made about 20 turns in a minute the effect was greateſt; when it made only $18\frac{1}{4}$ the motion was irregular; and when loaded ſo as not to admit its turning 18 times, the wheel was overpowered with the load. When it made 30 turns, the power was diminiſhed by about $\frac{1}{20}$th, and when the number of turns was increaſed to 40, it was diminiſhed by one-fourth. Hence we ſee, that in practice the velocity of the wheel ſhould not be diminiſhed farther than what will procure ſome ſolid advantage in point of power; becauſe, *cæteris paribus*, the buckets muſt be larger as the motion is ſlower; and the wheel being more loaded with water, the ſtreſs will be proportionably increaſed upon every part of the work. The beſt velocity for practice, therefore, will be that when the wheel made 30 turns in a minute, which is little more than three feet in a ſecond. This velocity is applicable to the higheſt overſhot wheels as well as the loweſt. Experience however determines, that high wheels may deviate farther from this rule before they will loſe their power, by a given aliquot part of the whole, than low ones can be permitted to do; for a wheel of 24 feet high may move at the rate of ſix feet *per* ſecond; while our author has ſeen one of 33 feet high move very ſteadily and well with a velocity of little more than two feet. The reaſon of this ſuperior velocity in the 24 feet wheel, may probably be owing to the ſmall proportion that the head requiſite to give the proper velocity to the wheel bears to the whole height.

4. The maximum load for an overſhot wheel is that which reduces the circumference of the wheel to its proper velocity; which is known by dividing the effect it ought to produce in a given time by the ſpace intended to be deſcribed by the circumference of the wheel in the ſame time: the quotient will be the reſiſtance overcome at the circumference of the wheel, and is equal to the load required, including the friction and reſiſtance of the machinery.

5. The greateſt velocity that an overſhot wheel is capable of, depends jointly upon the diameter or height of the wheel and the velocity of falling bodies; for it is plain that the velocity of the circumference can never be greater than to deſcribe a ſemi-circumference, while a body let fall from the top deſcribes the diameter, nor even quite ſo great; as the difference in point of time muſt always be in favour of that which falls through the diameter. Thus, ſuppoſing the diameter of the wheel to be 16 feet and an inch in diameter, an heavy body would fall through this ſpace in one ſecond; but ſuch a wheel could never arrive at this velocity, or make one turn in two ſeconds, nor could an overſhot wheel ever come near it: becauſe, after it has acquired a certain velocity, great part of the water is prevented from entering the buckets, and part is thrown out again by the centrifugal force: and as theſe circumſtances have a conſiderable dependence upon the form of the buckets, it is impoſſible to lay down any general rule for the velocity of this kind of wheels.

6. Though in theory we may ſuppoſe a wheel to be made capable of overcoming any reſiſtance whatever, yet as in practice it is neceſſary to make the wheel and buckets of ſome certain and determinate ſize, we always find that the wheel will be ſtopped by ſuch a weight as is equal to the effort of the water in all the buckets of a ſemi-circumference put together. This may be determined from the ſtructure of the buckets themſelves; but, in practice, an overſhot wheel becomes unſerviceable long before this time; for, when it meets with ſuch an obſtacle as diminiſhes its velocity to a certain degree, its motion becomes irregular; but this never happens till the velocity of the circumference is leſs than the two feet *per* ſecond, when the reſiſtance is equable.

7. From the above obſervations, we may eaſily deduce the force of water upon breaſt-wheels, &c. But, in general, all kinds of wheels where the water cannot deſcend through a given ſpace unleſs the wheel moves with it, are to be conſidered as overſhot wheels; and thoſe which receive the impulſe or ſhock of the water, whether in an horizontal, oblique, or perpendi-

cular direction, are to be conſidered as underſhots. Hence a wheel in which the water ſtrikes at a certain point below the ſurface of the head, and after that deſcends in the arch of a circle, preſſing by its gravity upon the wheel, the effect of ſuch a wheel will be equal to that of an underſhot whoſe head is equal to the difference of level between the ſurface of the water in the reſervoir and the point where it ſtrikes the wheel, added to that of an overſhot, whoſe height is equal to the difference of level between the point where it ſtrikes the wheel and the level of the tail-water.

In the 66th volume of the Tranſactions, our author conſiders ſome of the cauſes which have produced diſagreements and diſputes among mathematicians upon this ſubject. He obſerves, that ſoon after Sir Iſaac Newton had given his definition, "that the quantity of motion is the meaſure of the ſame, ariſing from the velocity and quantity of matter conjointly," it was controverted by his cotemporary philoſophers. They maintained, that the meaſure of the quantity of motion ſhould be eſtimated by taking the quantity of matter and the ſquare of the velocity conjointly. On this ſubject he remarks, that from equal impelling powers acting for equal intervals of time, equal augmentations of velocity are acquired by given bodies when they are not reſiſted by a medium. Thus a body deſcending one ſecond by the force of gravity, paſſes through a ſpace of 16 feet and an inch; but at the end of that time it has acquired a velocity of 32 feet 2 inches in a ſecond; at the end of two ſeconds, it has acquired one that would carry it through 64 feet 4 inches in a ſecond. If, therefore, in conſequence of this equal increaſe of velocity, we define this to be a double quantity of motion generated in a given time in a certain quantity of matter, we come near to Sir Iſaac's definition: but in trying experiments upon the effects of bodies, it appears, that when a body is put in motion by whatever cauſe, the impreſſion it will make upon an uniformly reſiſting medium, or upon uniformly yielding ſubſtances, will be as the maſs of matter of the moving body multiplied by the ſquare of its velocity. The queſtion therefore properly is, whether thoſe terms, the *quantity of motion*, the *momenta*, or *forces* of bodies in motion, are to be eſteemed equal, double, or triple, when they have been generated by an equable impulſe acting for an equal, double, or triple time? or that it ſhould be meaſured by the effects being equal, double, or triple, in overcoming reſiſtances before a body in motion can be ſtopped? For, according to the meaning we put upon theſe words, the momenta of equal bodies will be as the velocities or ſquares of the velocities of the moving bodies.

Though by a proper attention to the terms employed, however, we ſhall find both theſe doctrines to be true; it is certain that ſome of the moſt celebrated writers upon mechanics have fallen into errors by neglecting to attend to the meaning of the terms they make uſe of. Deſaguliers, for inſtance, after having been at pains to ſhow that the diſpute, which in his time had ſubſiſted for 50 years, was a diſpute merely about words, tells us, that both opinions may be eaſily reconciled in the following caſe, viz. that the wheel of an underſhot water-mill is capable of doing quadruple work when the velocity of the water is doubled, inſtead of double work only: "For (ſays he) the adjutage being the ſame, we find, that as the water's velocity is double, there are twice the number of particles that iſſue out, and therefore the ladle board is ſtruck by twice the matter; which matter moving with twice the velocity that it had in the firſt caſe, the whole effect muſt be quadruple, though the inſtantaneous ſtroke of each particle is increaſed only in a ſimple proportion of the velocity." In another place, the ſame author tells us, that though "the knowledge of the foregoing particulars is abſolutely neceſſary for ſetting an underſhot wheel to work, yet the advantage to be reaped from it would ſtill be gueſs-work; and we ſhould be at a loſs to find out the utmoſt that it could perform, had it not been for an ingenious propoſition of that excellent mechanic, M. Parent, of the Royal Academy of Sciences, who has ſhowed, that an underſhot wheel can do the moſt work when its velocity is equal to the third part of that of the water; becauſe then two thirds of the water is employed in driving the wheel, with a force proportionable to the ſquare of the velocity. By multiplying the ſurface of the adjutage or opening by the height of the water, we ſhall have the column of water that moves the wheel. The wheel thus moved will ſuſtain on the oppoſite ſide only four-ninths of that weight which will keep it in equilibrio; but what it can move with the velocity it has, is only one-third of the equilibrium." This concluſion is likewiſe adopted by Mr. Maclaurin.

Underſhot wheels had been greatly preferred by M. Belidor to thoſe of any other conſtruction. He had even concluded, that water applied in this way will do more than ſix times the work of an overſhot wheel; while Dr. Deſaguliers, in overthrowing Belidor's propoſition, determined that an overſhot wheel would do 10 times the work of an underſhot wheel with an equal quantity of water. Between theſe two celebrated authors, therefore, there is a difference of no leſs than 60 to 1.

In conſequence of ſuch monſtrous diſagreement, Mr. Smeaton began the experiments of which we have already given an account. From them, beſides the poſitions already deduced, it appears, that where the velocity of water is double, the adjutage or aperture of the ſluice remaining the ſame, the effect is eight times; that is, not as the ſquare, but as the cube of the velocity. In the other concluſion of Deſaguliers and Maclaurin, the error was no leſs; for from thence it would follow, that by means of the wheel only $\frac{4}{7}$ths of the water expended would be raiſed back again to the height of the reſervoir from which it deſcended, excluſive of the friction, which would ſtill diminiſh the quantity: but from Mr. Smeaton's experiments it appears, that in ſome caſes upwards of one-fourth had been raiſed. In large works the effects had been ſtill greater, approaching in an underſhot wheel to one half, and in an overſhot one to the whole; which would be the limit, if it were poſſible to remove the friction and reſiſtance of the air. The velocity of the wheel alſo, which, according to the concluſions of M. Parent and Dr. Deſaguliers, amounted to no more than one-third of the velocity of the water, varies, according to Mr. Smeaton, between one-third and one-half. But in all great works the maximum lieth much nearer to one-half than a third; the former appearing to be the true maximum, if all friction, reſiſtance of the air, and ſcattering of water could be avoided.

To make theſe matters plain to mechanics, and to prevent them from running into practical errors in conſequence of a fallacious theory, Mr. Smeaton, in the year 1759, inſtituted another ſet of experiments; the immediate object of which was, to determine what proportion or quantity of mechanical power is expended in giving the ſame body different degrees of velocity. Having conſtructed a proper apparatus for the purpoſe, and with it made a number of experiments, he concludes, "that time, properly ſpeaking, has nothing to do with the production of mechanical effects otherwiſe than as by equally flowing it becomes a common meaſure; ſo that, whatever mechanical effect is found to be produced in a given time, the uniform continuance of the action of the ſame mechanical power will, in a double time, produce twice that effect. A mechanical power, therefore, properly ſpeaking, is meaſured by the whole of its mechanical effects produced, whether that effect be produced in a greater or leſſer time: thus, having treaſured up 1000 tuns of water, which I can let out upon the overſhot wheel of a mill, and deſcending through a perpendicular of 20 feet; this power, applied in a proper manner, will grind a certain quantity of corn in an hour: but, ſuppoſing the mill to be capable of receiving a greater impulſe

with as great advantage as a leſſer; then, if the corn be let out twice as faſt, the ſame quantity of water will be ground in half an hour, the whole of the water being likewiſe expended in that time. What time has therefore to do in the caſe is this: Let the rate of doing the buſineſs or producing the effect be what it will; if this rate is uniform, when I have found by experiment what is done in a given time, then, proceeding at the ſame rate, twice the effect will be produced in twice the time, on ſuppoſition that I have a ſupply of mechanic power to go on with. Thus, 1000 tuns of water deſcending through 20 feet perpendicular, being, as has been ſhown, a given mechanic power, let it be expended at what rate it will; if, when this is expended, we are to wait another hour till an equal quantity can be procured, then we can only expend 12 ſuch quantities in 24 hours. But if, while the thouſand tuns of water are expending in one hour, the ſame quantity is renewed, we can then expend 24 ſuch in the 24 hours, or go on without intermiſſion. The product or effect will then be in proportion to time, which is the common meaſure; but the quantity of mechanic power ariſing from the flow of the two rivers, compared by taking an equal portion of time, is double in the one to the other; though each has a mill that, when going, will grind an equal quantity of corn in an hour."

Mr. Ferguſon, in his directions to mill-wrights, has adopted the maxim which Mr. Smeaton condemns as erroneous, viz. that when the velocity of the wheel is but one-third of that of the water, it then acts to the greateſt advantage. He adds, that the mill-ſtone ought to make about 60 turns in a minute; for when it makes only 40 or 50 turns it grinds too ſlowly; and when more than 70, it heats the meal too much, and cuts the bran ſo ſmall that a part of it mixes with the meal, and cannot be ſeparated from it by any means. The utmoſt perfection of mill-work, therefore, according to this author, lies in making the train ſo that the mill-ſtone ſhall make about 60 turns in a minute, when the wheel moves with one-third of the velocity of the water. To accompliſh this he lays down the following rules: 1. Meaſure the perpendicular height of the fall of water above the middle of the aperture, where it is let out to act by impulſe againſt the float-boards on the lower ſide of the underſhot wheel. 2. Multiply this conſtant number 64.2882 by the height of the fall in feet, and extract the ſquare-root of the product, which will give the number of feet that the water moves in a ſecond. 3. The velocity of the floats of the wheel is equal to one-third of the velocity of the water juſt now found. 4. Divide the circumference of the wheel by the velocity of its floats, and the quotient will be the number of ſeconds in one turn of the great water-wheel, on whoſe axis the cog-wheel that turns the trundle is fixed. 5. Divide 60 by the number of ſeconds in a turn of the water-wheel, and the quotient will be the number of turns it makes in a minute. 6. By this number of turns divide 60, the number of times that a mill-ſtone ought to have in a minute; the quotient is the number of turns that the mill-ſtone ought to make for every one of the large wheel. 7. Then as the number of turns required of the mill-ſtone in a minute is to the number of turns of the cog-wheel in a minute; ſo muſt the number of cogs in the wheel be to the number of ſtaves in the trundle on the axis of the mill-ſtone, in the neareſt whole number that can be found.

For the conſtruction of the different parts of mills, Mr. Imiſon gives the following general directions:

The method for ſetting out a ſpur-wheel and wallower.—Draw the pitch lines A 1, B 1, A 2, 2 B, pl. 21. fig. 96.; then divide them into the number of teeth or cogs required, as *abc*.

Divide one of thoſe diſtances, as *bc*, into ſeven equal parts, as 1, 2, 3, 4, 5, 6, 7: three parts allow for the thickneſs of the cogs, as 1, 2, 3, in the cog *a*, and four for the thickneſs of the ſtave, of the wallower (one reaſon for allowing three parts for the cog and four for the ſtave, is, the wallower is in general of leſs diameter than the wheel, therefore ſubject to more wear in proportion of the number of cogs to the number of ſtaves; but if there is the ſame number of ſtaves as of cogs, they may be of equal thickneſs), as 1, 2, 3, 4, in the ſtave *m*, fig. 97. the height of the cog is equal to four parts; then divide its height into five equal parts, as 1, 2, 3, 4, 5, in the cog C; allow three for the bottom to the pitch line of the cog; the other two parts for epicycloid, ſo as to fit and bear on the ſtave equally. The mill-wrights in general put the point of a pair of compaſſes in the dot 3, of the cog *a*, and ſtrike the line *de*; then remove the point of the compaſſes to the point *d*, and ſtrike the curve line 3 *f*, which they account near enough the figure of the epicycloid.

The method for a face-wheel is thus: Divide the pitch line A B into the number of cogs intended, as *abc*; divide the diſtance *bc* into ſeven equal parts; three of thoſe parts allow for the thickneſs of the cogs, as 1, 2, 3, in the cog *a*, four for the height, and four for the width, as *de*, and four for the thickneſs of the ſtave *m*; draw a line through the centre of the cog, as the line AI at S: and on the point 5 deſcribe the line *ds*; remove the compaſſes to the point A, and draw the line *fg*, which forms the ſhape of the cog; then ſhape the cog on the ſides to a cycloid, as *dcfg*. But this method of ſetting out the ſhape of a cog is variable, according to the cycloid in different diameters of wheels.

In common ſpur-nuts, divide the pitch line A into twice as many equal parts as you intend teeth, as *a*, *b*, *c*, *d*, *e*, fig. 98. with a pair of compaſſes opened to half the diſtance of any of thoſe diviſions from the points *a* 1, *c* 3, *e* 5, draw the ſemicircles *a*, *c*, and *e*, which will form the ends of the teeth. From the points 2, 4, and 6, draw the ſemicircles *gbi*, which will form the hollow curves for the ſpaces; but if the ends of the teeth were epicycloids, inſtead of ſemicircles, they would act much better.

The principle of bevel geer conſiſts in two cones, rolling on the ſurface of each other. As the cone A and B fig. 99. revolving on their centres *ab*, *ac*; if their baſes are equal, they will perform their revolutions in one and the ſame time, or any other two points equally diſtant from the centre *a*, as *d* 1, *d* 2, *d* 3, &c. will revolve in the ſame time as *f* 1, *f* 2, *f* 3, &c. In the like manner, (figures 100 and 101) if the cones *afde* be twice the diameters at the baſe *de*, as the cones *afe* are; then if they turn about their centres when the cone *afd* has made one revolution, the cone *ade* will have made but half a revolution; or when *afd* has made two revolutions, *ade* will have made but one, and every part equally diſtant from the centre *a*, as *f* 1, *f* 2, *f* 3, &c. will have made two revolutions to *e* 1, *e* 2, *e* 3, &c. and if the cones were fluted, or had teeth cut in them, diverging from the centre *a* to the baſes *de*, *ef*, they would then become bevel geer. The teeth at the point of the cone being ſmall and of little uſe, may be cut off at E and F, figs. 102, 103. as ſeen by fig. 104. where the upright ſhaft *ab*, with the bevel wheel *cd*, turns the bevel wheel *ef* with its ſhaft *bg*, and the teeth work freely into each other, as *ab*, fig. 105. The teeth may be made of any dimenſion, according to the ſtrength required; and this method will enable them to overcome a much greater reſiſtance, and work ſmoother than a face wheel and wallower of the common form can poſſibly do: beſides, it is of great uſe to convey a motion in any direction, or to any part of a building, with the leaſt trouble and friction.

The method of conveying motion in any direction, and proportioning or ſhaping the wheels thereto, is as follows: Let the line *ab*, fig. 106. repreſent a ſhaft coming from a wheel; draw the line *cd* to interſect the line *ab*, in the direction that the

motion to be conveyed is intended, which will now repreſent a ſhaft to the intended motion.

Again, ſuppoſe the ſhaft *ed* is to revolve three times, whilſt the ſhaft *ab* revolves once, draw the parallel line *ii*, at any diſtance not too great, ſuppoſe one foot by a ſcale; then draw the parallel line *kk* at three feet diſtance, after which draw the dotted line *w*X, through the interſection of the ſhafts *ab* and *ed*, and likewiſe through the interſection of the parallel lines *ii* and *kk*, in the points X and *y*; which will be the pitch line of the two bevel wheels, or the line where the teeth of the two wheels act on each other, as may be ſeen fig. 107. where the motion may be conveyed in any direction.

The univerſal joint, as repreſented fig. 108. may be applied to communicate motion inſtead of bevel geer, where the ſpeed is to be continued the ſame, and where the angle does not exceed 30 or 40 degrees, and the equality of motion is not regarded; for, as it recedes from a right line, its motion becomes more irregular. This joint may be conſtructed by a croſs, as repreſented in the figure; or with four pins faſtened at right angles upon the circumference of a hoop or ſolid ball. It is of great uſe in cotton-mills, where the tumbling ſhafts are continued to a great diſtance from the moving power. But by applying this joint, the ſhafts may be cut into convenient lengths, by which it will be enabled to overcome greater reſiſtance.

To deſcribe the cycloid and epicycloid, of uſe in ſhaping the teeth of wheels, &c.—If a point or pencil *a* fig. 109. on the circumference of the circle B proceeds along the plane *a* C in a right line, and at the ſame time revolves round its centre, it will deſcribe a cycloid. And if the generating circle D, fig. 110. moves along the circumference of another circle E, and at the ſame time turns round its centre, the point of contact will deſcribe an epicycloid.

In the conſtruction of wind-mills, Mr. Smeaton has been at no leſs pains to explain the principles than in thoſe which go by water. For this purpoſe he conſtructed a machine, of which a particular deſcription is given in the 51ſt volume of the Philoſophical Tranſactions. The general principle of this was, that by means of a determinate weight it carried round an axis with an horizontal arm, upon which were four ſmall moveable ſails. Thus the ſails met with a conſtant and equable blaſt of air; and as they moved round, a ſtring with a weight affixed to it was wound about their axis, and thus ſhowed what kind of ſize or conſtruction of ſails anſwered the purpoſe beſt. With this machine a great number of experiments were made; the reſults of which were as follow:

1. The ſails ſet at the angle with the axis, propoſed as the beſt by M. Parent and other geometricians, *viz.* 55°, was found to be the worſt proportion of any that was tried.

2. When the angle of the ſails with the axis was increaſed from 72° to 75°, the power was augmented in the proportion of 31 to 45; and this is the angle moſt commonly in uſe when the ſails are planes.

3. Were nothing more requiſite than to cauſe the ſails to acquire a certain degree of velocity by the wind, the poſition recommended by M. Parent would be the beſt. But if the ſails are intended with given dimenſions to produce the greateſt effects poſſible in a given time, we muſt, if planes are made uſe of, confine our angle within the limits of 72 and 75 degrees.

4. The variation of a degree or two, when the angle is near the beſt, is but of little conſequence.

5. When the wind falls upon concave ſails, it is an advantage to the power of the whole, though each part ſeparately taken ſhould not be diſpoſed of to the beſt advantage.

6. From ſeveral experiments on a large ſcale, Mr. Smeaton has found the following angles to anſwer as well as any. The radius is ſuppoſed to be divided into ſix parts; and $\frac{1}{6}$th, reckoning from the centre, is called 1, the extremity being denoted 6.

N°	Angle with that axis.	Angle with the plane of motion.
1	72°	18°
2	71	19
3	72	18 middle
4	74	16
5	7$\frac{1}{2}$	12$\frac{1}{2}$
6	83	7 extremity.

7. Having thus obtained the beſt method of *weathering* the ſails, *i. e.* the moſt advantageous manner in which they can be placed, our author's next care was to try what advantage could be derived from an increaſe of ſurface upon the ſame radius. The reſult was, that a broader ſail requires a larger angle; and when the ſail is broader at the extremity than near the centre, the figure is more advantageous than that of a parallelogram. The figure and proportion of enlarged ſails, which our author determines to be moſt advantageous on a large ſcale, is that where the extreme bar is one-third of the radius or whip (as the workmen call it), and is divided by the whip in the proportion of 3 to 5. The triangular or loading ſail is covered with board from the point downward of its height, the reſt as uſual with cloth. The angles above mentioned are likewiſe the moſt proper for enlarged ſails; it being found in practice, that the ſails ſhould rather be too little than too much expoſed to the direct action of the wind.

Some have imagined, that the more ſail the greater would be the power of the windmill, and have therefore propoſed to fill up the whole area; and by making each ſail a ſector of an ellipſis, according to M. Parent's method, to intercept the whole cylinder of wind, in order to produce the greateſt effect poſſible. From our author's experiments, however, it appeared, that when the ſurface of all the ſails exceeded ſeven-eighths of the area, the effect was rather diminiſhed than augmented. Hence he concludes, that when the whole cylinder of wind is intercepted, it cannot then produce the greateſt effect for want of proper interſtices to eſcape.

"It is certainly deſirable (ſays Mr. Smeaton), that the ſails of windmills ſhould be as ſhort as poſſible; but it is equally deſirable, that the quantity of cloth ſhould be the leaſt that may be, to avoid damage by ſudden ſqualls of wind. The beſt ſtructure, therefore, for large mills, is that where the quantity of cloth is the greateſt in a given circle that can be: on this condition, that the effect holds out in proportion to the quantity of cloth; for otherwiſe the effect can be augmented in a given degree by a leſſer increaſe of cloth upon a larger radius, than would be required if the cloth was increaſed upon the ſame radius.

8. The ratios between the velocities of windmill ſails unloaded, and when loaded to their maximum, turned out very different in different experiments, but the moſt common proportion was as 3 to 2. In general it happened, that where the power was greateſt, whether by an enlargement of the ſurface of the ſails, or an increaſed velocity of the wind, the ſecond term of the ratio was diminiſhed.

9. The ratios between the leaſt load that would ſtop the ſails and the maximum with which they would turn, were confined betwixt that of 10 to 8 and 10 to 9; being at a medium about 10 to 8.3, and 10 to 9, or about 6 to 5; though on the whole it appeared, that where the angle of the ſails or quantity of cloth was greateſt, the ſecond term of the ratio was leſs.

10. The velocity of windmill ſails, whether unloaded or loaded, ſo as to produce a maximum, is nearly as the velocity of the wind, their ſhape and poſition being the ſame. On this ſubject Mr. Ferguſon remarks, that it is almoſt incredible to think with what velocity the tips of the ſails move when acted upon by a moderate wind. He has ſeveral times counted the

number of revolutions made by the ſails in 10 or 15 minutes; and, from the length of the arms from tip to tip, has computed, that if an hoop of the ſame ſize was to run upon plain ground with an equal velocity, it would go upwards of 30 miles in an hour.

11. The load at the maximum is nearly, but ſomewhat leſs than, as the ſquare of the velocity of the wind; the ſhape and poſition of the ſails being the ſame.

12. The effects of the ſame ſails at a maximum are nearly, but ſomewhat leſs than, as the cubes of the velocity of the wind.

13. The load of the ſame ſails at a maximum is nearly as the ſquares, and the effect as the cubes of their number of turns in a given time.

14. When ſails are loaded ſo as to produce a maximum at a given velocity, and the velocity of the wind increaſes, the load continuing the ſame; then the increaſe of effect, when the increaſe of the velocity of the wind is ſmall, will be nearly as the ſquares of theſe velocities: but when the velocity of the wind is double, the effects will be nearly as 10 to $27\frac{1}{2}$; and when the velocities compared are more than double of that where the given load produces a maximum, the effects increaſe nearly in a ſimple ratio of the velocity of the wind. Hence our author concludes, that windmills, ſuch as the different ſpecies for draining water, &c. loſe much of their effect by acting againſt one invariable oppoſition.

15. In ſails of a ſimilar figure and poſition, the number of turns in a given time will be reciprocally as the radius or length of the ſail.

16. The load at a maximum that ſails of a ſimilar figure and poſition will overcome, at a given diſtance from the centre of motion, will be as the cube of the radius.

17. The effects of ſails of ſimilar poſition and figure are as the ſquare of the radius. Hence augmenting the length of the ſail without augmenting the quantity of cloth, does not increaſe the power; becauſe what is gained by the length of the lever is loſt by the ſlowneſs of the motion. Hence alſo, if the ſails are increaſed in length, the breadth remaining the ſame, the effect will be as the radius.

18. The velocity of the extremities of the Dutch ſails, as well as of the enlarged ſails, either unloaded or even when loaded to a maximum, is conſiderably greater than that of the wind itſelf. This appears plainly from the obſervations of Mr. Ferguſon already related concerning the velocity of ſails, and is more fully treated of under the article WIND.

19. From many obſervations of the comparative effects of ſails of various kinds, Mr. Smeaton concludes, that the enlarged ſails are ſuperior to thoſe of the Dutch conſtruction.

Having thus diſcuſſed the ſubject of the common windmills with oblique vanes, our author next proceeds to the conſideration of thoſe called *horizontal* windmills, in which it is attempted to make the wind impinge directly upon the wheel, as in the caſe of water-mills. To ſet the probable advantage of this ſcheme in its proper point of view, Mr. Smeaton proceeds in the following manner: "Let AB, fig. 111. be the ſection of a plane, in which let the wind blow in the direction CD, with ſuch a velocity as to deſcribe a given ſpace BE, in a given time, ſuppoſe one ſecond; and let AB be moved parallel to itſelf in the direction CD. Now if the plane AB moves with the ſame velocity as the wind; that is, if the point B moves through the ſpace BE in the ſame time that a particle of air would move through it, it is plain, that in this caſe there can be no preſſure or impulſe of the wind upon the plane; but if the plane moves ſlower than the wind, ſo that the point B may move to F, while a particle of air ſetting out from B would reach E, then BF will expreſs the velocity of the plane; and the relative velocity of the wind and plane would be expreſſed by the line FE. Let the ratio of FE to BE be given, ſuppoſe 2 to 3; let the line AB repreſent the impulſe of the wind upon the plane AB when acting with its whole velocity BE; but, when acting with its relative velocity FE, let its impulſe be denoted by ſome aliquot part of AB, as for inſtance $\frac{4}{5}$; then will $\frac{4}{5}$ths of the parallelogram AF repreſent the mechanical power of the plane, that is, $\frac{4}{5}$ths $AB \times \frac{1}{3}BE$.

"2. Let IN be the ſection of a plane inclined in ſuch a manner that the baſe IK of the right-angled triangle IKN may be equal to AB; and the perpendicular $NK = BE$: let the plane IN be ſtruck by the wind in the direction LM, perpendicular to IK; then, according to the known rules of oblique forces, the impulſe of the wind upon the plain IN, tending to move it according to the direction LM or NK, will be denoted by the baſe IK; and that part of the impulſe tending to move it, according to the direction IK, will be expreſſed by the perpendicular NK. Let the plain IN be moveable in the direction of IK only; that is, the point I in the direction of IK, and the point N in the direction NQ parallel thereto. Now it is evident, that if the point I moves through the line IK, while a particle of air, ſetting forwards at the ſame time from the point N, moves through the line NK, they will both arrive at the point K at the ſame time; and conſequently there can be no preſſure or impulſe of the particle of air upon the plain IN. Now let IO be to IK as BF to BE; and let the plane IN move at ſuch a rate that the point I may arrive at O, and acquire the poſition OQ, in the ſame time that a particle of air would move through the ſpace NK: as OQ is parallel to IN, by the properties of ſimilar triangles, it will cut NK in the point P in ſuch a manner, that NP will be equal to BF, and PK to FE. Hence it appears, that the plane IN, by acquiring the poſition OQ, withdraws itſelf from the action of the wind, by the ſame ſpace NP that the plane AB does by acquiring the poſition FG; and conſequently from the equality of PK to FE, the relative impulſe of the wind PK upon the plane OQ will be equal to the relative impulſe of the wind upon the plane FG: and ſince the impulſe of the wind upon AB, with the relative velocity FE, in the direction BE, is repreſented by $\frac{4}{5}$ AB; the relative impulſe of the wind upon the plane IN in the direction NK will in like manner be repreſented by $\frac{4}{5}$ IK; and the impulſe of the wind upon the plane IN, with the relative velocity PK, in the direction IK will be repreſented by $\frac{4}{5}$ NK: and conſequently the mechanical power of the plane IN in the direction IK will be repreſented by $\frac{4}{5}$ of the parallelogram IQ; that is, $\frac{1}{3}$ IK $\times$ $\frac{4}{5}$ NK: that is, from the equality of IK to AB, and NK to BE, we ſhall have $\frac{4}{5}$ IQ $= \frac{1}{3}$ AB $\times \frac{4}{5}$ BE $= \frac{4}{5}$ AB $\times \frac{1}{3}$ BE $= \frac{4}{5}$ the area of the parallelogram AF.

"Hence we deduce this general propoſition; that all planes, however ſituated, that intercept the ſame ſection of the wind, and having the ſame relative velocity in regard to the wind, when reduced into the ſame direction, have equal powers to produce the ſame mechanical effects. For what is loſt by the obliquity of the impulſe, is gained by the velocity of the motion.

"Hence it appears, that an oblique ſail is under no diſadvantage in reſpect of power, compared with a direct one; except what ariſes from a diminution of its breadth, in regard to the ſection of the wind; the breadth IN being by obliquity reduced to IK.

"The diſadvantage of horizontal windmills therefore does not conſiſt in this, that each ſail, when directly oppoſed to the wind, is capable of a leſs power than an oblique one of the ſame dimenſions; but that in an horizontal windmill little more than one ſail can be acting at once: whereas, in the common windmill, all the four act together; and therefore, ſuppoſing each vane of an horizontal windmill to be of the ſame ſize with that of a vertical one, it is manifeſt that the power of

a vertical mill will be four times as great as that of an horizontal one, let the number of vanes be what they will. This diſadvantage ariſes from the nature of the thing; but if we conſider the further diſadvantage that ariſes from the difficulty of getting the ſails back again againſt the winds, &c. we need not wonder if this kind of mill is in reality found to have not above one-eighth or one-tenth of the power of the common ſort; as has appeared in ſome attempts of this kind."

Notwithſtanding what is here advanced, it ſeems that the ideas of Mr. Smeaton have not been very generally received, as premiums are ſtill held forth for the beſt methods of conſtructing horizontal windmills. Indeed, conſidering the clearneſs and perſpicuity of the above reaſoning, it ſeems ſurpriſing that public encouragement ſhould continue to be given to attempts which muſt certainly prove abortive. The principal inconvenience in windmills is their exceſſive irregularity and difficulty of being managed when the wind is high, owing to the great extent of the ſails and bulk of the machinery. But were it poſſible to make a number of ſmall windmills exert their power upon one object, theſe would be much more eaſily managed than one large one. Perhaps if a number of theſe were to be employed in pumping up water to a certain height from a lake or reſervoir, ſo as to produce a conſtant ſtream of water to turn a common mill, it might be more advantageous than to employ them directly. Windmills are commonly erected upon eminences for the ſake of receiving the wind to more advantage; and there are few eminences which do not afford a ſmall ſupply of water at no great diſtance from their ſummit. This ſupply being collected in a reſervoir, might be drawn up to the top by pumps worked by windmills; where being collected in another reſervoir, it might be let down to the former, turning a water-mill in its way, and being again drawn up by the pumps as before.

Some projectors, conſidering the great power of oblique vanes in windmills, have attempted to improve water-mills by giving them oblique vanes, but with as little ſucceſs. The power of the ſame ſection of a ſtream of water is not greater when acting upon an oblique vane than on a direct one; and any advantage which can be made of intercepting a greater ſection of water, which ſometimes may be done in the caſe of an open river, muſt be counterbalanced by the ſuperior reſiſtance that ſuch vanes would meet with by moving at right angles to the current: whereas the common floats always move with the water nearly in the ſame direction.

Mr. Smeaton concludes his diſſertation upon this ſubject, with giving a reaſon why one angle ſhould be preferable to another in ſetting the ſails of a windmill. "It is to be obſerved (ſays he), that if the breadth of the ſail IN is given, the greater the angle KIN, the leſs will be the baſe IK; that is, the ſection of the wind intercepted will be leſs. On the other hand, the more acute the angle KIN, the leſs will be the perpendicular KN; that is, the impulſe of the wind in the direction IK being leſs, and the velocity of the ſail greater, the reſiſtance of the medium will be greater alſo. Hence, therefore, as there is a diminution of the ſection of the wind intercepted on one hand, and an increaſe of reſiſtance on the other, there is ſome angle where the diſadvantage ariſing from theſe cauſes upon the whole is the leaſt of all; but as the diſadvantage ariſing from reſiſtance is more of a phyſical than geometrical conſideration, the true angle will beſt be aſſigned by experiment."

Sect. VI. *Of the Motion of Bodies in Straight Lines and Curves; the Acceleration, Accumulation, and Retardation, of Motion in various Circumſtances.*

TO underſtand this ſubject, it is neceſſary to keep in mind what has been ſaid concerning the *momentum* or quantity of motion in any moving body, *viz.* that it is compounded of the velocity multiplied into the quantity of matter. Thus, ſuppoſe there are two bodies, one containing twice the quantity of matter contained in the other, but moving with thrice its velocity, the quantities of matter will be expreſſed by any numbers in the proportion of 2 to 1, and their velocities by any others in the proportion of 3 to 1. Multiplying therefore the quantity of matter in the firſt (2) by its velocity (3), the product is 6; and multiplying the quantity of matter (1) by its velocity (1), the product is only 1; whence it appears that the momenta or abſolute forces of theſe bodies are to one another as 6 to 1.

As ſome bodies are elaſtic and others non-elaſtic, the effect of motion communicated from one to another becomes very different, according to this circumſtance. The motion is likewiſe very different, according to the manner in which one body acts upon another, and according to which it will be driven forward in a rectilinear direction, or deſcribe curves of various kinds, revolving on its axis, &c. Theſe different kinds of motion have been conſidered by different authors, but by none more particularly than Mr. G. Atwood, who has publiſhed a large octavo volume upon the rectilinear motion and rotation of bodies. The fundamental laws of motion aſſumed by this author as axioms are three: 1. Every body perſeveres in its ſtate of reſt or uniform motion in a right line, until a change is effected by the agency of ſome external force. 2. Any change effected in the quieſcence or motion of a body is in the direction of the force impreſſed, and is proportional to it in quantity. 3. Action and reaction are equal, and in contrary directions.

From theſe three ſimple axioms, the truth of which muſt, from what has been already ſaid, be abundantly evident, our author proceeds to demonſtrate the moſt difficult problems concerning the impulſe and motion of bodies in every poſſible direction, beginning from the moſt ſimple and eaſy deductions. For the more eaſy comprehending this ſubject, however, we ſhall premiſe what our author has ſaid in his ſecond ſection concerning the properties of *ratios* or proportions.

1. Two mathematical quantities of the ſame kind, as two lines, two ſurfaces, two angles, &c. conſtitute a ratio. Thus, ſuppoſe one line two feet in length and another four; theſe are to one another in the ratio of 4 to 2, or of 2 to 1; but a line cannot be ſaid to bear any ratio to a ſurface, becauſe they are not quantities of the ſame kind, and therefore cannot be compared.

2. We may compare the ratio of two quantities of one kind with the ratio of two quantities of a different kind. Thus, when two bodies move uniformly, for an equal time, but with different velocities, the ratio of the ſpaces paſſed over may be compared with that of the velocities, though ſpace and velocity are accounted different quantities.

3. If any quantity be divided by another of the ſame kind, the quotient becomes abſolute number. Thus, if we divide a velocity of four feet in a ſecond by one of two feet in a ſecond, the quotient will be 2; and in all caſes the quotient will be to 1 as the greater quantity is to the leſſer.

4. The ratio of any mathematical quantities may be expreſſed by two numbers, if both terms of the ratio be divided by the conſequent or by the antecedent. Thus let the antecedent be 8, and the conſequent 4; let both be divided by 4, and the ratio will then be 2 to 1; or let both be divided by 8, and it will be 1 to 0.5, which is the ſame.

5. Any ratio may be repreſented by a fraction, the numerator of which is the antecedent, and the denominator the conſequent. Thus the ratio of 8 to 4 is repreſented by the fraction $\frac{8}{4}$; and hence we may add and ſubtract ratios by the addition and multiplication of fractions. Thus, ſuppoſing two bodies to

move uniformly, one at the rate of 8 feet in a ſecond and the other 4; ſuppoſing them alſo to move, the former for four, and the latter for two ſeconds, the ſpaces paſſed over will be 32 and 8, their ratio $\frac{32}{8}$, or at length 32 : 8 : 4 × 8 : 2 × 4; or $\frac{32}{8} = \frac{4}{2} \times \frac{8}{4}$. Here it is to be obſerved, that when the mark of equality is interpoſed betwixt heterogeneous quantities, the only equality meant is that which ſubſiſts between the ratios there expreſſed; and when the mark of multiplication is interpoſed between heterogeneous quantities, it means the addition of two ratios, the antecedents of which are the terms expreſſed, and the conſequents are unity.

6. If there are three ratios, conſiſting of variable terms, and the relation of the quantities to each other be ſuch, that when the third ratio becomes unity the other two become equal; or when the ſecond becomes unity, the firſt and third are equal; then in all caſes, whatever be the magnitudes, we have the firſt ratio = the 2d × 3d. Thus let the three ratios be $\frac{5}{2}$, $\frac{7}{3}$, and $\frac{4}{1}$, diminiſhing the numbers by 1, we have $\frac{4}{2}$, $\frac{6}{3}$, and $\frac{3}{1}$, it is evident that $\frac{4}{2} = \frac{6}{3} \times \frac{3}{1}$: the ſame will be the caſe if we place them in a different order, as $\frac{5}{2}$, $\frac{2}{1}$, and $\frac{7}{3}$; for then, diminiſhing as before, we have $\frac{4}{2}$, $\frac{1}{1}$, and $\frac{6}{3}$, in which caſe $\frac{4}{2}\frac{1}{1} = \frac{1}{1} \times \frac{6}{3}$.

7. In comparing the ratios which obtain between mathematical quantities of any ſort, the ſtandard to which each of thoſe quantities is referred may be taken = 1. Thus, ſuppoſing we compare the weight, magnitude, and denſity of any ſubſtance with water, we may take a cubic inch of that element for a ſtandard, and call the weight, magnitude, and denſity of it = 1; by which means we may readily compare the weight, magnitude, or denſity of any quantity, however large, of another ſubſtance with water.

We now proceed to that part of the work which treats directly of the motion of bodies acted upon by any external impulſe.

8. Any force acting continually upon a body in the ſame direction, will produce a continual acceleration or retardation of the motion. Thus, if a body deſcends by the force of gravity, its motion is continually accelerated; or, if it be thrown up againſt the force of gravity, the motion will be continually retarded until it be totally deſtroyed.

9. If, while a body moves, equal quantities of motion be communicated to it, or taken from it, in equal ſpaces of time, the force is ſaid to be conſtant, and equally accelerated or retarded.

10. When unequal velocities are generated or deſtroyed in equal ſpaces of time, the force is ſaid to be variable.

11. When a body is acted upon by a conſtant force, we muſt conſider the ſpace through which it moves, the time it takes to move through it, the velocity it acquires, and the force which produces it; any two of which being given, we may from them find the other two. Here we muſt obſerve, that the force mentioned relates only to the communication of the velocity without any regard to the quantities of matter moved. As it is proportioned to the velocity generated in a given time, it is thence called the *accelerating* force. That which relates to the quantity of matter moved, as well as the velocity communicated, is called the *moving* force; being proportional to the quantity of motion produced in a given time.

12. The moving forces which communicate the ſame velocity in a given time to different bodies, will be as the quantities of matter contained in the bodies moved. This will appear from a conſideration of what has already been ſaid concerning the momenta of bodies. For, if one body contains ten times the quantity of matter that another does, it will of courſe require ten times as much force to move it with an equal degree of velocity; for the former is equivalent to ten ſuch bodies, and it is the ſame thing whether they be ſeparate or all together.

13. The moving forces which act upon bodies, and the degrees of velocity communicated to them in a certain time, are proportional to the quantities of matter moved and the velocities communicated jointly: for, by the laſt propoſition, when the velocity communicated in a certain time is the ſame, the moving force is as the quantity of matter moved. Thus, if a ball of ten pounds weight be made to move at the rate of 10 feet in a ſecond, and another of one pound is made to move at the ſame rate, the moving forces will be in proportion to the quantities of matter; that is, as 10 to 1. Hence we may eaſily perceive, that when the quantity of matter is given, the moving force will be as the velocity. Thus, if two balls of ten pounds each are cauſed to move, one with the velocity of ten feet in a ſecond, and the other with a velocity of five feet in the ſame time, the forces will be as the velocities; that is, as 10 to 5, or as 2 to 1; and hence, when both the quantities of matter and velocities are different, the moving forces will be according to theſe jointly. Thus, if a ball of ten pounds is moved with a velocity of ten feet in a ſecond, and a ball of one pound moves with a velocity of five feet in a ſecond, the moving forces will be as 10 × 10 or 100 is to 1 × 5, or as 20 to 1.

Here our author takes occaſion to deny that there is any ſuch thing as a communication of motion by an inſtantaneous impulſe or ſtroke, as has commonly been ſuppoſed. Every degreee of motion, according to him, is the effect of acceleration. "The latter way (ſays he), viz. the communication by inſtantaneous impulſe, can obtain only in bodies perfectly hard and inflexible, which exiſt not in nature; and even in the abſtract conſideration of theſe as well as of other caſes in mechanics, when metaphyſical poſſibilities inſtead of the natural ſtate of bodies are attended to, difficulties ariſe hardly explicable by any method of reaſoning: but it is certain, that when finite velocity is communicated to any natural body, the time in which it is communicated muſt be finite alſo; ſo that, when the body acted upon begins to move from quieſcence, it muſt, during the action of the force, poſſeſs all the intermediate degrees of velocity between 0 and the velocity ultimately communicated.

"To exemplify this further, let it be ſuppoſed that a ſoft and flexible ball of clay impinges againſt another of the ſame ſort, in the direction of a line joining the centres of the balls. At the firſt inſtant of the impact, the body ſtruck will begin to move, and will proceed with a velocity inferior to that of the impinging body, the velocity of which will continue to decreaſe, and that of the other body to increaſe, as long as the impinging force cauſes a change in the figure of the two bodies; that is, till they have both acquired a common velocity; at which inſtant all acceleration ceaſes if the bodies be perfectly non-elaſtic. If the bodies be of ſuch a kind, as, after having received impreſſion from any impact, poſſeſs a power of reſtoring their changed figure with a force equal to that of the impact, it is manifeſt that whatever velocity was communicated during the change of figure, an equal quantity will be ſuperadded during the reſtoration of it. In this caſe, after the acceleration ariſing from the impact during the change of the figure of the bodies has ceaſed, the bodies having then acquired a common velocity, a new acceleration will begin, being cauſed by the elaſtic force of the balls, which, acting in a direction of the lines joining their centres, tends to ſeparate them, accelerating the ball ſtruck, and retarding the other.

"From theſe conſiderations it appears, that in whatever degree the hardneſs of perfectly elaſtic bodies may differ, the

effects of their impact will be the same, the weights and velocities before the ſtroke being given. For the figures of the ſtriking and of the other body continually change, till they have acquired a common velocity, which depends only on the velocity of bodies and their impact, and is determined by the rules for the colliſion of non-elaſtic bodies. Moreover, the reſtoration of the changed figures, how great or how ſmall ſoever may have been the change, muſt cauſe an addition of velocity in the ball ſtruck equal to that received from the impact.

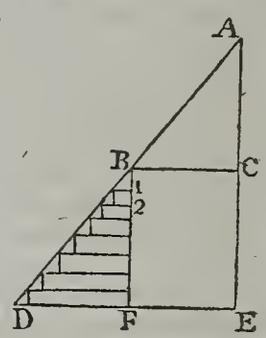
"It follows alſo, that the effect will be the ſame, whether the bodies be both perfectly elaſtic, or whether one of them be perfectly elaſtic and the other perfectly hard; every thing elſe being given; for the figure of the elaſtic body muſt change until the bodies have obtained a common velocity, which depends on the weights and velocities before the ſtroke only; and will be the ſame as if the bodies were non-elaſtic: the reſtoration of the figure will in this, as well as in the former caſe, cauſe an increaſe of velocity in the ball ſtruck, equal to that before communicated. Although no ſubſtance in nature poſſeſſes perfect elaſticity, or is entirely deſtitute of it, yet there are ſeveral elaſtic and non-elaſtic bodies ſubject to experimental trials, wherein the laws relating to colliſion are found to agree with fact to a conſiderable degree of exactneſs."

14. The accelerating forces which communicate velocity to bodies are directly as the moving forces, and inverſely as the quantity of matter moved; for ſince by prop. 11. the accelerating force is as the velocity generated in a given time; and by prop. 13. the moving force is as the quantity of matter and velocity generated in a given time, it follows, that the moving force is as the accelerating force and quantity of matter moved jointly: that is, the accelerating force is as the moving force directly, and the quantity of matter moved inverſely. Thus, let a maſs of matter, equal to four ounces, be impelled by a force equal to three ounces; then the force which accelerates the maſs of four ounces will be three-fourths when the acceleration of gravity is 1; or, in other words, it will generate, in a given time, three parts in four of the velocity which gravity generates during any given time.

15. In bodies impelled in a rectilinear direction by forces acting uniformly, the velocities generated are as the forces and times in which they act, conjointly. Thus, ſuppoſe a force equal to ten acting upon a ball of ten pounds, and another alſo equal to ten acting upon a ball of equal weight, the former for one ſecond, and the latter for two; it is plain that the velocity generated in the latter will be double to that generated in the former. But if we ſuppoſe the latter ball to be acted upon by a force equal only to five, then will both the velocities be equal, though the latter ſhould continue for two ſeconds and the former only for one. In all practical inquiries of this kind, however, it muſt be remarked, that a ſtandard velocity is to be obtained from obſerving what degree of velocity is generated by the force of gravity during a given time; one ſecond, for inſtance.

16. If a quieſcent body be impelled by any conſtant force acting upon it for a given time, the ſpace deſcribed will be to the ſpace deſcribed in the ſame time by a body moving uniformly with the laſt acquired velocity, in the ratio of one to two. In order to underſtand this, we muſt ſuppoſe the time to be divided into ſuch ſmall parts that the acceleration during any one of them is imperceptible: then it is evident, that at the end of two moments, the impulſe continuing the ſame, it will have gained double the velocity it did the firſt moment; and this is manifeſt from the phænomena of falling bodies, which having deſcended for one ſecond, acquire then a velocity twice as great as that which they had during the firſt ſecond. That this propoſition may be true, however, it is neceſſary that the velocity of the impelling power ſhould be *infinite* with reſpect to that which the body itſelf can acquire; for whenever the body moved comes to acquire a velocity in any degree proportional to that of the moving power, then that proportion muſt be deducted from the acceleration; and when both come to be equal, no further acceleration can take place. With regard to falling bodies, indeed, as far as our obſervations can go, were it not for the reſiſtance of the air, this acceleration would go forward till the body had acquired a velocity much ſuperior to any that we can now communicate, either by that or any other method. In all artificial accelerations, however, the velocity of the body moved ſoon becomes equal to that of the moving power, and then the motion goes on uniformly, which otherwiſe would continually increaſe.

17. The ſpaces which bodies deſcribe from reſt, by the action of conſtant forces, are in a compound ratio of the velocities laſt acquired and the times of motion: For the ſpaces deſcribed by the laſt acquired velocities continued uniform, are as thoſe velocities and the times of motion jointly; and the ſpaces deſcribed by the accelerating forces acting conſtantly for equal reſpective times are half the former ſpaces by prop. 16. This will perhaps appear more intelligible from the annexed figure; in which the motion of a body by an accelerated force is repreſented by a triangle; for ſuppoſing the body to begin its motion from the point A, and to be uniformly accelerated until it arrives at the point C, it is plain that the velocity acquired would then be properly repreſented by the triangle ABC; but if the acceleration was then to ceaſe, the velocity, and conſequently the ſpace paſſed over, would be repreſented by the parallelogram BCFE, double the triangle ABC. But let us ſuppoſe the acceleration ſtill to go on, as is repreſented in the triangle BDF; it is plain that the ſpace paſſed over in every ſmall moment of time will be compoſed of a parallelogram formed by the velocity laſt acquired, and a triangle formed by the acceleration during that moment, which is entirely in terms of the propoſition, that the ſpaces are in a compound ratio of the velocities laſt acquired, and the times of motion.



18. Conſtant forces, which accelerate bodies, cauſe them to deſcribe, from reſt, ſpaces which are as the forces and ſquares of the times wherein they act jointly: for the ſpaces deſcribed are as the velocities laſt acquired, and the times of motion. This will be evident, from an inſpection of the former figure; for in the triangle BDF, let B 1 repreſent the time in which a body acquires a certain velocity; then when it has attained the length of 2, the ſpace paſſed over will be repreſented by a ſmall ſquare, being that of the firſt moment, and of a triangle repreſenting the additional force the ſecond moment.

19. The conſtant forces which accelerate bodies from a ſtate of reſt, are in a direct duplicate ratio of the velocities generated, and in an inverſe ratio of the ſpaces deſcribed. Hence the following corollary is deduced, viz. that the laſt acquired velocities are in a ſubduplicate ratio of the accelerating forces, and a ſub-duplicate ratio of the ſpaces deſcribed jointly.

20. If bodies unequal in quantity of matter be impelled from reſt through equal ſpaces, by the action of moving forces which are conſtant, theſe forces are in a duplicate ratio of the laſt acquired velocities, and the ratio of the quantity of matter jointly.

In his obſervations on this propoſition, our author takes occaſion to conſider the theory of thoſe who inſiſt, contrary to the

opinion of Sir Iſaac Newton, that the abſolute force of bodies is compounded of the quantity of matter and *ſquare* of the velocity, inſtead of the velocity itſelf. "In the experiments (ſays he) which have been made on the force of bodies, the loſs of motion from reſiſtance has been more attended to than the communication of it by acceleration; and the reaſon probably aroſe from a want of adequate methods of ſubjecting accelerating forces, velocities acquired, and quantities of matter moved, to experimental trials; whereas the impact of bodies on ſubſtances which they penetrate, by affording convenient opportunity for obſerving the depths to which bodies ſink before all motion is deſtroyed, regard being had to the velocities of impact, and the weight and form of the impinging body, has ſeemed a more eligible method, however imperfect, of inveſtigating the principles of motion. When a body deſcends for three ſeconds by the force of gravity, it acquires, by a force of acceleration, a velocity of 96½ feet in a ſecond: alſo, if a body be projected perpendicularly upward, with a velocity of 96½ feet in a ſecond, the whole velocity will be deſtroyed in three ſeconds; and in like manner, every other property demonſtrated concerning accelerated motions is found to belong to retarded ones, provided we attend to the following circumſtances: If, in any propoſition relating to accelerated motion, the force is conſtant, it follows, that when this is applied to retarded motion, the retardation muſt alſo be conſtant. Moreover, ſince in accelerated motions the ſpaces are eſtimated from quieſcence, ſo in retarded motions the bodies are ſuppoſed to move to quieſcence; that is, till all motion is deſtroyed by retardation: in whatever concerns motions of this kind, therefore, we muſt conſider the retarding force to be directly as the force of reſiſtance, and inverſely as the quantity of matter.

"In order to illuſtrate this ſubject, it is to be obſerved, that if a body projected with different initial velocities be retarded by any conſtant given force, the whole ſpaces which the body deſcribes are in a duplicate ratio of the initial velocities, which follows from what has been already demonſtrated; and converſely, ſince when bodies are impelled by an accelerating force through various ſpaces, if theſe ſpaces are always as the ſquares of the laſt acquired velocities, it follows that the force of acceleration is conſtant: ſo when a given body is projected with different velocities, and is retarded by a given force, if the whole ſpaces deſcribed be always in a duplicate ratio of the initial velocities, it is concluded, that the force of retardation is conſtant. It is from this argument inferred, that the force whereby blocks of wood, banks of earth, &c. reſiſt the penetration of bodies impinging on them, is conſtant; for it is obſerved, that the depths to which military projectiles of a given magnitude and weight, ſtriking againſt a body of this kind, enter its ſubſtance, are in a duplicate ratio of the initial velocities; which has been ſufficiently proved by Mr. Robins, who firſt aſcertained the velocities of military projectiles, and applied his method, among other uſeful purpoſes, to the diſcovery of the retardation which bodies ſuffer by paſſing through reſiſting ſubſtances.

"The forces of reſiſtance, which are oppoſed to the motion of bodies impinging on ſubſtances which they penetrate, being granted conſtant, the propoſitions concerning acceleration already demonſtrated may be applied to explain the motion of bodies, which, having been projected with given initial velocities, are interrupted by ſuch obſtacles as blocks of wood, banks of earth, or others of a ſimilar kind. For example it has been demonſtrated, that bodies moving from reſt by the acceleration of conſtant forces, deſcribe ſpaces which are as the accelerating forces and ſquares of the times jointly. By applying this propoſition to retarded motions, we ſhall have the whole ſpaces or depths to which bodies impinging on the ſubſtances penetrate, as the forces of retardation and ſquares of the times wherein the bodies move, jointly. Moreover, it has been demonſtrated, that if different quantities of matter be impelled from reſt through equal ſpaces, the moving forces will be in a ratio compounded of the duplicate ratio of the velocities laſt acquired, and the ratio of the quantities of matter moved. It is from hence inferred, that in retarded motions alſo, if different quantities of matter be projected againſt any of the ſubſtances above deſcribed, with different initial velocities, and the whole depths to which the bodies penetrate are equal, the forces whereby the bodies reſiſt the progreſs of the impinging bodies will be in a duplicate ratio of the initial velocities of impact and the quantities of matter jointly.

"By this propoſition we may examine ſome of the experiments concerning the force of moving bodies, and the concluſions deduced from them by Bernouilli, Leibnitz, Poléni, &c. againſt the meaſure of force delivered by Sir Iſaac Newton, which he deſcribed in the following definitions:

"The quantity of motion is meaſured by the quantity of matter in a moving body and its velocity jointly.

"The moving forces whereby bodies tend towards centres of attraction are as the quantities of motion generated in a given time.

"It follows, then, from theſe definitions, that the moving forces, acting for a given time, will be proportional to the quantities of matter moved, and velocities generated, jointly: ſo that if the ratio of the moving forces be known, and we can find by experiment what velocities are generated in given bodies by the action of them for the ſame time; the quantities of motion generated in the bodies may be eſtimated according to Sir Iſaac Newton's definition. Moreover, ſince it is allowed that the effects of a reſiſting force to deſtroy are the ſame as thoſe of an equal force to generate motion in a given time; it follows, that if the ratio of two reſiſting forces be known, the quantities of matter in bodies which impinge on ſubſtances, and penetrate them, and the velocities deſtroyed in a given time, will give the ratio of the quantities of motion deſtroyed, according to Sir Iſaac Newton's definition.

"In many of the experiments alluded to, which have been greatly varied and multiplied, the reſiſting forces were made equal, by cauſing ſpheres equal in magnitude to impinge on a given ſubſtance which they penetrated; and the ſpheres being of given denſities, it was obſerved in experiments, that whenever the denſities or weights of thoſe equal ſpheres were in an inverſe duplicate ratio of their velocities, the depths to which they penetrated would be equal. The concluſions were theſe: The quantities of matter diſplaced by the moving bodies were equal, the depths to which the equal ſpheres penetrated were the ſame. Moreover, the whole motions which had been communicated to the bodies were deſtroyed; that is, the whole motion of the impinging bodies muſt have been as the ſquares of the velocities into the quantities of matter. But it plainly appears, that this concluſion is not applicable to the Newtonian definition, according to which the moving force generates motion in bodies: and it follows by what has preceded, that the reſiſting force by which the motion of bodies is deſtroyed, is proportional to the quantities of motion generated or deſtroyed in a given time reſpectively; and conſequently, to eſtimate the quantity of motion deſtroyed, the time wherein reſiſting forces act ſhould be equal. If, therefore, the times wherein the bodies in the experiment deſcribe the equal ſpaces can be proved different, this will plainly ſhow that the quantities of motion deſtroyed cannot be inferred from the experiment, the different times of the bodies deſcribing the depths to which they ſink not being taken into the account: this will be eaſily proved, ſince from propoſition 17, it appears, that the ſpaces deſcribed are univerſally as the velocities and ſpaces laſt deſcribed jointly; and from what has been ſaid, the converſe of

this propoſition when applied to retarded motions muſt alſo be true. The ſpaces therefore being given as in the experiment, the times will be inverſely as the initial velocities; which velocities being unequal from the experiment, it follows that the times are unequal. This being the caſe, it is manifeſt that no concluſion can be drawn from theſe experiments concerning the quantity of motion deſtroyed, tending to prove any inconſiſtency between the Newtonian eſtimation of force and matter of fact.

"It is next to be ſhown, that the experiments are ſtrictly conſiſtent with the Newtonian meaſure, and with the theory in general. It has already been proved, that in accelerated motions the ſpaces deſcribed are in a duplicate ratio of the velocities laſt acquired, and the quantities of matter moved, and an inverſe ratio of the moving forces. This propoſition being applied to retarded motions, it will follow, that the whole ſpaces or depths to which the impinging bodies ſink, are in a duplicate ratio of the quantities of matter, and an inverſe ratio of the reſiſting forces; whence alſo the depths to which the bodies penetrate muſt be equal when ſpheres of equal diameters are projected againſt a given ſubſtance, the weights being in an inverſe duplicate ratio of the initial velocities, which we find entirely correſpondent to experiment. It ſeems indeed rational to ſuppoſe, independent of all theory, that, in eſtimating the quantities of motion generated or deſtroyed by given moving or reſiſting forces, regard muſt be had to the times wherein the forces act; becauſe moving forces, or thoſe of reſiſtance, may be equal, and may generate or deſtroy quantities of motion varying in any aſſignable degree. For it is manifeſt, that a ſmall reſiſtance, oppoſed to a moving body for a longer time, may deſtroy more motion than a greater force acting for a ſhorter time; which ſufficiently ſhows, that the times wherein the moving and reſiſting forces act, muſt either be equal, or muſt be taken into the account in eſtimating the quantities of motion generated or deſtroyed."

21. The moving forces which communicate, and the forces of reſiſtance which deſtroy, the motion of bodies in the ſame time, will be in a compound ratio of the quantities of matter in the moving bodies and velocities generated or deſtroyed. This and the preceding propoſitions have been fully illuſtrated and confirmed by experiments. From them we deduce the following facts: 1. When muſket-balls, equal in weight and magnitude, impinge on a block of wood with different velocities, the reſiſting force being conſtant, we ſhall have the whole ſpaces through which the balls move in the wood as the ſquares of the velocities. 2. If balls of equal diameters, but different weights, impinge againſt a block with the ſame velocity, we have the depths to which they penetrate the block as the weights. 3. If balls of the ſame kind of ſubſtance, that is, of the ſame denſity, but of different diameters, impinge againſt a given block of wood or the ſame bank of earth with equal velocities, the depths to which they penetrate will be directly as the diameters of the balls.

When the force of reſiſtance is not uniform, the ſame principle obtains in degree, though the laws are then various; for greater bodies always ſuffer leſs by retardation than ſmaller ones of the ſame denſity, moving through the ſame reſiſting medium, and projected with a given initial velocity: becauſe, though the force of reſiſtance increaſes with the increaſe of the body's magnitude, yet the weight in moſt bodies increaſes in a greater proportion. Thus, in cannon balls, and other ſolid bodies, though the reſiſtance of the air increaſes as the ſquare of the ball's diameter, yet the weight increaſes as the cube. Thus, if a ball two inches in diameter is projected from the mouth of a piece, it is reſiſted by the atmoſphere four times leſs than one four inches in diameter; but the weight of the latter, being *eight* times greater, makes the reſiſtance leſs upon the whole in the large ball than in the ſmall one. It is otherwiſe when the weight does not increaſe in this manner; for then the ſmaller the body is, the leſs reſiſtance it meets with, and the faſter it goes. This is manifeſt from aeroſtatical experiments; for ſmall air-balloons always outſtrip the larger ones: and the ſame thing is obſervable in boats; for the ſmaller ones, if they have the ſame advantages in proportion to their bulk, will always ſail faſter than the larger ones.

22. If bodies, projected with the ſame velocity, be retarded by different conſtant forces, theſe forces will be in an inverſe ratio of the whole ſpaces deſcribed by the projected bodies, until all motion is deſtroyed. For example, let a body be projected on an inclined plane, in a direction contrary to that in which gravity acts in the plane, and with a velocity of 144.467 inches in a ſecond. Suppoſe the body then projected, aſcending along the plane, to deſcribe 216 inches before its motion is deſtroyed; let it be required to aſcertain the retarding force which oppoſes its aſcent, that is, the proportion of it to the force of gravity. If the body were projected perpendicularly upward, with the given velocity of 144.467 inches in a ſecond, it would riſe only to 27 inches, as follows in prop. 19. And ſince it aſcends along the plane 216 inches, the retarding force on the plane will be to that of gravity as 27 to 216, or as 1 to 8; which is alſo the proportion of the height of the plane to the length of it.

From this propoſition, having given the depth to which a body impinging againſt another penetrates it, the proportion of the retarding force of gravity may be determined. For example, Mr. Robins found that a leaden ball of $\frac{3}{4}$ of an inch, or $\frac{1}{16}$ of a foot in diameter, impinging on a block of elm with a velocity of 1700 feet in a ſecond, penetrated it to the depth of five inches, or $\frac{5}{12}$ of a foot; wherefore, ſince a body projected upwards with a velocity of 1700 feet in a ſecond, would riſe, if the atmoſphere made no reſiſtance, to the height of 44922 feet, we have the force by which elm retards the ball to the force of gravity as 44922 to $\frac{5}{12}$; or as 107.813 to 1.

On this theory it may further be obſerved, that the reſiſtances oppoſed to ſpherical bodies, which impinge on a block of wood, a bank of earth, &c. depend not only on the tenacity or denſity of the parts, of which the penetrated ſubſtances are compoſed, but upon the diameters of the impinging ſpheres: ſo that, although the reſiſting and retarding forces be determined in any ſubſtance for a ſingle caſe; yet when the diameters and weights of the impinging bodies vary, the forces of reſiſtance and retardation oppoſed to the impact on the ſame ſubſtance will be different. By the preceding propoſition, however, we may be enabled from a ſingle experiment made on the retardation of any ſubſtance oppoſed to a ſphere, the weight and diameter of which are known, to infer the retardation in any other caſe, however the weights and diameters may vary.

23. If ſpheres of different diameters and different ſpecific gravities impinge perpendicularly on fixed obſtacles, the reſiſting forces of which are conſtant, but of different quantities, the forces which retard the progreſs of the impinging ſpheres will be in a direct ratio of the abſolute forces of reſiſtance, and the joint inverſe ratio of the diameters and ſpecific gravities of the ſpheres. No abſolute concluſion can be drawn from this propoſition concerning any matter of fact, unleſs an experiment be firſt made on the retarding and reſiſting force of ſome ſubſtance which is to be conſidered as a ſtandard.

24. The whole ſpaces or depths to which ſpheres, impinging on different reſiſting ſubſtances, penetrate, are in the ratio compounded of the duplicate ratio of the velocities of impact, the joint ratios of the diameters and ſpecific gravities of the ſpheres, and an inverſe ratio of the abſolute forces whereby the ſubſtances reſiſt the progreſs of the ſpheres.

Mr. Atwood concludes this ſection with ſome problems relative chiefly to military projectiles; and in his next ſection (the 4th) conſiders the rectilinear motion of bodies acted upon by forces which vary in ſome ratio of the diſtances from a fixed point. This ſection chiefly relates to the powers of gravity and projection, by which the celeſtial bodies are actuated, and which conſequently chiefly regards aſtronomy and the motion of pendulums; though there are likewiſe ſome curious particulars relating to the action of compreſſed air, the vibration of muſical ſtrings, and the undulation of fluids. The fifth ſection conſiders the motion of bodies immerſed in fluids; but the ſixth treats of a ſubject which properly belongs to mechanics, viz. the communication of motion to bodies revolving round an axis.

In treating this ſubject Mr. Atwood obſerves, that in the former part of his work he had ſuppoſed the accelerating, as well as reſiſting, forces to act upon the body in a ſtraight line paſſing through the centre of gravity of the moving; in which caſe every particle of the body muſt partake of the ſame degree of velocity, being equal to that with which the common centre of gravity moves. "But (ſays he) it frequently happens, that a body, or ſyſtem of bodies, is ſo conſtituted, that when any force is impreſſed upon it, no motion can be produced except round a fixed axis; ſo that the velocity of the particles which compoſe the ſyſtem will be greater or leſs according as theſe particles are farther from the common axis or nearer it. Theſe circumſtances ſhould be attended to, in order to aſcertain the motion of revolving bodies; the preceding principles of acceleration being not wholly of themſelves ſufficient for that purpoſe.

"In this inveſtigation two things muſt be attended to. 1. The moving force by which the revolving motion is generated; and, 2. The inertia of the parts of which the ſyſtem is compoſed. The moving force exerted on any given particle of the ſyſtem, as well as its inertia, depends on its diſtance from the axis of motion, every thing elſe being the ſame; and if both theſe be aſcertained, the abſolute acceleration of the particle will be determined, and conſequently the abſolute velocity generated in a certain time. The methods therefore of determining theſe forces in any given circumſtance ſhould next be deſcribed.

"Let AFGH (fig. 112. pl. 21.) repreſent the circumference of a wheel which turns in its own plane round an horizontal axis, paſſing through its centre; and let a weight P, fixed at the extremity of a line AP, communicate motion to the wheel. Moreover, let the whole weight of the wheel be Q; and ſuppoſe this weight to be collected uniformly into the circumference AFGH; then, during the deſcent of the weight P, each point of the circumference muſt move with a velocity equal to that with which P deſcends; and conſequently, ſince the moving force is the weight P, and the maſs moved P + Q, the force which accelerates P in its deſcent will, by Prop. 14, be that part of the accelerating force of gravity which is expreſſed by the fraction $\frac{P}{P+Q}$. The velocity, therefore, which is generated in P in any given time, is found from the rules before demonſtrated. Thus, ſuppoſing Q to be equal to P, then will $\frac{P}{P+Q} = \frac{1}{2}$: and the weight P will be accelerated by a power which is to that of gravity as 1 to 2; and ſince gravity generates in bodies which deſcend for one ſecond of time near the earth's ſurface a velocity of $32\frac{1}{6}$ feet in a ſecond; it follows, that the weight P will in the ſame time have acquired a velocity of $16\frac{1}{12}$ feet in a ſecond only.

"The parts of the weight Q which are uniformly diſpoſed over the circumference AFGH, balance each other round the common centre of gravity S; their weight therefore is of no effect in accelerating or retarding the deſcent of P: and this will be the caſe whenever the axis of motion paſſes through the common centre of gravity. But in order to render the properties of rotatory motions more obvious, it will be convenient to diſpoſe the parts of the revolving ſyſtem ſo that the axis of motion ſhall not neceſſarily paſs through the common centre of gravity: thus, inſtead of having the weight Q uniformly diſpoſed over the circumference AFGH, let it be collected into any point Q. Here it is manifeſt, that if the maſs Q be acted upon by gravity, the force which communicates motion to the ſyſtem round S will be variable, it being the greateſt when SQ is horizontal, and gradually diminiſhing till Q has arrived at its loweſt point. But as we ſhould begin with the moſt ſimple caſes, the moving force muſt be conſtant. This will be effected by ſuppoſing the maſs which is collected in Q to be deſtitute of weight, and to poſſeſs inertia only. It follows therefore, that during the revolution of Q round S as an axis, the moving force will be conſtantly equal to P, and the maſs moved = P + Q. Conſequently the force which accelerates the deſcending weight, or any point in the circumference, will be that part of gravity which is expreſſed by the fraction $\frac{P}{P+Q}$ as before.

"In theſe caſes, the force which communicates motion to the ſyſtem has been ſuppoſed a weight or body acted upon by the earth's gravity, and conſequently conſtitutes a part of the maſs moved, at the ſame time that it acts as a moving force: but motion may be communicated by a force which ſhall add nothing to the inertia of the matter moved: and it will be convenient in many demonſtrations to aſſume the force of this kind; and in this caſe we have not to take the inertia into the account. Thus, if any number of bodies without gravity collected into the points F, H, Q, (fig. 112.) are cauſed to revolve round the axis S, by a moving force P, the force which accelerates theſe bodies in their revolution will be $\frac{P}{F+H+Q}$; provided the bodies F, H, Q, be diſpoſed at a diſtance from the axis of motion equal to the radius of the circle AFGH, at the circumference of which the moving force P is applied.

"In the preceding example, F, H, Q, &c. have been ſuppoſed to move with the ſame velocity; but when bodies revolve at unequal diſtances from the axis, their velocities of motion being different, other rules will be neceſſary to determine the force whereby any given point of the ſyſtem is accelerated. In demonſtrating the properties of rotatory motion, the revolving ſyſtem may be ſuppoſed to conſiſt of one or more of the bodies A, B, C; the magnitude of theſe may be ſuppoſed evaneſcent; becauſe, were the contrary ſuppoſition adopted, the particles in each body would be impelled by different moving forces, and exert different degrees of inertia in oppoſition to the communication of motion. But the force which impels each individual particle, and the effects of its inertia in different circumſtances, muſt be known before the acceleration of the whole ſyſtem can be determined.

"The bodies A, B, and C, which may be termed, according to the ideas juſt deſcribed, material points, are imagined to be connected together by ſome perfectly rigid ſubſtance, ſo as always to poſſeſs the ſame ſituation in reſpect to each other: and conſequently no motion can be produced in any of them, excepting that all revolve at the ſame time round the common axis of motion.

"All the points in this imaginary ſubſtance, by which the parts of the ſyſtem are connected together, partake of the ſame angular motion, deſcribing circles round the common axis S. A force P therefore being applied to any point in the plane of its motion, and in the direction of any line in that plane which paſſes not through the axis, will communicate an

equal angular motion to the whole. Thus, let B (fig. 113. pl. 22.) repreſent a material point moveable about an axis of motion paſſing through S. With the radius SD deſcribe a circle DGH. Now, if B be connected with every point in the area of this circle, which is an inflexible ſubſtance, no force can be applied to move the circle but what muſt communicate the ſame angular motion to B. Let the force be applied at the point D; it is manifeſt, that in order to render its effects conſtant, the inclination of its direction to SD muſt be always the ſame, and in a given plane; and the moſt obvious method of effecting this, either in conſidering the ſubject theoretically, or in the practical illuſtration of it, is by applying a thin and flexible line GHDP round the circumference of the circle DGH, and ſtretching this line by a given moving force P. Here it is plain, that in whatever part the point D is ſituated, the effects of the force P will be the ſame as if it were directly applied to D in the direction of the plane of motion, and perpendicular to SD, and the point B will revolve with the ſame abſolute and angular velocity in both caſes.

"Let now ABC (fig. 114.) be a ſyſtem of bodies of evaneſcent magnitude and without gravity, moveable about an axis of motion which paſſes through S; it muſt be obſerved, that the imaginary ſubſtance by which the parts of the ſyſtem ABC are connected, muſt contribute nothing either by its weight or inertia to accelerate or retard the motion of the material points A, B, C, which are cauſed to revolve by the action of the given and conſtant force P, applied at the diſtance from the axis SD. The abſolute force of to move D, or any point of the circumference, will be P; but the communication of motion to this point D is reſiſted by the inertia of the bodies A, B, C; which being moved with different velocities, and acted on by different moving forces, their inertia will not be eſtimated by their quantities of matter only, according to the laws obſerved in rectilinear motion: the force which accelerates D, therefore, cannot be obtained by dividing P by A + B + C; but if an equivalent maſs, or a quantity of matter, can be aſſigned, which being collected into any points of the circumference *a*, *b*, *c*, will cauſe an inertia or reſiſtance to the motion of D equal to that exerted by the particles A, B, C, when revolving at their reſpective diſtances, the force which accelerates the circumference or any point in it D will be determined. Thus, let the maſs Q, when collected into *a*, be ſuch as will be equivalent in its inertia to A, when revolving at the diſtance SA; alſo, let R be the maſs collected into *b*, which is equivalent to B when revolving at the diſtance SB; and let T, the maſs collected into C, be equivalent to C when revolving at the diſtance SC; then will the maſs moved by the force P be Q + R + T; and the force which accelerates the

$$\text{circumference} = \frac{P}{Q + R + T},$$

being equal to that by which the circumference or any point in it is accelerated when the point conſiſts of A and B and C, revolving at the reſpective diſtances from the axis of motion SA, SB, SC."

Our author next proceeds particularly to inveſtigate the motion of revolving bodies in almoſt all poſſible circumſtances, deducing from his propoſitions many concluſions very uſeful in practical mechanics. Many of theſe regard the pendulum, and are therefore taken notice of under that article; others more immediately relate to the parts of mechanics particularly treated of in this article: the principal of which follow.

1. The force which accelerates the centre of gravity of a ſphere, while it rolls down an inclined plane, is to the force by which it would be accelerated were it to ſlide in the ratio of five to ſeven. As our limits will not admit of inſerting at length the demonſtration of this and other propoſitions, we ſhall in this only obſerve, that when a wheel or a ſphere *rolls*, the circumference goes backward, while the centre moves forward; which retrograde motion muſt of neceſſity make the other ſlower than it would otherwiſe be: and this retardation Mr. Atwood has determined to be in the proportion above-mentioned.

From this propoſition the following corollaries are deduced: 1. The abſolute force whereby motion is generated in the circumference of a ſphere in ſuch a ſituation, is expreſſed by a fraction conſiſting of twice the weight of the ſphere divided by ſeven, and multiplied into another fraction conſiſting of the height of the plane divided by its length; that is, ſuppoſe the weight of the ſphere to be repreſented by w, the height of the plane by b, and its length by l, the force by which the circumference of the ſphere is impelled will be repreſented by $\frac{w}{7} \times \frac{b}{l}$. 2. In the ſame manner, let a cylinder roll down an inclined plane, keeping the axis always horizontal, and the force which accelerates the axis will be repreſented by the fraction $\frac{2}{3} \times \frac{b}{l}$.

2. Let AB (fig. 115.) repreſent a ſtraight lever moveable round an horizontal axis of motion, which paſſes through S. Let the arms be SB, SA. Suppoſe a weight W to be affixed to the extremity of the ſhorter arm, and to be raiſed by the weight P applied at the extremity of the longer arm, when the lever is horizontal. Required to determine the time in which W will be raiſed through any given height, the weight and inertia of the lever itſelf not being conſidered.

"When there is an equilibrium (ſays Mr. Atwood) on any mechanic power, the proportion of the weight ſuſtained to the power ſuſtaining it, will, in all caſes, be aſſigned from having given the dimenſions of the mechanic power. An equilibrium having been once formed, the ſmalleſt addition of weight will cauſe the body to which it is applied on either ſide to preponderate. In this caſe a certain degree of motion is generated; and ſince the uſes of the mechanic powers are not only to ſuſtain forces in equilibrio, but to raiſe weights and overcome reſiſtances, it is a problem of principal conſequence to aſſign the abſolute quantity of motion generated by a known moving force in given circumſtances." The general ſolution of the problem is as follows:

"Let AB be the lever. W the weight moved by the power P; each acting in a direction perpendicular to the horizon. Let G be the common centre of gravity of the whole ſyſtem, including the weights P and W with the lever itſelf; and o the centre of oſcillation, when AB vibrates round the axis S; the force which accelerates B when the lever is horizontal

$$= \frac{SG \times SB}{SG \times SO} = \frac{SB}{SO}\ *.$$

If this be put = F, the time wherein P deſcends through a perpendicular ſpace x, and conſequently wherein W aſcends through the correſponding ſpace; then

$$x \times \frac{SA}{SB} = \sqrt{\frac{}{lF}} \dagger \cdot \frac{1 + x^2}{SB^2\, 2.5}, \text{ \&c.} \quad - - - - - - - - -$$

$$= \sqrt{\frac{x}{l} \times \frac{SO}{SB}} + 1 + \frac{x^2}{SB^2\, 2.5}, \text{ \&c.}$$

3. Let ABC (fig. 116.) repreſent a wheel and axle, its weight w, and let the axis be horizontal; having a given weight Q applied to the circumference of the axle, and P ap-

* This he had formerly proved when treating of pendulums. † l is here put for 193 inches, the ſuppoſed velocity of the weight P.

plied to the circumference of the wheel in order to raiſe Q. Required to aſſign the ſpace deſcribed by the elevated weight Q in any given time. The ſolution of this problem, without attending to the demonſtration, is this; Having found the accelerating power, which here is $\frac{P \times SD - Q \times SA \times SA}{w \times SR^2 *. + p \times SD^2 + Q \times SA^2}$. All this he puts = F; and then l being = 193 inches as before, the ſpace deſcribed by Q in any number of ſeconds will be = the ſquare of that number of ſeconds multiplied into lF. On this propoſition our author makes the following obſervations:

"Whenever motion is communicated to a body, a certain reſiſtance muſt have been overcome by the moving force. This reſiſtance is of various kinds. 1. The inertia of the maſs moved, whereby it endeavours to perſevere in its ſtate of quieſcence, or of uniform motion in a right line. 2. That of a weight or other abſolute force oppoſed to the action of the moving power. 3. Obſtacles upon which the moving body impinging is retarded in its progreſs: ſuch, for example, is the reſiſtance which ariſes from the particles of a fluid through which a body moves. The eſtimation of theſe reſiſtances, and their effects in retarding the motion of bodies acted on by a given force, are deducible from the laws of motion, and conſtitute a part of the ſolution of almoſt all problems relating to the motion of bodies.

"The moving forces alſo are of various kinds, viz. The power of gravity, muſcular power, the impact of bodies, ſolid and fluid, &c. It has been ſhown, that the effects of theſe moving forces which are exerted on bodies in order to create motion, excluſive of the reſiſtance oppoſed to them, depend on the various circumſtances of the time in which they act, and on the ſpaces through which the bodies moved are impelled, &c.

"Theſe conſiderations are urged, to ſhow, that from the great variety of undetermined conditions which may enter into mechanical problems, there muſt of courſe be various methods of producing the ſame mechanical effect: and it is a very material part of the art, conſidered either in a theoretical or practical view, to proportion the means to the end, and to effect this with all the advantages which the nature of the caſe is capable of. It is the due obſervation of theſe particulars which contributes to render mechanic inſtruments complete, and the neglect of them defective, in their conſtruction. This proper choice of means to produce mechanical effects, is frequently the reſult of long continued experience independent of all theory; the knowledge of which, however, when applied to practice, would ſave the artiſt much time and trouble, as well as would be productive of other advantages, which experience alone muſt be deſtitute of."

4. A C (fig. 116.) is a wheel and axis moveable round an horizontal axis, which paſſes through S. Suppoſe a given weight Q, which is applied to the circumference of the axle; let it be required to aſſign the proportion of the radii of the wheel and axle, ſo that the time in which the weight Q aſcends through any given ſpace ſhall be the leaſt poſſible. In this caſe, ſuppoſing the radius of the wheel to be 10 inches, and its weight 22 ounces; let the radius of the axle SA = 1 inch, the weight to be raiſed through any given ſpace to be 100 ounces, the moving force by which it is raiſed to be 33 ounces; then the diſtance of the centre of gyration from the axis is $\sqrt{50}$ inches; and the length of the radius ſought is 9.55 inches.—If, inſtead of raiſing the weight perpendicularly, it be required to draw it horizontally, and to aſſign the diſtance SD, at which, if a given force P be applied, the time of deſcribing a given ſpace ſhall be the leaſt, and the moment of q the greateſt poſſible, we have the following concluſion: "Let the quantity of matter to be drawn along the plane be four times greater than that which is contained in the moving force; the radius of the axle SA being given; in order that it may be impelled with the greateſt velocity poſſible and with the greateſt moment, the radius of the wheel ſhould be double that of the axle when the inertia of the wheel is not conſidered.

5. Let ARCH (fig. 117.) be a ſyſtem of bodies moveable round a vertical axis which paſſes through the common centre of gravity of the ſyſtem. Suppoſe DEG to be a wheel, the axis of which is vertical, and coincident with that of the ſyſtem; let motion be communicated by means of a line going round this wheel, the ſtring DP being ſtretched by a given weight P; let it be required to aſſign the radius of the wheel EGD, ſo that the angular velocity communicated to the ſyſtem may be the greateſt poſſible. Here, ſuppoſing the moving force to be one-fourth of the weight of the ſyſtem, it ſhould be applied at a diſtance from the axis equal to twice the diſtance of the centre of gyration, in order to produce the greateſt poſſible angular velocity in a given time.

"In order (ſays Mr. Atwood) to increaſe the action of a moving force againſt a weight to be raiſed, or reſiſtance to be overcome, a combination of two or more mechanic powers is frequently made uſe of. Let p (fig. 118.) be a power applied by means of a line to the vertical wheel C: ſuppoſe the circumference of the axle K to be in contact with the circumference of any other vertical wheel B; ſo that the circumference of the wheel B may always move equally faſt with that of the axle which belongs to C; let alſo the axle of B communicate motion to a vertical wheel A, to the axle of which a weight q is ſuſpended, ſo as to act in oppoſition to p; moreover, let the ratio of lmn to 1 be the ſum of the ratios of the radius of each wheel to that of its axle: then, if $plmn = q$, the two weights p and q will ſuſtain each other in equilibrio; but if $plmn$ be at all greater than q, the equilibrium will be deſtroyed;" and our author gives a method of calculating the quantity of motion communicated in certain circumſtances.

Our author next goes through a ſet of ſimilar propoſitions relating to the pulley and wedge; after which he treats of the accumulation of power in ponderous cylinders, and the uſe of ballaſt-wheels in machines, of which mention has already been made; and having diſcuſſed theſe ſubjects, he next comes to treat of the action of a ſtream of water upon a wheel revolving round an horizontal axis.

6. Let ABC (fig. 119.) repreſent a water-wheel which revolves round an horizontal fixed axis, paſſing through its centre S. Suppoſe DEF to be the axle of this wheel, and that a weight W is affixed to a line DW, ſo wound round the axle, that while the wheel is driven round its own plane by the force of the water impinging at I, the weight W may be raiſed in a vertical line: having given the area of the boards I I, againſt which the ſtream impinges perpendicularly, and the altitude from which the water deſcends, it is required to aſſign the greateſt velocity with which the wheel can revolve.

"When a ſtream of any fluid (ſays he) impinges perpendicularly againſt a plain and quieſcent ſurface, the exact quantity of the moving force is equal to the weight of a column of the fluid, the baſe of which is the area upon which the fluid impinges, and the altitude that from which a body muſt deſcend freely from reſt by gravity, in order to acquire that velocity. This will be the moving force which impels the body when quieſcent or juſt beginning to move: but after it has acquired ſome motion, the impulſive force of the body will be

* R is the centre of gyration of the wheel.

diminiſhed; being the ſame as if the body were quieſcent, and the water impinged upon it with the difference of the former velocities. Wherefore the altitude of the column of the fluid, which is equal to its impelling force, will be always as the difference between the velocity of the impact and that of the body itſelf; and ſince the altitudes from which bodies fall from reſt are in a duplicate ratio of the velocities acquired, it follows, that the force of the impact will be in a duplicate ratio of the difference between the velocity of the wheel and that of the impact." The following is the concluſion drawn by Mr. Atwood concerning the velocity: Putting A for the weight of the column of water when the wheel is quieſcent; V the velocity with which it impinges on the boards II, &c. and y the velocity of the circumference ſought; W the weight of the wheel; then $y = V - V \times \sqrt{\frac{W}{A}} \times \frac{SD}{SI}$.

7. Every other thing remaining the ſame, let the weight W be varied; and let it be required to aſſign the weight W, ſo that when the wheel has acquired its uniform velocity, the moment of W may be the greateſt poſſible. Here the weight $= \frac{4A \times SI}{9SD.}$

8. Having given a weight W to be raiſed by the action of the ſtream of water, the force of which is = A againſt a quieſcent ſurface; let it be required to aſſign what muſt be the proportion between the radius of the wheel and that of the axle; ſo that the uniform velocity of the aſcending weight may be the greateſt poſſible. Here the length of the radius $= \frac{9W \times SD}{4A}$. Hence he concludes, that if the velocity with which the water impinges againſt the boards be doubled, the greateſt moment communicated to a weight aſcending uniformly, will be increaſed in the proportion of 8 to 1.

"The force (ſays Mr. Atwood) which communicates motion to water-wheels, and the reſiſtances which are occaſioned by friction, tenacity, and various other cauſes, render the application of the theory of mechanics to practice, in theſe caſes, extremely difficult. It is probably from this reaſon, that the conſtruction of machines moved by the force of water, &c. has been almoſt wholly practical, the beſt improvements having been deduced from continued obſervation of the reſults produced in given circumſtances; whereby the gradual correction of error, and varied experience of what is moſt effectual, have ſupplied the place of a more perfect inveſtigation from the laws of motion.

"This ſeems to be the beſt method, as far as regards the practical conſtruction of theſe machines, the nature of the caſe will admit of; for although there may be two ways leading ultimately to the ſame truths, *i. e.* a direct inveſtigation from the laws of motion and long continued obſervation, independent of theory, the latter is frequently the moſt eaſy and intelligible, although leſs direct and leſs ſcientific; the former being inacceſſible to thoſe who poſſeſs the elementary parts of mechanics only. It is in vain to attempt the application of the theory of mechanics to the motion of bodies, except every cauſe which can ſenſibly influence the moving power and the reſiſtance to motion be taken into account: if any of theſe be omitted, error and inconſiſtency in the concluſions deduced muſt be the conſequence. It was at one time ſuppoſed, from this inadequate application of the theory, that the ſame laws of motion would not extend to all branches of mechanics, but that different principles were to be accommodated to different kinds of motion. If this were truly the caſe, the ſcience of mechanics would fall ſhort of that ſuperior excellence and extent which it is generally allowed to poſſeſs. For it is probable, that there is no kind of motion but what may be referred to three eaſy and obvious propoſitions, the truth of which it is impoſſible to doubt: and if we are not enabled to inveſtigate the effects from the data in all caſes, the deficiency muſt not be imputed to the ſcience of mechanics, but to the want of methods of applying mathematics to it.

"This may be illuſtrated by an example, in order to ſhew that the motion communicated to water-wheels, however complicated the data may be, is equally referable to the laws of motion, with the effects of the moſt uncompounded force. If a ſtream of water falls perpendicularly on a plain ſurface, the moving force ariſing from the impact only is equal to the weight of a column of water, the baſe of which is the ſurface upon which the water impinges, and altitude that through which a body muſt fall to acquire the velocity of impact. If the inclination of the ſtream to the ſurface ſhould be changed, the force exerted in a direction perpendicular to the plane will be diminiſhed in a duplicate ratio of the radius to the ſine of inclination; the ſurface on which the water impinges remaining. Now, when the water falls on the boards of a water-wheel, the direction of the ſtream makes different angles with the planes of thoſe boards; for, ſince the particles of water deſcend in curve-lines, they will ſtrike any plane ſurface in the direction of a tangent to the curve on the point of impact. Moreover, the wheel will ſtrike the higher boards TT, fig. 119. with leſs velocity, and in a direction more inclined to their planes, than the lower ones II; it is alſo to be conſidered, that the ſtream will impinge on the boards at different diſtances from the axis of motion: all which circumſtances muſt be taken into account, to find the force which tends to communicate motion to the wheel when quieſcent; and when motion has been communicated, the force of the ſtream to turn the wheel will be determined in the manner already mentioned. But this is not the only conſideration which affects the moving force: the force hitherto conſidered has been ſuppoſed to proceed from the impact of the particles only; in which caſe, each particle after it has ſtruck the board is imagined to be of no other effect in communicating motion: but this is not wholly the caſe; for, after the particle has impinged on the board it will continue ſome time to operate by its weight; and this time will be longer or ſhorter according to the different conſtructions of the wheel. In the overſhot-wheel, the continuance of the preſſure, ariſing from the weight of the water, will be longer than in the underſhot, the force which ariſes from the impact of the water being nearly the ſame in each caſe. The whole moving force, therefore, will conſiſt of the impact determinable as above, and of the weight of the water deſcending along with the circumference, and communicating additional motion to it: this entire moving force being determined either by theory or experience, may be denoted by A. After the moving forch which impels the circumference has been determined, the reſiſtance to this force muſt be found; for on the proportion between the moving force and the reſiſtance the acceleration of the machine will depend. This reſiſtance is of various kinds: 1. That of inertia. 2. If the machine is of that kind which raiſes weights, ſuch for inſtance as water; the weight raiſed, allowing for its mechanical effect on the point of which we deſire to know the acceleration, muſt be ſubducted from the moving force before found; and this will be a conſtant quantity. There are other reſiſtances alſo homogeneal to weight, viz. thoſe of friction and tenacity, &c. which are variable in ſome ratio of the machine's velocity: and in order to proceed with the inveſtigation, the exact quantity of weight which the friction is equal to, when the wheel moves with a given velocity, muſt be conſidered, as well as the variation of the reſiſtances in reſpect to the velocities; which circumſtances muſt be determined by experiment. If the force equivalent to the friction, &c. be ſubducted from

the moving force, the remainder will give the moving power, by which the circumference is impelled upon the whole: this being divided by the inertia of the mafs moved, will give the force which accelerates the circumference.

The following apparatus has been invented by Mr. Atwood for illuftrating his doctrines concerning accelerated motion, and has been found to anfwer the purpofe more completely than any other we have heard of; difcovering at once the quantity of matter moved, the force which moves it, the fpace defcribed from reft, the time of defcription, and the velocity acquired.

1. *Of the mafs moved.*—In order to obferve the effects of the moving force, which is the object of any experiment, the interference of all other forces fhould be prevented: the quantity of matter moved, therefore, confidering it before any impelling force has been applied, fhould be without weight; for although it be impoffible to abftract the natural gravity or weight from any fubftance whatever, yet the weight may be fo counteracted as to be of no fenfible effect in experiments. Thus in the inftrument conftructed to illuftrate this fubject experimentally, A, B, fig. 120, repref ent two equal weights affixed to the extremities of a very fine and flexible filk line: this line is ftretched over a wheel or fixed pulley *abcd*, moveable round an horizontal axis: the two weights A, B, being precifely equal and acting againft each other, remain in equilibrio; and when the leaft weight is fuperadded to either (fetting afide the effects of friction), it will preponderate. When AB are fet in motion by the action of any weight m, the fum $A+B+m$ would conftitute the whole mafs moved, but for the inertia of the materials which muft neceffarily be ufed in the communication of motion: thefe materials conift of, 1. The wheel *abcd*, over which the line fuftaining A and B paffes. 2. The four friction-wheels, on which the axle of the wheel *abcd* refts: the ufe of thefe wheels is to prevent the lofs of motion, which would be occafioned by the friction of the axle if it revolved on an immoveable furface. 3. The line by which the bodies A and B are connected, fo as when fet in motion to move with equal velocities. The weight and inertia of the line are too fmall to have fenfible effect on the experiments; but the inertia of the other materials juft mentioned conftitute a conficerable proportion of the mafs moved, and muft be taken into account. Since when A and B are put in motion, they muft neceffarily move with a velocity equal to that of the circumference of the wheel *abcd*, to which the line is applied; it follows, that if the whole mafs of the wheels were accumulated in this circumference, its inertia would be truly eftimated by the quantity of matter moved; but fince the parts of the wheels move with different velocities, their effects in refifting the communication of motion to A and B by their inertia will be different; thofe parts which are furtheft from the axis refifting more than thofe which revolve nearer in a duplicate proportion of thofe diftances. If the figures of the wheels were regular, from knowing their weights and figures, the diftances of their centres of gyration from their axes of motion would become known, and confequently an equivalent weight, which being accumulated uniformly in the circumference *abcd*, would exert an inertia equal to that of the wheels in their conftructed form. But as the figures are wholly irregular, recourfe muft be had to experiment, to affign that equivalent quantity of matter, which being accumulated uniformly in the circumference of the wheel *abcd*, would refift the communication of motion to A in the fame manner as the wheels.

In order to afcertain the inertia of the wheel *abcd*, with that of the friction-wheels, the weights AB being removed, the following experiment was make. A weight of thirty grains was affixed to a filk line (the weight of which was not fo much as $\frac{1}{8}$th of a grain, and confequently too inconfiderable to have fenfible effect in the experiment); this line being wove round the wheel *abcd*, the weight 30 grains by defcending from reft communicated motion to the wheel, and by many trials was obferved to defcribe a fpace of about $38\frac{1}{3}$ inches in 3 feconds. From thefe data the equivalent mafs or inertia of the wheels will be known from this rule:

Let a weight P (fig. 121.) be applied to communicate motion to a fyftem of bodies by means of a very flender and flexible line going round the wheel SLDIM, through the centre of which the axis paffes (G being the common centre of gravity, R the centre of gravity of the matter contained in this line, and O the centre of ofcillation). Let this weight defcend from reft through any convenient fpace s inches, and let the obferved time of its defcent be t feconds; then if l be the fpace through which bodies defcend freely by gravity in one fecond, the equivalent weight fought $= \frac{W \times SR \times SO}{SD^2}$

$= \frac{P \times t^2 l}{s} - P.$

Here we have $P = 30$ grains, $t = 3$ feconds, $l = 193$ inches, $s = 38.5$ inches; and $\frac{P \times t^2 l}{s} - P = \frac{30 \times 9 \times 193}{385} - 30$ $= 13.23$ grains, or $2\frac{3}{4}$ ounces.

This is the inertia equivalent to that of the wheel *abcd*, and the friction wheels together: for the rule extends to the eftimation of the inertia of the mafs contained in all the wheels.

The refiftance to motion therefore arifing from the wheel's inertia, will be the fame as if they were abfolutely removed, and a mafs of $2\frac{3}{4}$ ounces were uniformly accumulated in the circumference of the wheel *abcd*. This being premifed, let the boxes A and B, fig. 120. be replaced, being fufpended by the filk line over the wheel or pulley *abcd*, and balancing each other: fuppofe that any weight m be added to A fo that it fhall defcend, the exact quantity of matter moved, during the defcent of the weight A, will be afcertained, for the whole mafs will be $A + B + m + 2\frac{3}{4}$ oz.

In order to avoid troublefome computations in adjufting the quantities of matter moved and the moving forces, fome determinate weight of convenient magnitude may be affumed as a ftandard, to which all the others are referred. This ftandard weight in the fubfequent experiments is $\frac{1}{4}$ of an ounce, and is repref ented by the letter m. The inertia of the wheels being therefore $= 2\frac{3}{4}$ ounces, will be denoted by $11\,m$. A and B are two boxes conftructed fo as to contain different quantities of matter, according as the experiment may require them to be varied: the weight of each box, including the hook to which it is fufpended, $= 1\frac{1}{2}$ oz. or according to the preceding eftimation, the weight of each box will be denoted by $6\,m$; thefe boxes contain fuch weights as are repref ented by fig. 122. each of which weighs an ounce, fo as to be equivalent to $4m$; other weights of $\frac{1}{2}$ oz. $= 2m$, $\frac{1}{4} = m$, and aliquot parts of m, fuch as $\frac{1}{2}m$, $\frac{1}{4}m$, may be alfo included in the boxes, according to the conditions of the different experiments hereafter defcribed.

If $4\frac{3}{4}$ oz. or $19\,m$, be included in either box, this, with the weight of the box itfelf, will be $25\,m$; fo that when the weights A and B, each being $25\,m$, are balanced in the manner above repref ented, their whole mafs will be $50\,m$, which being added to the inertia of the wheels $11\,m$, the fum will be $61\,m$. Moreover, three circular weights, fuch as that which is repref ented at fig. 123. are conftructed; each of which $= \frac{1}{4}$ oz. or m: if one of thefe be added to A and one to B, the whole mafs will now become $63\,m$, perfectly in equilibrio, and moveable by the leaft weight added to either (fetting afide the effects of friction), in the fame manner precifely as if the fame weight

or force were applied to communicate motion to the mafs $63\,m$, exifting in free fpace and without gravity.

2. *The moving force.* Since the natural weight or gravity of any given fubftance is conftant, and the exact quantity of it eafily eftimated, it will be convenient here to apply a weight to the mafs A as a moving force: thus, when the fyftem confifts of a mafs $=63m$, according to the preceding defcription, the whole being perfectly balanced, let a weight $\frac{1}{4}$oz. or m, fuch as is repreſented in fig. 124. be applied on the mafs A; this will communicate motion to the whole fyftem: by adding a quantity of matter m to the former mafs $63m$, the whole quantity of matter moved will now become $64m$; and the moving force being $=m$, this will give the force which accelerates the defcent of A $=\frac{m}{64m}$, or $\frac{1}{64}$ part of the accelerating force by which the bodies defcend freely towards the earth's furface.

By the preceding conftruction, the moving force may be altered without altering the mafs moved; for fuppofe the three weights m, two of which are placed on A, and one on B to be removed, then will A balance B. If the weights $3m$ be all placed on A, the moving force will now become $3m$, and the mafs moved $64m$ as before, and the force which accelerates the defcent of A $=\frac{3m}{64m}=\frac{3}{64}$ parts of the force by which gravity accelerates bodies in their free defcent to the furface.

Suppofe it were required to make the moving force $2m$, the mafs moved continuing the fame. In order to effect this, let the three weights, each of which $=m$, be removed; A and B will balance each other; and the whole mafs will be $61m$: let $\frac{1}{2}m$ fig. 124. be added to A, and $\frac{1}{2}m$ to B, the equilibrium will ftill be preferved, and the mafs moved will be $62m$; now let $2m$ be added to A, the moving force will be $2m$, and the mafs moved $64\,m$, as before; wherefore the force of acceleration $=\frac{1}{32}$ part of the acceleration of gravity. Thefe alterations in the moving force may be made with great eafe and convenience in the more obvious and elementary experiments, there being no neceffity for altering the contents of the boxes A and B: but the proportion and abfolute quantities of the moving force and mafs moved may be of any aſſigned magnitude, according to the conditions of the propofition to be illuftrated.

3. *Of the fpace defcribed.* The body A, fig. 120, defcends in a vertical line; and a fcale about 64 inches in length graduated into inches and tenths of an inch is adjufted vertical, and fo placed that the defcending weight A may fall in the middle of a fquare ftage, fixed to receive it at the end of the defcent: the beginning of the defcent is eſtimated from 0 on the fcale, when the bottom of the box A is on a level with 0. The defcent of A is terminated when the bottom of the box ftrikes the ftage, which may be fixed at different diftances from the point 0; fo that by altering the poſition of the ſtage, the fpace defcribed from quiefcence may be of any given magnitude lefs than 64 inches.

4. *The time of motion* is obferved by the beats of a pendulum, which vibrates feconds; and the experiments, intended to illuftrate the elementary propofitions, may be eafily fo conftructed that the time of motion fhall be a whole number of feconds: the eſtimation of the time, therefore, admits of conſiderable exactneſs, provided the obſerver takes care to let the bottom of the box A begin its defcent precifely at any beat of the pendulum; then the coincidence of the ſtroke of the box againſt the ſtage, and the beat of the pendulum at the end of the time of motion, will ſhow how nearly the experiment and the theory agree together. There might be various mechanical devices thought of for letting the weight A begin its defcent at the inſtant of a beat of the pendulum W: let the bottom of the box A, when at 0 on the ſcale, reſt on a flat rod, held in the hand horizontally, its extremity being coincident with 0, by attending to the beats of the pendulum; and with a little practice, the rod which ſupports the box A may be removed at the moment the pendulum beats, ſo that the deſcent of A ſhall commence at the ſame inſtant.

4. *Of the velocity acquired.* It remains only to deſcribe in what manner the velocity acquired by the deſcending weight A, at any given point of the ſpace through which it has deſcended, is made evident to the ſenſes. The velocity of A's deſcent being continually accelerated will be the ſame in no two points of the ſpace deſcribed. This is occaſioned by the conſtant action of the moving force; and ſince the velocity of A at any inſtant is meaſured by the ſpace which would be deſcribed by it, moving uniformly for a given time with the velocity it had acquired at that inſtant, this meaſure cannot be experimentally obtained, except by removing the force by which the deſcending body's acceleration was cauſed.

In order to ſhow in what manner this is affected particularly, let us again ſuppoſe the boxes A and B $=25\,m$ each, ſo as together to be $=50\,m$; this with the wheel's inertia $11\,m$ will make $61\,m$; now let m, fig. 125, be added to A, and an equal weight m to B, theſe bodies will balance each other, and the whole mafs will be $63\,m$. If a weight m be added to A, motion will be communicated, the moving force being m, and the mafs moved $64\,m$. In eſtimating the moving force, the circular weight $=m$ was made uſe of as a moving force: but for the preſent purpoſe of ſhowing the velocity acquired, it will be convenient to uſe a flat rod, the weight of which is alſo $=m$. Let the bottom of the box A be placed on a level with 0 on the ſcale, the whole mafs being as deſcribed above $=63\,m$, perfectly balanced in equilibrio. Now let the rod, the weight of which $=m$, be placed on the upper ſurface of A; this body will deſcend along the ſcale preciſely in the ſame manner as when the moving force was applied in the form of a circular weight. Suppoſe the mafs A, fig. 125, to have deſcended by conſtant acceleration of force of m, for any given time, or through a given ſpace: let a circular frame be ſo affixed to the ſcale, contiguous to which the weight deſcends, that A may paſs centrally through it, and that this circular frame may intercept the rod m, by which the body A has been accelerated from quieſcence. After the moving force m has been intercepted at the end of the given ſpace or time, there will be no force operating on any part of the ſyſtem which can accelerate or retard its motion: this being the caſe, the weight A, the inſtant after m has been removed, muſt proceed uniformly with the velocity which it had acquired that inſtant: in the ſubſequent part of its deſcent, the velocity being uniform will be meaſured by ſpace deſcribed in any convenient number of ſeconds.

Other uſes of the inſtrument. It is needleſs to deſcribe particularly, but it may not be improper juſt to mention the further uſes of this inſtrument; ſuch as the experimental eſtimation of the velocities communicated by the impact of bodies claſtic and nonelaſtic; the quantity of reſiſtance oppoſed by fluids, as well as for various other purpoſes. Theſe uſes we ſhall not inſiſt on; but the properties of retarded motion being a part of the preſent ſubject, it may be neceſſary to ſhow in what manner the motion of bodies reſiſted by conſtant forces are reduced to experiment by means of the inſtrument above deſcribed, with as great eaſe and preciſion as the properties of bodies uniformly accelerated. A ſingle inſtance will be ſufficient: thus, ſuppoſe the maſs contained in the weights A and B, fig. 125, and the wheels to be $61\,m$, when perfectly in equilibrio; let a circular weight m be applied to B, and let two long weights or rods, each $=m$, be applied to A, then

will A descend by the action of the moving force m, the mass moved being $64\,m$: suppose that when it has described any given space by constant accelleration, the two rods m are intercepted by the circular frame above described, while A is descending through it, the velocity acquired by that descent is known; and when the two rods are intercepted, the weight A will begin to move on with the velocity acquired, being now retarded by the constant force m; and since the mass moved is $62\,m$, it follows, that the force of retardation will be $\frac{1}{62}$ part of that force whereby gravity retards bodies thrown perpendicularly upwards. The weight A will therefore proceed along the graduated scale in its descent with an uniformly retarded motion, and the spaces described, times of motion, and velocities destroyed by the resisting force, will be subject to the same measures as in the examples of accelerated motion above described.

In the foregoing descriptions, two suppositions have been assumed, neither of which are mathematically true: but it may be easily shown that they are so in a physical sense; the errors occasioned by them in practice being insensible.

1. The force which communicates motion to the system has been assumed constant; which will be true only on a supposition that the line, at the extremities of which the weights A and B, fig. 12, are affixed, is without weight. In order to make it evident that the line's weight and inertia are of no sensible effect, let a case be referred to, wherein the body A descends through 48 inches from rest by the action of the moving force m, when the mass moved is $64\,m$; the time wherein A describes 48 inches is increased by the effects of the line's weight by no more than $\frac{312}{10000}$th parts of a second; the time of descent being 3.9896 seconds, when the string's weight is not considered, and the time when the string's weight is taken into account = 4.0208 seconds; the difference between which is wholly insensible by observation.

2. The bodies have also been supposed to move in vacuo, whereas the air's resistance will have some effect in retarding their motion: but as the greatest velocity communicated in these experiments, cannot much exceed that of about 26 inches in a second (suppose the limit 26.2845), and the cylindrical boxes being about $1\frac{1}{4}$ inches in diameter, the air's resistance can never increase the time of descent in so great a proportion as that of 240 : 241; its effects therefore will be insensible in experiment.

The effects of friction are almost wholly removed by the friction wheels; for when the surfaces are well polished and free from dust, &c. if the weights A and B be balanced in perfect equilibrio, and the whole mass consists of $63\,m$, according to the example already described, a weight of $1\frac{1}{2}$ grains, or at most 2 grains, being added either to A or B, will communicate motion to the whole; which shows that the effects of friction will not be so great as a weight of $1\frac{1}{2}$ or 2 grains. In some cases, however, especially in experiments relating to retarded motion, the effects of friction become sensible; but may be very readily and exactly removed by adding a small weight 1.5 or 2 grains to the descending body, taking that the weight added is such as is in the least degree smaller than that which is just sufficient to set the whole in motion, when A and B are equal and balance each other before the moving force is applied.

MEC

MECHOACAN, a province of Mexico, or New Spain, in America, bounded on the north by Panuco and Gaudalajara, on the east by Panuco and Mexico Proper, on the south by the Pacific Ocean, and on the west by Guadalajara and the South Sea. The soil is exceedingly fertile; and the climate so wholesome, that the Spaniards imagine it to be possessed of some peculiarly restorative quality: for which reason the sick and infirm flock to it from all quarters. The commodities are sulphur, indigo, sarsaparilla, saffafras, cacao, vanelloes, ambergrise, hides, wool, cotton, silk, sugar, the root mechoacan or white jalap, and silver. This province formed an independent kingdom at the time Mexico was reduced by Cortez. The sovereign had long been the inveterate enemy of the Mexicans, and was considered, next to the republic of Tlascala, as the most formidable barrier against the extension of the imperial frontier. However he submitted to Cortez without striking a blow, being intimidated by the wonders he had performed with a handful of men; and thus Mechoacan became a province of the Spanish empire, and a valuable addition to Mexico. The country at that time was exceedingly populous, but the natives are now much thinned; and that rather by the luxury and effeminacy introduced by the Spaniards, than by their tyranny. The capital of the province is also called *Mechoacan* by the natives, but *Valladolia* by the Spaniards.

MECHOACAN, or *White Jalap*, in the materia medica, the root of an American species of convolvulus brought from Mechoacan, a province of Mexico, in thin slices like jalap, but larger, and of a whitish colour. It was first introduced into Europe about the year 1524, as a purgative universally safe, and capable of evacuating all morbific humours from the most

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remote parts of the body: but as soon as jalap became known, mechoacan gradually lost its reputation, which it has never since been able to retrieve. It is nevertheless by some still deemed an useful cathartic; it has very little smell or taste, and is not apt to offend the stomach: its operation is slow, but effectual and safe. Geoffroy affirms, that there is scarce any purgative accompanied with fewer inconveniencies. It seems to differ from jalap only in being weaker; the resins obtained from both have nearly the same qualities, but jalap yields five or six times as much as mechoacan; hence it is found necessary to exhibit the latter in six times the dose of the former to produce the same effects.

MECKLENBURG, a duchy of Germany, containing those of Schwerin and Gustro, is bounded by Pomerania on the east, by part of the marquisate of Brandenburgh and the duchy of Lunenburgh on the south, the Baltic on the north, and Holstein and Saxe Lawenburg on the west. Their greatest length is about 120 miles, and greatest breadth upwards of 60. With respect to the soil, much cannot be said in favour of it, as it consists in general, either of sand, or large and desolate heaths, interspersed with moors, woods, fens, and lakes. It yields very little wheat, and not a great deal of oats, rye, and barley; but breeds a considerable number of sheep and cattle, has plenty of fish, with stone-quarries, salt-springs, alum, iron, and some copper. The principal rivers here are the Elde and Stor, which fall into the Elbe as it glides along the borders of this country to the south-west; the Reckenitz, which discharges itself into the Baltic; as do the Peene, the Warno, and the Stopenitz. This country has only one harbour on the Baltic, namely that of Rostock. In both

duchies, exclusive of Rostock, are 45 great and small cities, with three convents, and a great number of manors and farms, belonging either to the duke, the nobility or convents. The peasants are in a state of villanage; but the nobility enjoy very considerable privileges. The states are composed of the nobility and towns; and the diets, which are summoned annually, are held alternately at Sternberg and Malchin. The duchy of Schwerin appoints four provincial counsellors, and that of Gustro as many; who rank according to seniority with the duke's actual privy-councillors, as their marshals do with the colonels. The lesser committee represents the whole body of the nobility and commons, by whom the members are chosen freely and without controul, and no edict relative to the whole country can be published without their consent, or in prejudice of their rights. The inhabitants of this country are mostly Lutherans, under their superintendants. There are also some Calvinists and Roman Catholics. Besides the grammar-schools in the towns, there is an university at Rostock. The commodities of the duchy are corn, flax, hemp, hops, wax, honey, cattle, butter, cheese, wool and wood, a part of which is exported, but hardly any manufactures.

Of the house of Mecklenburg, there are two lines still subsisting, viz. that of Schwerin and that of Strelitz. The latter commenced in duke Adolphus Frederick II younger brother of the duke of Schwerin, and grandfather of the present duke of Strelitz, Adolphus Frederick IV. who entered on the government in 1752, and whose family hath lately received a great additional lustre by his Britannic majesty's taking his second sister for his consort, and by her own great merit and noble deportment in that high station. Besides the duchy of Strelitz, to this duke belong the principality of Ratzeburgh, with the lordship of Stargard, the ancient commanderies of Miro and Nemero, and a yearly pension of 9000 dollars out of the Boitzenburgh toll. The title assumed by both the dukes is *duke of Mecklenburg, prince of Wenden, Schwerin, and Ratzburgh, count of Schwerin and the country of Rostock, and lord of Stargard.* By the agreement concluded at Wittstock in 1442, the elector of Brandenburgh, on the extinction of the male-line of the dukes of Mecklenburg, is entitled to their whole succession. The duke of Schwerin has two votes both in the diet of the empire and that of the circle. The matricular assessment for the duchies of Schwerin and Gustro is 40 horse and 67 foot, or 748 florins monthly, including what is paid by Sweden for Wismar, and the bailiwics of Poll and Neukloster. To the chamber of Wetzlar, these two duchies pay each 243 rix-dollars, 43 kruitzers. For the government of Mecklenburg, the administration of justice, and the management of the revenue, there is the privy-council of regency, the demesne-chamber, the high and provincial court of justice, to which appeals lie in most causes, both from the consistory and the inferior civil courts, and which are common to both the dukes. As to the revenues, those of the Schwerin line must be very considerable, those arising from the demesne bailiwics and regalia alone amounting to 300,000 rix-dollars per annum. There is a tax on land that produces no contemptible sum, and that called the *princess's tax* is fixed at 20,000 rix-dollars: besides all these, there are also free-gifts. The whole revenues of the Strelitz branch are estimated at 120,000 rix-dollars. Each of these princes maintains a body of troops.

MECONIUM, the excrement contained in the guts of an infant at its birth. If this matter is not soon purged of, it occasions gripes, &c. A tea-spoonful of true castor oil is an excellent purge in this case; but the first milk from the mother's breast is usually sufficient, if it flows in due time.

MECONIUM, in pharmacy, the extract of British poppies. It has all the virtues of foreign opium, but in a somewhat lower degree.

MEDALS.

A MEDAL denotes a piece of metal in the form of coin, such as was either current money among the ancients, or struck on any particular occasion, in order to preserve to posterity the portrait of some great person, or the memory of some illustrious action. Scaliger derives the word *medal* from the Arabic *methalia*; a sort of coin with a human head upon it. But the opinion of Vossius is generally received; viz. that it comes from *metallum*, "metal;" of which substance medals are commonly made.

SECT. I. *Utility of Medals in History, and various other Sciences.*

THERE are few studies of more importance to history than that of medals; the sole evidence we can have of the veracity of an historian being only such collateral documents as are evident to every body, and cannot be falsified. In modern times, these are found in public memoirs, instructions to ambassadors, and state papers of various kinds. Such memorials, however, are subject to various accidents, and besides commonly remain in the countries where they are first published, and cannot therefore give to the world at large that perfect and entire satisfaction which ought to be derived from genuine history; so that more durable and widely diffused monuments are still to be wished for. Such are public buildings, inscriptions, and statues; but these, excepting a few instances of the two last, are always confined to particular countries; so that medals alone remain as infallible documents of truth, capable of being diffused over all countries in the world, and of remaining through the latest ages.

The study of the Greek coins does not show the dates of events, though it illustrates the chronology of reigns. This defect, however, is abundantly supplied by those of Rome, which commonly mark the date of the prince's consulship, the year of his tribunician power; giving also, upon the reverse, the representation or poetical symbol of some grand event.

Medals afford the most authentic documents of the Roman history, in particular, that could have been invented by man. The histories of Nerva and Trajan are much better elucidated by medals than by authors; for the history of Suetonius ends with Domitian, and the *Historiæ Augustæ Scriptores* begins with Adrian: so that the reigns of the two emperors just mentioned are almost unknown; and Mr. Pinkerton is surprised that none of the learned have attempted to supply the defect.—"Capitolinus (says he), in his life of Maximinus Junior, is quite puzzled to know if Maximus and Pupienus were two emperors, or two names for the same. Had he happened on any of those coins which bear M. CL. PUPIENUS MAXIMUS AUG. he would have seen at once that Maximus was only another name for Pupienus."

Medals are useful in other sciences besides history. In geography, we find the situation of towns determined by their vicinity to some noted river, mountain, &c. Thus, MAT-

ΝΗΤΩΝ ΣΙΠΥΛΟΥ shows that Magneſia was ſituated under Mount Sipylus. In like manner, it is ſhown from a medal, that Epheſus ſtood on the river Cayſter; and there is extant a medal, bearing an inſcription, which ſignifies Alexandria on the Scamander, a name given to Troy by Alexander the Great. The reverſe has upon it the famous Apollo Smintheus of Homer. In natural hiſtory, alſo, medals are uſeful chiefly from the coins ſtruck on the celebration of the ſecular games, in which the figures of various animals are preſerved; and thus it may very often be determined whether any animal be known to the ancients or not. On many of the Greek medals are ſeveral uncommon plants and animals. Thus, on moſt of the medals of Cyrene is the figure of the celebrated *Sylphium*; and on thoſe of Tyre, the ſhell-fiſh from which the famous Tyrian purple was procured. By means of medals, alſo, the exact delineations of many noble edifices are preſerved, though not even a veſtige of their ruins be now exiſting; ſo that the uſes of them to the architect are very conſiderable. To the connoiſſeur they are abſolutely neceſſary; becauſe by them alone he is enabled to aſcribe ancient buſts and ſtatues to their proper perſons, with multitudes of other points of knowledge which cannot be otherwiſe determined. The elucidations of obſcure paſſages in ancient authors by means of medals are ſo numerous and well known, that it is needleſs to inſiſt upon them.

Mr. Addiſon has treated the connection betwixt medals and poetry at conſiderable length; but Mr. Pinkerton finds fault with him for preferring the Latin to the Greek poets. He obſerves, alſo, that the knowledge of Greek medals is moſt neceſſary for a ſculptor, and perhaps an architect; but an acquaintance with Latin ones is preferable for a poet, or perhaps a painter. The reaſon of this difference is, that the former generally have on the obverſe the head of ſome king, god, or goddeſs, of exquiſite relief and workmanſhip; but the reverſe ſeldom affords much fancy of ſymbol in the early Greek coins; and in the imperial Greek coins, is chiefly impreſſed with the temples of their deities. To a perſon of poetical imagination, however, the Roman coins afford the greateſt entertainment, from the fine perſonifications and ſymbols to be found on their reverſes; of which our author gives many inſtances.

As the reverſes of medals are ſo uſeful for knowledge of perſonification, ſymbols of countries and actions, and the like; ſo the portraits to be ſeen on old coins are no leſs important to a painter; the high merit of a great number of them, in every character, juſtly intitling them to be regarded as the beſt ſtudies in the world. Not to mention, that, to an hiſtoric painter, the ſcience of ancient medals is abſolutely neceſſary, that he may delineate his perſonages with the features they really bore while in exiſtence. This can only be attained in this way, or from ſtatues and buſts; any one of which will coſt as much as hundreds of medals; and indeed a collection of ſuch is only attainable by princes.

The ſame things which render the ſtudy of medals important to a painter, do ſtill more ſo to a ſculptor; and in this particular, the ſtudy of the Greek coins is remarkably uſeful. The ſkill of the Greeks in the art of ſculpture has always been admired throughout the world: and on their coins the heads of ſeveral deities are repreſented in the moſt exquiſite *alto-relievo*. Our author therefore thinks it ſtrange, that the Grecian coins ſhould have hitherto been ſo little attended to by men of learning and taſte. They may have been looked upon, he ſuppoſes, as belonging only to the province of the antiquary; but he aſſures us, that the Greek medals will afford ſatisfaction to the perſons who value them only as pieces of workmanſhip. In moſt reſpects, they greatly excel thoſe of Rome even in its beſt times; which our author ſuppoſes to have been from the days of Auguſtus to Adrian. "In the days of Adrian, in particular (ſays he), the Roman mint ſeems to have been the very ſeat of art and genius; witneſs the vaſt number of exquiſite perſonifications, engraven with equal workmanſhip, which ſwarm on the medals of that prince. Yet from his time down to Poſthumus, coins of admirable workmanſhip are to be found. Thoſe of the Fauſtinas and Lucilla deſerve particular mention. There is one, and not an uncommon one, of the latter in great braſs, which yields to nothing of the kind. The reverſe is a Venus with the name around her. The portrait of the obverſe ſeems to ſpring from the field of the coin; it looks and breathes, nay talks, if you truſt your eyes. The coins of Tarſus are extremely remarkable for a kind of perſpective in the figures, as Froelich obſerves. On others are found triumphal arches, temples, fountains, aqueducts, amphitheatres, circi, hippodromes, palaces, baſilicas, columns and obeliſks, baths, ſea-ports, pharoſes, and the like. Theſe furniſh much pleaſure and inſtruction to the architect, and ſerve to form his taſte to the ancient manner; that manner which unites perfect ſimplicity with ſublimity and grace; that manner which every age admires, in proportion as it has genius to imitate.

Sect. II. *Hiſtory of Medals.*

The ſtudy of medals is not of very ancient date: None of the claſſic writers give any account of collections of them; though indeed many little particulars are paſſed without notice by them. In the times of the Greeks, a collection of ſuch coins as then exiſted muſt have been but little regarded, as conſiſting only of thoſe ſtruck by the numerous little ſtates which at that time uſed the Greek characters and language. Hence they would have had an air of domeſtic coinage, and no attention would have been paid to them, however exquiſite their workmanſhip might have been. The little intercourſe at that time carried on betwixt the different provinces alſo, greatly impeded any communication of knowledge to thoſe who wrote hiſtories; ſo that it is no wonder to find any ſmall collections that might then have exiſted altogether unnoticed by them.

Almoſt as ſoon as any communication was opened between the Greeks and Romans, the latter treated the arts of the Greeks with all due reſpect and applauſe. Their coins were imitated by the Romans, and preſerved in cabinets by the ſenators among their choiceſt treaſures. Suetonius informs us, that on ſolemn occaſions Auguſtus was accuſtomed to preſent his friends with medals of foreign ſtates and princes, along with other valuable teſtimonies of his friendſhip. In a more advanced period of the Roman empire, however, individuals would undoubtedly form collections of coins peculiar to their own ſtate; for Dr. Stukely, in his Medallic Hiſtory of Caraufius, informs us, that a complete ſeries of ſilver coins was lately found in Britain, containing all the emperors down to Caraufius inclufively. From Banduri we alſo know, that certain Greek coins were ſpecially preſerved by the Romans; and it appears from their code, that ancient gold and ſilver coins were made uſe of inſtead of gems; to which diſtinction thoſe of Sicily were particularly intitled. From the decline of the Roman empire till towards the end of the 5th century, almoſt all branches of literature were involved in darkneſs, and the medallic ſcience among the reſt. While the Chriſtian dominion of Conſtantinople laſted, indeed almoſt all the arts and ſciences may be ſaid to have been kept within its own boundaries; though the Arabs and eaſtern nations had ſome arts and ſciences of their own: but after the deſtruction of the imperial city by the Turks, the Greeks were once more compelled to become fathers to the European Science. Even before this time indeed, ſome veſtiges of a revival of literature had appeared in Italy; "and ſo intimate and neceſſary a connection (ſays Mr Pinkerton) has now the ſtudy of medals with that of ancient erudition, that, on the earlieſt appearance of a revival of the latter, the former was alſo diſcloſed."

The firſt among the moderns who began to ſtudy the medallic ſcience was Petrarch. Being deſired by the emperor Charles IV. to compoſe a book containing the lives of eminent men, and to place him in the liſt, he replied, that he would do ſo whenever the emperor's life and conduct deſerved it. In conſequence of this converſation he afterwards ſent the emperor a collection of gold and ſilver coins bearing the repreſentations of eminent men, with an addreſs ſuitable to his former declaration. A collection of coins was made in the next age by Alphonſo king of Arragon; but though this monarch collected all that could be found throughout Italy, we know that there could not have been very many, as the whole were contained in an ivory cabinet, and carried always about with him. A very conſiderable collection was made by Anthony Cardinal St. Mark, nephew to Eugene IV. who aſcended the pontifical chair in 1431; and ſoon after the grand muſeum at Florence was begun by Coſmo de Medici, where a collection of ancient coins and medals had a place among other curioſities. Corvinus king of Hungary about the ſame time formed a noble collection of coins along with ancient manuſcripts and other valuable relics of antiquity.

Mr. Pinkerton conſiders Agnolo Poliziano, more commonly known by the name of *Angelus Politianus*, as the firſt writer who adduced medals as vouchers of ancient orthography and cuſtoms. He cites different coins of the Medicean collection in his Miſcellanea written about the year 1400. By means of a cabinet of medals collected by Maximilian I. emperor of Germany, Joannes Huttichius was enabled to publiſh a book of the lives of the emperors, enriched with their portraits, delineated from ancient coins. It is generally ſuppoſed that this book, which appeared in 1525, was the firſt work of the kind; but Labbe, in his *Bibliotheca Nummaria*, mentions another named *Illuſtrium Imagines*, by one Andreas Fulvius, printed in 1517, in which moſt of the portraits ſeem to be from medals. About the year 1512 alſo, Guillaume Bude, a French author, had written his treatiſe *De Aſſe*, though it was not printed till many years afterwards. M. Grollier, treaſurer of the French armies in Italy, during part of the 16th century, had a great collection of coins of different kinds of metals. After his death, his braſs medals were ſent to Provence, and were about to be ſent into Italy; when the king of France, having got information of the tranſaction, gave orders to ſtop them, and purchaſe the whole at a very high price for his own cabinet of antiquities. M. Grollier had an aſſortment of gold and ſilver as well as of braſs medals: the cabinet in which they were contained fell two centuries afterwards into the hands of M. L'Abbe de Bothelin, and was known to have been that of Grollier, from ſome ſlips of paper, on which was his uſual inſcription for his books, *Joannis Grollierii et amicorum.*

Cotemporary with Grollier was Guillaume de Choul, who was likewiſe a man of rank and fortune. He had a good collection of medals, and publiſhed many in his Treatiſe on the Religion of the ancient Romans in 1557. In the low countries we know, from the letters of Eraſmus, that the ſtudy of medals was begun about the beginning of the 16th century. About the middle of that century, Hubertzus Goltzius, a printer and engraver, travelled over moſt countries in Europe ſearching for coins and medals, in order to publiſh books concerning them. From one of theſe works it appears, that there were then in the low countries 200 cabinets of medals, 175 in Germany, upwards of 380 in Italy, and 200 in France. It is probable, however, that there are now four times as many in theſe countries, beſides 500 in Britain; but we are not to imagine that all theſe were grand collections, for of ſuch there are not above a dozen even in Italy: moſt of thoſe juſt mentioned were of the claſs named *caſkets* of medals, containing from 100 to 1000 or 2000.

There are few countries, Italy excepted, in which a greater number of coins have been found than in Britain; though we are by no means well acquainted with the time when the ſtudy of them commenced. Mr. Pinkerton ſuſpects that Cambden was one of the firſt, if not the very firſt, Britiſh author who produced medals in his works, and who muſt have had a ſmall collection. Speed's Chronicle, publiſhed in the 17th century, was illuſtrated with coins from Sir Robert Cotton's cabinet. Gordæus's collection was purchaſed by Henry prince of Wales, brother to Charles I. to whom he left it at his death. According to Joſeph Scaliger, it conſiſted of 30,000 coins and medals. A collection of 5500 coins was purchaſed by Archbiſhop Laud for 600l. and given to the Bodleian library. Thomas earl of Arundel, earl-marſhal of England, well known from the Arundelian tables and other antiquities which he imported from Greece and Italy into Britain, had a rich cabinet of medals collected by Daniel Niſum. The dukes of Buckingham and Hamilton, Sir William Paſton, Sir Thomas Fanſhaw of Ware-Park, Sir Thomas Hanmer, Ralph Sheldon, Eſq; Mr. Selden, &c. are enumerated by Evelyn as collectors of medals. Charles I. as well as his hiſtorian the earl of Clarendon, were alſo collectors. The king had a very fine cabinet; which, however, were diſſipated and loſt during the civil commotions. Oliver Cromwell had a ſmall collection; and the cabinet of Charles II. is mentioned by Vaillant in the preface to his treatiſe intitled *Nummi in Coloniis*," &c. This branch of magnificence has not been much attended to by ſucceeding Britiſh monarchs; though his preſent majeſty has a very good collection of ancient gold coins.

A great number of fine cabinets have been formed in Britain ſince the time of Evelyn. About the year 1720 Haym makes mention of thoſe of the duke of Devonſhire, the earls of Pembroke and Winchelſea, ſir Hans Sloane, ſir Andrew Fontaine, Mr. Sadler, Mr. Abdy, Mr. Wren, Mr. Chicheley, and Mr. Kemp. At preſent there are many remarkable collections; but that of the late Dr. Hunter was deſervedly eſteemed the moſt remarkable in Europe, excepting that of the late French king. It was not only formed at a great expence, but with much care and ability; many foreign medals offered to it having been rejected. The other remarkable collections are thoſe of the duke of Devonſhire, the earl of Pembroke, earl Fitzwilliam, formerly the marquis of Rockingham's, the honourable Horace Walpole, the reverend Mr. Crachrode, the reverend Mr. Southgate, Mr. Townley, Mr. R. P. Knight, Mr. Edward Knight, Mr. Tyſon, Mr. Barker, Mr. Brown, and ſeveral others. The muſeum and univerſities have alſo collections; as well as the lawyers library, and the colleges in Scotland.

SECT. III. *Materials of which Medals are conſtructed.*

MEDALS are formed of gold, ſilver, and the various modifications of copper. The gold uſually made uſe of in coinage is about the fineneſs of 22 carats; and as the art of purifying this metal was very much unknown in former times, the moſt ancient medals are for this reaſon much more impure than the modern coins. Gold is never found in its native ſtate above 22 carats fine; and the very ancient medals are much under that ſtandard. Many of them are compoſed of a mixture of gold and ſilver, called by the ancients *electrum*. The gold medals were made of much finer metal after Philip of Macedon became poſſeſſed of the gold mines of Philippi in Thrace, and the medals of his ſon Alexander the Great are equally fine; as well as thoſe of ſome other princes of that age. Thoſe of the Egyptian Ptolemies are of the fineneſs of 23 carats three grains, with only one grain of alloy. The Roman coins are very pure, even from the earlieſt times; the art of refining gold being well known before any was coined at Rome. Some authors are of opinion, that the Roman coins

begin to fall ſhort of their purity after the time of Titus; but Mr. Pinkerton denies that any thing of this kind takes place till the time of the Emperor Severus; and even then only in a very few inſtances. Moſt of the Roman gold was brought from Dalmatia and Dacia, where that metal is ſtill to be met with. A very remarkable circumſtance is obſerved in the eaſtern part of Hungary, which belonged to the ancient Dacia: It germinates in the vines of Tokay, and is found in their ſtems; as it is elſewhere in the ſtraw of corn.

Pliny informs us, and indeed it is generally known, that gold and ſilver are found mixed together in the earth. When the ſilver amounted to one-fifth part of the gold, the metal was called *electrum*; but ſometimes the quantity of ſilver was added artificially. The gold was in thoſe days, as well as at preſent, refined by means of mercury: and the ancient artiſts had certainly attained to great perfection in this branch of metallurgy; as Bodin tells us, that the goldſmiths of Paris, upon melting one of Veſpaſian's gold coins, found only $\frac{1}{32}$th part of alloy.

Moſt of the ancient ſilver, particularly that of Greece, is leſs pure than that of ſucceeding times; even the Roman ſilver is rather inferior to the preſent ſtandard, and that from the very beginning; but in the time of Severus, the ſilver appears very bad, and continues ſo until the time of Dioclesian. Many writers upon this ſubject have miſtaken the *denarii ærei*, "coins of braſs waſhed with ſilver," for ſilver currency. Silver coins are extremely ſcarce from the time of Claudius Gothicus to that of Dioclesian. or from the year 270 to 284; in which ſhort ſpace no fewer than eight emperors reigned. Silver at that time was found moſtly in Spain; and the commerce with that country was diſturbed by the uſurpers who aroſe in Gaul: and ſuch were the troubles of the times, that not only the ſilver, but alſo the gold coins of thoſe eight emperors, are extremely ſcarce. There is ſtill, however, ſome ſilver extant of theſe eight emperors; and it is certain, that copper waſhed was never uſed as ſilver currency, but was entirely a diſtinct coinage. Occaſional depravations of ſilver had taken place long before; as Pliny tells us, that Mark Anthony mixed iron with his ſilver denarii; and Mr. Pinkerton informs us, that he had ſeen a denarius of Anthony, which was attracted by a magnet.

The ancient braſs coins conſiſt of two kinds: the red or Cyprian, which indeed is no other than copper; and the common yellow braſs. Our author obſerves, that in the Roman coinage braſs was of double the value of copper, and he is of opinion that it was the ſame among the Greeks; and the latter is the metal moſt commonly made uſe of in the Greek coinage. The Roman ſeſtertii are always of braſs: the middling ſized kind are partly copper and partly braſs; the former being double the value of the latter, which are the *aſes*.

Mr. Pinkerton next proceeds to give an account of the mixed metals uſed among the Romans. In Britain all kinds of coins made of mixed metal are without heſitation alleged to be forgeries; although it is certain that the variety of mixed metals uſed in coinage was very conſiderable. The moſt valuable mixture was that of gold or ſilver already mentioned, named *electrum*; the ſilver commonly amounting to one-fifth part of the gold made uſe of, or perhaps more. Of this mixture are many of the early coins of Lydia, and ſome other Aſiatic ſtates; alſo thoſe of the kings of the Boſphorus Cimmerius, during the imperial ages of Rome. Next to the electrum were the coins of Corinthian braſs: but Mr. Pinkerton informs us, that not a ſingle coin was ever ſtruck of this metal by the ancients; it having been conſtantly employed only in the fabrication of vaſes or toys. It was in uſe at any rate only for a very ſhort time; being altogether unknown in the days of Pliny the Elder. Our author therefore ridicules thoſe who pretend not only to find out imperial coins of this metal, but to diſcover three kinds of it; *viz.* one in which the gold predominates, another in which the ſilver prevails, and a third where the braſs is moſt conſpicuous. He gives Æneas Vico, one of the moſt ancient writers on medals, as the author of this idea; but whoſe opinions were confuted by one Savot, a writer in the 17th century. Vico mentions a coin of this kind ſtruck under Auguſtus, another of Livia, and a third of Claudius. The miſtake, he is of opinion, aroſe from the circumſtance of the firſt propagator not being able to account for the various mixtures and modifications of braſs obſervable in ancient coins of the large ſize; and which in ſo common a metal appear very odd to the moderns. Beſides the authority of Pliny and other antiquaries of more modern date, who all declare that they never ſaw a ſingle medal of Corinthian braſs, or of that metal mixed with ſilver and gold, our author adduces another evidence, which he looks upon to be ſuperior to either; *viz.* that thoſe who have given into this ſuppoſition, imagine, that the large pieces called *ſeſtertii*, and others called *dupondiarii*, worth about twopence or a penny, are ſaid to have been compoſed of this precious metal. It is unreaſonable to think, that any proportion of gold or ſilver could have been made uſe of in theſe. The coins ſaid to have been ſtruck upon Corinthian braſs are only done upon a modification of common braſs; of which we know, that in proportion to the quantity of zinc made uſe of in conjunction with the copper, the metal aſſumes a variety of hues. On the authority of Pliny he informs us, that the coins miſtaken for Corinthian braſs were no other than prince's metal.

The Egyptian ſilver coins, ſtruck under the Roman emperors, are at firſt of tolerably pure ſilver; but afterwards degenerate into a mixture of copper and tin with a little ſilver. They are very thick, but many of them are elegantly ſtruck, with uncommon reverſes. There are likewiſe three ſets of braſs coins belonging to this country, from the earlieſt times of the Roman emperors there. Some of theſe are of bell-metal or pot-metal; and after the time of Gallienus and Valerian, the coinage of braſs with a ſmall addition of ſilver becomes authoriſed by the ſtate; the coins ſtruck upon it being called *denarii ærei*. Thoſe of lead or copper plated with ſilver have been fabricated by Roman forgers. Some coins of lead, however, have been met with, of undoubted antiquity: and an ancient writer informs us, that tin money was coined by Dionyſius; but none has been found. The lead coins of Tigranes king of Armenia, mentioned as genuine by Jobert, are accounted forgeries by Mr. Pinkerton and other modern medaliſts. Plautus, however, makes mention of leaden coins, and ſeveral of them have been found; but our author looks upon them to have been chiefly eſſay pieces, ſtruck in order to let the artiſt judge of the progreſs of the dye. Others are the plated kind already mentioned, fabricated by ancient forgers, but having the plating worn off. A great number of leaden coins are mentioned by Ficorini, in a work entitled *Piombi Antichi*, in which he ſuppoſes them to have ſerved as tickets for gueſts; and coins of the ſame kind are alſo mentioned by Paſſeri. In the work intitled *Notitia Imperii Romani*, there is mention of coins made of leather, but none of them have ever been found.

Sect. IV. *Of Ancient Money.*

In conſidering the different ſizes, values, &c. of the Greek and Roman coins, our author treats of the medals as money; a knowledge of which, he ſays, is eſſentially neceſſary to every reader of the claſſics; inſomuch that it may almoſt diſpute the preference with the ſtudies of ancient geography and chronology. Notwithſtanding all that has been written upon the ſubject, however, our author is of opinion, that the ſcience is ſtill in its infancy, in as far as it relates to the real money of the ancients. "The ideal (ſays he), which is indeed the moſt important province of diſcuſſion, has been pretty clearly aſcer-

tained; and we are almoſt as well acquainted with the Attic *mna* or *mina*, and the perplexing progreſs of the Roman *ſeſtertia*, as with our own *pounds*. But with the actual coin of the ancients the caſe is different; and the ignorance even of the learned in this point is wonderful."

Our author now goes on, with great aſperity of language, to particulariſe the ignorant manner in which modern authors have treated the ſubject of medals. "Arbuthnot and Clarke (ſays he) are, if poſſible, more ignorant of medals than Budæus the very firſt. The latter profeſſes his love of medals, but quotes a conſular coin with the head of Cicero; and looks upon one of the 30 pieces of ſilver, the reward of the treachery of Judas, and which was ſaid to be preſerved among ſome relics at Paris, to be worthy of reference and commemoration. Arbuthnot, if we may judge from his book, had never ſeen any ancient coins; and Clarke, it is well known, was quite ignorant of them. The latter, with all his labour, ſeems even to have known nothing of the theoretic part of the real ancient money. Indeed Dr. Mead's catalogue ſeems to have been almoſt the only *book* on medals which had undergone his peruſal. On the other hand, the ignorance of medalliſts on this ſcore is no leſs profound. To this day they look upon the *didrachms* of Ægina, ſo celebrated in antiquity, as *tridrachms* of Ægium; and upon the early obolus as a braſs coin. In the Roman claſs the large braſs is eſteemed the *as*, while it ſhall be proved that it is the *ſeſtertius*, and worth four *aſes*. The *denarius* is reckoned at ten aſes even in the imperial times; whereas it only went at that rate for the firſt 90 years after the coinage of ſilver at Rome. The denarius æreus is taken for ſilver currency; with other miſtakes which evince that medalliſts are as ignorant of the theory as the others are of the practice."

In his account of the ancient Greek money, Mr. Pinkerton obſerves, that the light of ſcience, like that of the ſun, has proceeded from eaſt to weſt. "It is moſt probable (ſays he) that the firſt invention of money aroſe like the other arts and ſciences, and ſpread from thence into the weſtern parts of the world. In its firſt ſhape it appeared as mere pieces of metal without any ſtated form or impreſſion; in lieu of which it was regulated by weight. Even down to the Saxon government in England, large ſums were regulated by weight; and in our own times every ſingle piece is weighed in gold; though with regard to ſilver this nicety is not minded, nor indeed does it ſeem practicable. Among the ancients, whoſe commercial tranſactions were leſs important and extenſive than thoſe of the moderns, ſilver was weighed as well as gold, nay even braſs in ſome caſes.

In Greece, large ſums were determined by *mnæ* or *minæ*; and the moſt capital ſums by *talents*. In every country the mina is ſuppoſed to have contained 100 drachmæ, or ſmall ſilver coins, of that country, and the talent 60 minæ. The mina is ſuppoſed to be a pound weight of the country to which it belonged. The Attic pound, according to Dr. Arbuthnot, contained 16 ounces, equal to our avoirdupois pound: but Mr. Pinkerton looks upon this as a very abſurd opinion, and accuſes the doctor of having adopted it merely that he may explain a paſſage in Livy. He is of opinion, that the Attic pound is very nearly the ſame with the pound Troy. The mina of Athens had at firſt 73 drachms; but by Solon it was fixed at 100. The ancient drachm weighed the ſame which it does at preſent in medical weight, viz. the eighth part of an ounce. The mina or pound of 12 ounces had conſequently 96 of theſe drachms; but four of them were given to the round ſum to ſupply defects in the alloy; "and indeed (ſays our author), in conſequence of a common practice, in all ages and in all countries, of giving ſome addition to a large weight. Thus the pound in weight had but 96 drachmæ in fact, while the pound in tale had 100; as the Roman libra in weight had but 84 denarii, in tale 100; and as our pound in tale, by an inverſe progreſs, is not a third of our pound in common weight."

Notwithſtanding the very ſevere criticiſm on Dr. Arbuthnot juſt mentioned, however, we find our author adopting his account of the *talents* uſed in coinage in ſeveral countries. Thus, according to the doctor,

The Syrian talent had		15 Attic minæ.
Ptolemaic	-	20
Antiochian	-	60
Eubœan	- -	60
Babylonian	-	70
Larger Attic	-	80
Tyrian	-	80
Egyptian	-	80
Eginean	-	100
Rhodian	- -	100

Notwithſtanding the conceſſion made here by Mr. Pinkerton to the doctor, he tells us that he very much queſtions this liſt of talents, and that many ancient writers are little to be relied on.

Coinage, according to Herodotus, was firſt invented by the Lydians, from whom the Greeks quickly received it. The former could not have received it from the Perſians, whoſe empire did not begin till 570 B. C. though our author ſuppoſes that it might have proceeded from the Syrians, who carried on commerce in very ancient times. The moſt ancient Greek coins of ſilver have an indented mark upon one ſide, and a tortoiſe upon the other; and thoſe of greateſt antiquity have no letters upon them. Thoſe of later date have AIΓI marked upon them, which medalliſts interpret of Ægium in Achaia; being led into that ſuppoſition by the tortoiſe, which they look upon as the ſure mark of the Peloponneſus. But though our author agrees that the tortoiſe was ſo, he thinks that they are otherwiſe very far wrong in their concluſions. Ægium in Achaia was a place of no conſequence till the times of Aratus and the Achaian league; but there are 11 of theſe coins in Dr. Hunter's cabinet, which ſhow that they muſt have been ſtruck in times of the moſt remote antiquity, and that the place where they were ſtruck was rich and flouriſhing at the time. The coins we ſpeak of are not uncommon; but thoſe which have the name AIΓEIΩN at full length, and which may perhaps belong to Ægium in Achaia, are extremely ſcarce; inſomuch that in all Dr. Hunter's vaſt collection there are not above one or two. They are likewiſe conſtructed upon a ſcale quite different from all other Grecian money; being of 8, 13, 15$\frac{1}{7}$, 90, and about 186 grains. The Grecian drachma at an average is 66 grains; and Mr. Pinkerton thinks it would have been ſtrange if pieces had been ſtruck of eight-tenths of an obolus, of an obolus and an half, or of a drachma and an half. Ægium, being originally an obſcure village, could not be the firſt which coined money: ſo that Mr. Pinkerton ſuppoſes the name AIΓI to have ſtood for Ægialus, the ancient name of Sicyon, a wealthy and powerful city; or rather Ægina, the mint of which was much celebrated, and perhaps the moſt ancient in Greece.

Other arguments in favour of theſe coins being derived from Ægina, are drawn from their weight as well as their workmanſhip, which are quite different from thoſe bearing the name of Ægium at full-length. The coinage of Ægina is known to have been different from that of the reſt of Greece; inſomuch that its drachma was worth 10 Attic oboli, while the Attic drachma was valued only at ſix. Hence the drachmas of Ægina were named by the Greeks *παχειαν*, or *thick*; a name very applicable to the coins in queſtion. From theſe obſervations, our author is of opinion, that we may even diſtinguiſh the preciſe weight of the ancient coins of Ægina.

According to the exact proportion, the drachma of this place ſhould weigh exactly 110 grains; and one of them, very much rubbed, weighed above 90. The others of larger ſize, which ſeem to be didrachms of Ægina, weigh from 181 to 194 grains; but the latter being the only one he could meet with in good preſervation, it was impoſſible to form any juſt medium. Even in thoſe beſt preſerved, he thinks that ten grains may be allowed for a waſte of the metal in ſo long a time as 2400 years, which would bring the drachma of Ægina near its proper ſtandard. The obolus of Ægina was in proportion to its drachma of ſix oboli. It is the piece of 15½ grains, and 13 when very much rubbed. The hemiobolion is that of eight, and when rubbed ought to weigh nine.

The general denomination of the Greek money is the drachma, or eighth part of an ounce; which to this day is retained in the medical weights, the Grecian coins receiving their names from the weights they bore; though in ſome inſtances the weights received their appellations from the coins. The ſilver drachma, according to Mr. Pinkerton, was about nine pence ſterling; and he finds fault with thoſe who make the drachma and denarius both equal to one another, the latter being no more than eight pence. The didrachm of ſilver, according to the ſame calculation, was worth 18d.; but the *tridrachm* occurs very rarely: and Mr. Pinkerton is even of opinion, that medalliſts give this name to the didrachm of Ægina. The largeſt of all the Grecian coins is the tetradrachm, which on the Æ mean ſtandard is worth five ſhillings; but in thoſe of the other ſtates only four. There are, however, many ſubdiviſions in the ſilver drachma; the higheſt being the tetraobolion or coin of four oboli; being in proportion to the drachma as our groat to a ſixpence, weighing about 44 grains, and being in value about ſixpence. The hemidrachm or triobolion comes next in value, weighing about 33 grains, and worth fourpence halfpenny. The ſilver diobolion, or third of the drachma, weighs about 22 grains, and is worth three pence. The obolus of ſilver weighs about 11 grains, and is worth only three halfpence. There is likewiſe a hemiobolion in ſilver, or half the obolus, of five grains and an half, value three farthings: and another called *tetartobelion dichalcos*, or quarter obolus, which is the moſt minute coin yet met with; and by reaſon of its extreme ſmalleſs, weighing only two grains and a quarter, is now very ſcarce: but there is one in the cabinet of Dr. Hunter, and ſome more have been lately brought from Athens by Mr. Stuart. Some of them are likewiſe met with at Parentum. It would appear, however, that there were ſome ſtill ſmaller, and of value only three fourths of a farthing. None of theſe have been met with; and the ſmallneſs of the ſize renders it improbable that any will ever be met with; as the peaſants, who commonly diſcover coins, would probably either not obſerve them at all, or if they did would neglect them as things of no value.

Many different names have been impoſed on the coins belonging to the different ſtates of Greece: thus Κορη, *the maiden*, was a name often applied to the tetradrachm, and which would ſeem to apply to thoſe of Athens; though there are coins of other cities with the head of Proſerpine, and the word Κορη, to which it would appear more applicable in our author's opinion. Χελωνε, *the ſhell*, was the name of another coin, from its type. A Sicilian coin was named Δημαρετιον, from Gelon's wife. A tetradrachm was named Καπαταγους, and had eight ευβοιας or hemidrachms. The τροιζηνιον, ſo called from its country Troizene, had Pallas on one ſide and a trident on the reverſe. The hemiobolion was the πελανορ of Lacedemon; and the Κολλικος is ſuppoſed to have been equal to the Roman ſeſtertius or quarter drachma. The *cyſtophori* were coins with the myſtic cheſt or hamper of Bacchus upon them, out of which a ſerpent riſes; and are much celebrated in antiquity. We are told by Livy, that Marcus Acilius, in his triumph over Antiochus and the Etolians, carried 248,000 of them; Cneius Manlius Vulſo, in that over Gallo-Græcia, had 250,000; and Lucius Emilius Regillus, in his naval triumph over the fleets of Antiochus, had 131,300. Cicero likewiſe mentions his being poſſeſſed of a vaſt ſum in them. The moſt probable opinion concerning them ſeems to be, that they are all ſilver tetradrachms; ſuch as belong to the cities of Apamea and Laodicea in Phrygia, Pergamus in Myſia, Sardes and Tralles in Lydia, and Epheſus; but it is a miſtake to aſcribe any to Crete. Mr. Pinkerton thinks it abſurd to imagine that Crete, a ſmall iſland, ſhould ſtrike ſuch vaſt numbers of coins; though Cicero mentions his being in poſſeſſion of an immenſe treaſure in them at the time he was governor of Aſia Minor. "It is moſt likely (ſays Mr. Pinkerton), that his wealth ſhould be in the coin of the country to which he belonged. But what had theſe triumphs or Cicero's government to do with Cretan money? But indeed the coins themſelves, as above noticed, eſtabliſh the fact."

Another ſet of coins famous in antiquity were thoſe of Cyzicus in Myſia, which were of gold; but they are now almoſt entirely vaniſhed by being recoined in other forms. The Αριανδικον νομισμα, or *money of Aryandes*, who was made governor of Egypt by Cambyſes, is made mention of by Heſychius; but none of them, as far as is known, have reached our times. They muſt have been marked with Perſian characters, if with any. The coin of queen *Philiſtis* is mentioned by the ſame writer, and many of theſe pieces are ſtill extant; but we know not where this queen reigned, nor does there ſeem to be any means of finding it out. Mr. Pinkerton inclines to believe that ſhe preſided over Sicily; and as a confirmation of that ſuppoſition, mentions ſome inſcriptions of ΒΑΣΙΛΙΣΣΑΣ ΦΙΛΙΣΤΙΔΟΣ on the *Gradini* of the theatre at Syracuſe; but which appear not older than the Roman times. Some authors are of opinion, that ſhe reigned in Coſſara or Malta; which our author thinks much more improbable.

The moſt particular attention with regard to the names and ſtandard of coins is due to thoſe of Athens; and it is remarkable, that moſt of them which have reached us are of a very late period, with the names of magiſtrates inſcribed upon them. Some of theſe bear the name of Mithridates; and few are older than the æra of that prince; who, it is well known, took the city of Athens in his war with the Romans. I ſuſpect (ſays Mr. Pinkerton) that no Athenian coins of ſilver are poſterior to Sylla's infamous deſtruction of that city: an event the more remarkable, as Salluſt tells us that Sylla was learned in Greek. Indeed Caligula, Nero, and moſt of the peſts of ſociety, have been learned men, in ſpite of a noted axiom of Ovid,

Sed ingenuas didiſſe feliciter artes
Emollit mores, nec ſinit eſſe feros.

It is ſtill more remarkable, that the fabric of Athenian coins is almoſt univerſally very rude: a ſingular circumſtance, if we reflect how much the arts flouriſhed there. It can only be accounted for from the excellence of their artiſts being ſuch as to occaſion all the good ones to be called into other countries, and none but the bad left at home. In like manner the coins ſtruck at Rome in the imperial times are excellent, as being done by the beſt Greek artiſts; while thoſe of Greece, though famous at that time for producing miraculous works, are during that period commonly of very mean execution. The opulence of Athens in her days of glory was very great, owing in an eminent degree to her rich commerce with the kingdoms on the Euxine ſea, carried on chiefly from Delos, which belonged to Athens, and was the grand centre of that trade." Hence it has become matter of ſurpriſe to Neumann,

that when there are ſo many coins of Mycene, an iſland even proverbially poor, there ſhould be none of Delos. But Mr. Pinkerton accounts for this from Mycene's being a free ſtate, and Delos ſubject to Athens. "It may be well ſuppoſed (ſays he), that Athens had a mint at Delos; and ſuch Athenian coins as have ſymbols of Apollo, Diana, or Latona, were ſtruck in this iſland."

The copper-money of the Greeks is next in antiquity to the ſilver. Mr. Pinkerton is of opinion that it was not uſed at Athens till the 26th year of the Peleponneſian war; about 404 years before Chriſt, and 300 after ſilver was firſt coined there. The firſt copper coins were thoſe of Gelo of Syracuſe, about 490 B. C.

The chalcos of braſs, of which eight went to the ſilver obolus, ſeems to have been the firſt kind of Greek coin. At firſt it was looked upon as of ſo little conſequence that it became proverbial; and to ſay that a thing was not worth a *chalcos*, was equivalent to ſaying that it was worth nothing. As the Greeks became poor, however, even this diminutive coin was ſubdivided into two, four, nay eight λεπτα or ſmall coins; but our author cenſures very ſeverely thoſe who have given an account of thoſe diviſions. "Pollux and Suidas, copying from him (ſays he), tell us, that there were ſeven lepta to one chalcos; a number the moſt unlikely that can be, from its indiviſibility and incapacity of proportion.

"Pollux lived in the time of Commodus, ſo was too late to be of the ſmalleſt authority: Suidas is four or five centuries later, and out of the queſtion. Pliny tells us that there were ten chalci to the obolus; Diodorus and Cleopatra that there were ſix; Iſidorus ſays there were four: and if ſuch writers differ about the larger denomination, we may well imagine that the ſmaller equally varied in different ſtates; an idea ſupported by theſe undeniable witneſſes, the coins which remain. Moſt of the Greek copper-coin which has reached our times conſiſts of chalci; the lepta being ſo ſmall as to be much more liable to be loſt. In Dr. Hunter's cabinet, however, there are ſeveral of the dilepta of Athens: and from being ſtamped with the repreſentation of two owls, ſeem to be the ſame with the ſilver diobolus: "a circumſtance (ſays Mr. Pinkerton) of itſelf ſufficient to confute Pollux; for a dilepton can form no part of ſeven: a number indeed which never appeared in any coinage of the ſame metals, and is contradictory to common ſenſe. It may be obſerved, that the whole braſs coins of Athens publiſhed by Dr. Combe are reducible to four ſizes, which may be the *lepton*, *dilepton*, *tetralepton* or *hemichalchos*, and *chalchos*. The firſt is not above the ſize of one of king James I.'s farthing tokens; the laſt about that of our common farthing." The *lepta* was alſo called Κερμα, as being change for the poor. The Κιδαϛος, perhaps ſo called from the figure of a wolf upon it, was the coin of a particular ſtate, and if of braſs muſt have weighed three chalci. The other names of the copper-coins of Greece are but little known. Lycurgus ordered iron money to be coined at Sparta; but ſo periſhable is this metal, that none of that kind of money has reached our times.

After the conqueſt of Greece by the Romans, moſt of the coins of that country diminiſhed very much in value, the gold coinage being totally diſcontinued: though ſome of the barbarous kings who uſed the Greek character were permitted to coin gold, but they uſed the Roman model; and the ſtandard uſed by the few cities in Aſia who ſpoke the Greek language in the times of the emperors is entirely unknown. Copper ſeems to have been the only metal coined at that time by the Greeks themſelves; and that upon the Roman ſtandard, then univerſal through the empire, that there might be no impediment to the circulation of currency. They retained, however, ſome of their own terms, uſing them along with thoſe of the Romans. The *aſſarion* or *aſſarium* of Rome, the name of the diminiſhed *as*, being 16 to the drachma or denarius, the obolus was ſo much diminiſhed in value as to be ſtruck in braſs not much larger than the old chalcus, and valued at between two and three aſſaria, which was indeed its ancient rate as to the drachma. This appears from the copper coins of Chios, which have their names marked upon them. The braſs obolus, at firſt equal in ſize to the Roman ſeſtertius or large braſs, leſſens by degrees to about the ſize of a ſilver drachma. From the badneſs of the imperial coinage in Greece alſo, it appears that braſs was very ſcarce in that country, as well as in all the cities uſing the Greek characters; being found moſtly in the weſtern countries of the Roman empire. The time of this declenſion in ſize of the Greek coins is by Mr. Pinkerton ſuppoſed to have been from Auguſtus down to Gallienus. He is of opinion, however, that the copper obolus, at firſt above the ſize of large braſs, was uſed in Greece about the time of its firſt ſubjection to Rome; and that the lepta ceaſing, the chalci came in their room, with the dichalchus and the hemiobolion of braſs.

With reſpect to the gold coins of the Greeks, Mr. Pinkerton is of opinion, that none of that metal was coined before the time of Philip of Macedon, as none have reached our times prior to the reign of that monarch. From a paſſage in Thucydides our author concludes, that in the beginning of the Peloponneſian war the Athenians had no gold coin. Mentioning the treaſure in the Acropolis or citadel of Athens, at the commencement of that war, the hiſtorian mentions ſilver-coin, and gold and ſilver in bullion; and had any of the gold been in coin, he would certainly have mentioned it. Philip began his reign about 68 years after the beginning of the Peloponneſian war; and we can ſcarce ſuppoſe that any city would have preceded the elegant and wealthy Athens in the coining of gold.

Notwithſtanding, however, this deficiency of gold coin among the Greeks, it is certain that the coinage of gold had taken place in Sicily long before; as we have gold coins of Gelo about 491 B. C. of Hiero I. 478, and of Dionyſius I. in 404, all uſing the Greek characters; though not to be ranked among the gold coins of Greece, as Philip caused his to be. Gold coins of Syracuſe even appear of the third claſs of antiquity, or with an indented ſquare, and a ſmall figure in one of its ſegments. Gold coins were uſed in the cities of Brettium, Tarentum, and throughout Magna Grecia; alſo in Panticapæa in Thrace, and likewiſe Coſa in that country; but not in Tuſcany as is commonly believed, though Neumann proves that they are ſtruck by Brutus, and are unqueſtionably as ancient as the Greek coins. The Thebans and Athenians probably coined the firſt gold after Philip had ſet them the example, and when they were attempting to reſiſt the projects of that enterpriſing monarch. The Ætolians probably coined their gold during the time of their greateſt power, about a century after Philip, and when they were combating the power of Aratus and the Achæan league. "There is (ſays Mr. Pinkerton) but one ημιχρυσος of Thebes, much worn, in Dr. Hunter's cabinet, and weighing but 59 grains; and perhaps not above two or three χρυσαι or gold didrachms of Athens in the world; one of which is alſo in the collection of Dr. Hunter, and weighs 132½ grains. It appears to be more modern than the reign of Philip. That monarch having got poſſeſſion of the mines of Philippi in Thrace, improved them ſo much, that they produced him annually above a thouſand talents of gold, or 2,880,000l. of our money. From this gold the firſt coins named from the monarch *Philippi* were ſtruck. They were marked with his portrait; and for many ages after were ſo numerous, that they were common in the Roman empire; whence the name *Philippi* became at length

common to gold, silver, and at last even brass coins of their size. Even in the time of Philip gold was very scarce in Greece: but after the Phocians had plundered the temple of Delphos, this precious metal, which had been valued as gems, and consecrated only to the decoration of the temples of the gods, began to be known among the Greeks. The comparative value of gold and silver, however, seem to have been at that time very different from what they are now. Herodotus values gold at 13 times its weight in silver; Plato in his Hipparchus at 12; and even the low value of 10 to 1 seems to have been the stated value in Greece, though in Rome the plenty of silver from the Spanish mines made the value of gold to be much higher; and there is no reason to think that it was ever valued in that city at less than 12 times its weight in silver. The *Philippus*, χρυσος, gold piece, or *stater*, is a didrachm, and is the most common of all the ancient coins. Mr. Pinkerton is of opinion, that it went for 20 silver drachms on its first appearance; but in later times for 25 Greek drachmæ or Roman denarii. There are proofs of the Philippi being didrachms, both from the writings of ancient authors, and from numbers of the coins themselves, which remain to this day; and that the χρυσος, or principal gold coin of Greece, was of the same weight, is also evident from ancient writings. It was anciently worth about 15s. but valuing gold now at the medium price of 4l. per ounce, it is worth about 20s. The ημιχρυσος, or half the former coin, scarcely occurs of the coinage of Philip and Alexander, though it does of Hiero I. of Syracuse, and of king Pyrrhus. It passed for ten silver drachmas, and was valued only at 7s. 6d. though now worth 10s. There was another division of this kind worth about 5s. There were besides some lesser divisions of gold coins, which could not be worth above two drachmas. These were coined in Cyrene; and there were besides several old gold coins of Asia Minor, the value of which is now unknown. Our author supposes that they were coined not with relation to their weight as parts of the drachma, but merely to make them correspond with so many silver pieces as was necessary. There are also larger coins than the χρυσος, the διχρυσος of Alexander and Lysimachus being double its value. Some others are met with by Lysimachus, Antiochus III. and some of the Egyptian monarchs, weighing four times the χρυσος, and now worth about 4l. sterling. Some weigh even more; but this our author supposes owing to the gold being less pure.

In Rome, as well as in Greece, the money was at first estimated by weight; and the first metal coined by that people was copper, silver being long unknown in Rome; nor is it certainly known that any silver has ever been found in the Italian mines. In Rome the first valuation of money was by the *libra gravis æris*, or pound of heavy brass: and in the progress of their conquests, the little silver and gold that came in their way was regulated by the same standard, as appears from the story of Brennus. The weights made use of were the same with those which continue to this day. The pound consisted of 12 ounces of 458 grains each; but the pound by which the money was weighed appears to have consisted only of 420 grains to the ounce, or to have contained in all 5040 grains. This became the standard of copper; and when silver came to be coined, seven denarii went to the ounce, as eight drachms did in Greece. Gold was regulated by the *scriptulum* or *scrupulum*, the third part of a denarius, and by the larger weights just mentioned. The number 10 was at first used by the Romans in counting their money; but finding afterwards that a smaller number was more convenient, they divided it into quarters; and as the quarter of 10 is $2\frac{1}{2}$, they for this reason bestowed upon it the name of *sestertius*, or "half the third;" to express that it was two of any weights, measures, &c. and half a third; whence the sestertius came at last to be the grand estimate of Roman money. The *as* being at first the largest, and indeed the only Roman coin, the word *sestertius* means *sestertius as*, or "two ases and an half." On the first coining of silver, the denarius of ten ases was struck in the most common and convenient denary division of money, or that by tens; the sestertius being of course two ases and an half. But the denarius being afterwards estimated at 16 ases, the name *sestertius* was still applied to a quarter of the denarius, though it now contained four ases. The term *sestertius* was applied to all sums not exceeding 1000 sestertii, or 8l. 6s. 8d.; but for greater sums the mode of the sestertius was likewise altered, though not to exclude the former. Very large sums of money were estimated by the hundred weight of brass; for the Romans were at first unacquainted with the talent. The hundred weight, by way of eminence, was distinguished by the name of *pondus*, and *sestertium pondus* became a phrase for two hundred weight and an half. Mr. Pinkerton is of opinion, that we may value the *as libralis* of ancient Rome at about eight pence English. Estimating the *as* therefore at a pound weight, the *sestertium pondus* was equal to 1000 *sestertii*, or 8l. 6s. 8d.; and by a coincidence which our author supposes to have been the effect of design, as soon as the silver coinage appeared, the *sestertium centum denariorum* was always equal to 8l. 6s. 8d. also. The word *sestertium* itself, however, seems to have been unknown prior to the coinage of silver money at Rome; the *pondera gravis æris* being sufficient before that time for all the purposes of a state in which money was so scarce. But however this may be, the *pondus* or hundred weight of brass was precisely worth 100 denarii, or a pound of silver. As the great sestertium was always valued at 1000 of the smaller, or 8l. 6s. 8d. we never find one sestertium mentioned in authors, but two, three, or more; ten thousand of them being equal to 8,333,333l. 6s. 8d.

The states from which the Romans may be supposed first to have derived their coinage, were the Etruscans and the Greek colonies in Magna Græcia and Sicily. Joseph Scaliger, Gronovius, &c. contend that it was from the Sicilians that the Romans first derived their knowledge of money; but Mr. Pinkerton argues that it was from the Etruscans. In confirmation of his opinion he appeals to the state of the Roman territories in the time of Servius Tullius, who is looked upon to have been the first who coined money at Rome. At that time the whole Roman dominion did not extend beyond ten miles round the city, and was entirely surrounded by the Etruscan and Latin states; Cuma being the next Greek colony to it that was of any consequence, and which was in the neighbourhood of Naples, at about the distance of 150 miles. Our author asks, Is it reasonable to think that the Romans received the use of money from the Etruscans and Latians who were their neighbours, or from the Greeks who were at a distance and at that time, as far as appears from their history, absolutely unknown to them? "If this argument (adds he) is strong with regard to the nearest Grecian colonies, what must it be with respect to Sicily, an island 300 miles distant from Rome, where it was not known, at that time, if a boat went by land or water?" Arguments, however, for this opinion, have been derived from the similarity betwixt the Sicilian and Roman coins; which Mr. Pinkerton now proceeds to examine. The Greek pound in Sicily was called λιτρα, and consisted, like the Roman, of 12 ουγκιαι, or ounces; and Mr. Pinkerton grants that the Roman *libra* was derived from the Greek λιτρα, but denies that the *as*, or libra, a coin, was from Sicilian model. The Sicilians had indeed a coin named λιτρα; but it was of silver, and of equal value to the Æginean standard, ten of which went to the Sicilian δεκαλιτρον. He differs from Gronovius, that the standard of Ægina was

uſed at Corinth, and of courſe at Syracuſe; as it appears from Ariſtotle, that the Sicilians had a talent or ſtandard of their own. The Sicilian obolus or λιτρα contained alſo 12 ounces or *chalci*, ſo named at firſt becauſe they weighed an ounce weight; but the ουγκιαι of Hiero weigh more than a Troy ounce: and the braſs coins of Agrigentum are marked with cyphers as far as ſix; the largeſt weighing only 186 grains, or about one third of the primitive ounce. Our author denies that even the Roman denarius took its riſe from the Sicilian δεκαλιτρον, as many authors aſſert. Were this the caſe, it would have weighed 180 grains; whereas the Roman denarii are not above the third part of the quantity.

From all theſe conſiderations, our author is of opinion, that the Sicilians borrowed the diviſion of their λιτρα from the Etruſcans, or poſſibly from the Romans themſelves; which our author thinks is more probable than that the Romans had it from Sicily. The ſtrongeſt argument, however, againſt the Roman coinage being borrowed from the Sicilian is, that though great numbers of Sicilian coins are to be found in the cabinets of medalliſts, yet none of them reſemble the *as libralis* of the Romans in any degree. In moſt cabinets alſo there are Etruſcan coins upon the exact ſcale of the *as libralis*, and ſeveral of its diviſions; from whence Mr. Pinkerton concludes, that "theſe, and theſe alone, muſt have afforded a pattern to the primitive Roman coinage." The Etruſcans were a colony from Lydia, to which country Herodotus aſcribes the firſt invention of coinage. "Thoſe coloniſts (ſays Mr. Pinkerton), upon looking round their ſettlements, and finding that *no* ſilver was to be had, and *much leſs* gold," ſupplied the mercantile medium with copper; to which the caſe of Sweden is very ſimilar, which, as late as the laſt century, had copper coins of ſuch magnitude, that wheel-barrows were uſed to carry off a ſum not very conſiderable.

Some coins are found which exceed the *as libralis* in weight; and theſe are ſuppoſed to be prior to the time of Servius Tullius. Some of them are met with of 34 and of 53 Roman ounces; having upon one ſide the figure of a bull rudely impreſſed, and upon the other the bones of a fiſh. They are moſt commonly found at Tudder, or Tuderum in Umbria; but they appear always broken at one end: ſo that Mr. Pinkerton is of opinion that perhaps ſome might be ſtruck of the decuſſis form, or weighing ten pounds. Theſe pieces, in our author's opinion, make it evident, that the Romans derived their large braſs coins from the Etruſcans and the neighbouring ſtates: they are all caſt in moulds; and the greater part of them appear much more ancient than the Roman aſes, even ſuch as are of the greateſt antiquity.

Mr. Pinkerton agrees with Sir Iſaac Newton as to the time that Servius Tullius reigned in Rome, which he ſuppoſes to be about 460 B. C. His coinage ſeems to have been confined to the as, or piece of braſs having the impreſſion of Janus on the one ſide, and the prow of a ſhip on the other, becauſe Janus arrived in Italy by ſea. Varro, however, informs us, that the very firſt coins of Tullius had the figure of a bull or other cattle upon them, like the Etruſcan coins, of which they were imitations. Thoſe with the figure of Janus and the prow of a ſhip upon them may be ſuppoſed firſt to have appeared about 400 B. C. but, in a ſhort time, various ſubdiviſions of the as were coined. The *ſemis*, or half, is commonly ſtamped with the head of Jupiter laureated; the *triens*, or third, having four cyphers, as being originally of four ounces weight, has the head of Minerva; the *quadrans*, or quarter, marked with three cyphers has the head of Hercules wrapt in the lion's ſkin; the *ſextans*, or ſixth, having only two cyphers, is marked with the head of Mercury with a cap and wings; while the *uncia*, having only one cypher, is marked with the head of Rome. All theſe coins appear to have been caſt in moulds, by a conſiderable number at a time; and in the Britiſh muſeum there are four of them all united together as taken out of the mould in which perhaps dozens were caſt together. In proceſs of time, however, the ſmaller diviſions were ſtruck, inſtead of being caſt; but the larger ſtill continued to be caſt until the as fell to two ounces. Even after this time it was ſtill called *libra*, and accounted a pound of copper, though there were now larger denominations of it coined, ſuch as the *biſſas* or double as: *treſſis* and *quadruſſis* of three and four aſes; nay as far as *decuſſis* or ten aſes, marked X. Olivieri mentions one in his own cabinet weighing upwards of 25 ounces, and caſt when the as was about three ounces weight. There is likewiſe in the Muſæum Etruſcum a decuſſis of 40 Roman ounces, caſt when the as was at four ounces. There was likewiſe a curious decuſſis in the Jeſuits' library at Rome, for which an Engliſh medalliſt offered 20l.; but it was ſeized by the Pope, along with every other thing belonging to the ſociety.

Mr. Pinkerton conteſts the opinion of Pliny that the as continued of a pound weight till the end of the firſt Punic war. His opinion (he ſays) is confuted by the coins which ſtill remain; and it appears probable to him that the as decreaſed gradually in weight; and, from one or two of the pieces which ſtill exiſt, he ſeems to think that the decreaſe was ſlow, as from a pound to eleven ounces, then to ten, nine, &c.; but neither the as nor its parts were ever correctly ſized. During the time of the ſecond Punic war, when the Romans were ſore preſſed by Hannibal, the as was reduced to a ſingle ounce. It is ſaid to have taken place in the 215th year before our æra, being about 36 years after the former change. This as libralis, with the face of Janus upon it, is the form moſt commonly met with previous to its being reduced to two ounces. Our author ſuppoſes that the as libralis continued for at leaſt a century and an half after the coinage of Tullius, down to 300 B. C. about the year of Rome 452, between which and the 502d year of Rome a gradual diminution of the as to two ounces muſt have taken place. The following table of the dates of the Roman coinage is given by Mr. Pinkerton.

The libralis, coined by Tullius with the figures of oxen, &c. about 167 years after the building of Rome, according to Sir Iſaac Newton, or about the year before Chriſt - 460

As libralis with Janus and the prow of a ſhip	400
As of ten ounces	300
Eight	290
Six	280
Four	270
Three	260
Two, according to Pliny	250
One, according to the ſame author	214

About 175 B. C. alſo, we are informed by Pliny, that the as was reduced to half an ounce by the Papyrian law, at which it continued till the time of Pliny himſelf, and long after.

After the Romans began to have an intercourſe with Greece, a variety of elegant figures appear upon the parts of the as, though not on the as itſelf till after the time of Sylla. Towards the latter end of the republic alſo, *dupondii*, or double aſes, were coined, together with the ſeſtertii ærei, which came in place of the *quadruſſis*, when the denarius began to be reckoned at 16 aſes; probably at the time the latter was reduced to half an ounce. In ſome inſtances it is to be obſerved, that the Romans accommodated their coins to the country where their army was ſtationed; whence we have many coins marked as Roman, which have been coined in Magna Græcia and Sicily, and are evidently upon the Greek and not the Roman ſcale. In the latter part of the republican times, alſo, the types begin to vary; ſo that we have a braſs coin ſuppoſed to be ſtruck by Sextus Pompeius in Sicily, having upon it a double head of that warrior, repreſenting a Janus. Mr. Pinkerton ſuppoſes

it to have been a dupondius; which indeed appears to be the caſe from the double head. This coin is of copper, and ſtill weighs an ounce, notwithſtanding its antiquity.

The largeſt imperial copper coin was the ſeſtertius, a piece worth about two pence of our money. Mr. Pinkerton cenſures ſeverely the opinion of other medalliſts, all of whom ſay that the ſeſtertius was of ſilver. "In fact (ſays he), it would be as rational in any antiquary, a thouſand years hence, to contend that the halfpenny and farthing are of ſilver, becauſe they were ſo in the reign of Henry VIII." In confirmation of his own opinion, he quotes the following paſſage from Pliny: "The greateſt glory of braſs is now due to the Marian, called alſo that of Cordova. This, after the Livian, moſt abſorbs the lapis calaminaris, and imitates the goodneſs of native orichalcum in our ſeſtertii and dupondiarii, the aſes being contented with their own copper." Gronovius confeſſes that he does not know what to make of this paſſage, and that it cauſes him to heſitate in his opinion. The *Livian* mine, mentioned here by Pliny, is ſuppoſed to have got its name from *Livia* the wife of Auguſtus; and it is probable that the pieces marked with her portrait, intitled JUSTITIA, SALUS, VIRTUS, &c. were dupondii from this very mine, the metal being exceedingly fine, and of the kind named *Corinthian braſs* by the ancient medalliſts. "Perhaps (ſays Mr. Pinkerton) the mine received its name from this very circumſtance of her coins being ſtruck in the metal taken from it."

No change took place in the Roman coinage from the time that the as fell to half an ounce to the days of Pliny: but Mr. Pinkerton obſerves, that before the time of Julius Cæſar yellow braſs began to be uſed, and was always looked upon to be double the value of Cyprian or red copper. There are but few coins in large braſs immediately before Julius Cæſar, or even belonging to that emperor; but from the time of Auguſtus downward, the large coins are all found of braſs, and not one of them copper. The largeſt of what are called the middle ſize are all of yellow braſs; and the next ſize, which is the as, and weighs half an ounce, is univerſally copper. What the ancients named *orichalcum*, or what we call *braſs*, was always looked upon to be greatly ſuperior in value to the as cyprium. Procopius, ſpeaking of a ſtatue of Juſtinian, tells us, that braſs inferior in colour to gold is almoſt equal in value to ſilver. The mines of native braſs were very few in number, and were owing entirely to the ſingular combination of copper and lapis calaminaris in the bowels of the earth, which very ſeldom occurs; and the ancients were far from being well acquainted with the method of combining theſe two bodies artificially; ſo that yellow braſs was always eſteemed at double the value of copper: and hence, in the ancient coinages, the braſs and copper pieces were kept as diſtinct as thoſe of gold and ſilver.

Mr. Pinkerton challenges to himſelf the diſcovery that the imperial ſeſtertius was of braſs; and is at conſiderable pains to bring proofs of it. Beſides the teſtimony of Pliny, which of itſelf would be deciſive, this is ſupported by the ſtrongeſt collateral evidence of other authors. From a paſſage in Julius Africanus, who wrote the Ἰατρικα, or *Treatiſe on Medicine*, it appears that the nummus, or ſeſtertius, weighed an ounce, and of conſequence that it could not be ſilver, but braſs; and all the large imperial Roman coins weigh an ounce. We know not the age in which Julius Africanus lived; but as he makes the denarius to contain 16 aſes, he muſt have been before the age of Gallienus, when it had 60. Gronovius ſuppoſes him to have been the ſame mentioned by Euſebius. This author ſpeaks of a Julius Africanus who lived in the time of Heliogabulus, and whom Mr. Pinkerton ſuppoſes to have been the ſame with him above mentioned.

The ſeſtertius underwent no change till the time of Alexander Severus, when it was diminiſhed by one third of its weight. Trajanus Decius was the firſt who coined double ſeſtertii, or quinarii, of braſs; but from the time of Trebonianus Gallus to that of Gallienus, when the firſt braſs ceaſes, the ſeſtertius does not weigh above the third part of an ounce: the larger coins are accounted double ſeſtertii; and after the time of Gallienus it totally vaniſhes. In the time of Valerian and Gallienus we find a new kind of coinage, mentioned by the name of *denarii æris*, or *Philippi ærei*. Two ſizes of denarii began to be uſed in the time of Caracalla; the larger of ſix ſeſtertii, or 24 aſſaria; the ſmaller of four ſeſtertii, or 16 aſſaria as uſual. In the time of Pupienus, the latter was reduced to ſuch a ſmall ſize as not to weigh more than 36 grains; though in Caracalla's time it weighed 56. After the time of Gordian III. the ſmaller coin fell into diſuſe, as bearing confuſion. The larger denarius of ſix ſeſtertii, though diminiſhed at laſt to the ſize of the early denarius, ſtill retained its value of ſix ſeſtertii, or 24 aſſaria. The *Philippus æreus* came at length in place of the ſeſtertius. It was alſo called *denarius*; from which we may learn not only their ſize, but that they were in value ten aſſaria as the firſt denarius. In the reign of Diocleſian, the place of the ſeſtertius was ſupplied by the *follis*, that emperor having reſtored the ſilver coin to its purity, and likewiſe given this form to the copper; but it would ſeem that this reſtoration of the coinage only took place towards the end of his reign; whence we have but few of his ſilver coins, and ſtill fewer of the *folles*, though the *denarii ærei* continue quite common down to the time of Conſtantine. The follis of Diocleſian ſeems to have weighed above half an ounce; and Mr. Pinkerton is of opinion, that Diocleſian deſigned this coin to ſupply the place of the denarius æreus; which of courſe was worth ten aſſariæ, and ſix of them went to the ſilver denarius. From this time the aſſarium diminiſhes to the ſize of 30 grains; and ſoon after the follis appeared, the denarius æreus was entirely dropped, the former having gradually ſupplied its place. Some mints appear to have retained the uſe of the denarius longer than others; and in ſome the change was preceded, and gradually brought in by waſhing the follis with ſilver or tin, as the denarius had formerly been. Pieces of this kind occur in the times of Diocleſian, Maximian I. and II. and Conſtantius I.; that is, for about ten years after the follis made its appearance. Some countries, however, retained the denarius æreus; others the follis; and ſome had a medium betwixt the two, or the follis waſhed in imitation of the denarius.

Towards the end of the reign of Conſtantine I. a new coinage was introduced throughout the whole empire. The follis coined by this prince was of half an ounce weight; 24 of them going to the milliarenſis, or larger ſilver coin. The word *follis* ſignifies alſo a purſe, in which ſenſe we ſometimes find it mentioned in the Byzantine hiſtory. The common follis of ſilver, when it occurs by itſelf, means a purſe of 250 milliarenſes, as the ſeſtertium was 250 denarii; and by a law of Conſtantine I. every man paid to the ſtate a follis or purſe according to his income. The method of counting by purſes continues in Turkey to this day.

The *dupondius* was only half the value of the ſeſtertius, or about one penny ſterling; and before the yellow braſs appeared it ſeems to have been ſtruck upon copper, and double the ſize of the as. There are ſome of this coin, ſtruck in the time of Julius Cæſar, in yellow braſs, weighing half an ounce, with a head of Venus Victrix upon one ſide; on the reverſe, a female figure, with ſerpents at her feet: while others have a Victory on the reverſe, with Q. Oppius Pr. After the time of Auguſtus, the dupondius was ſtruck in yellow braſs; which Pliny tells us was alſo the caſe in his time. The word dupondiarius ſeems to have been uſed by Pliny, and adopted not to expreſs that the coin was *dupondius*, but that it was of dupondiary value. Neither was the former word confined to ſignify double weight, but was uſed alſo for double length or meaſure, as in the inſtance of *dupondius pes*, or two feet, &c. In the imperial times, therefore, *dupondius* was uſed, not to ſignify a coin of double

the weight of the as, but of double the value. It was one of the moſt common of the Roman coins; and ſeems to have been very common even in Conſtantinople. In the time of Juſtinian, it ſeems there was a cuſtom of nicknaming young ſtudents of the law *Dupondii*, againſt which the emperor made a law; but it is not known what gave riſe to the name. The dupondius, though of the ſame ſize with the as, is commonly of finer workmanſhip, the metal being greatly ſuperior in value. It continues to be of yellow braſs, as well as the ſeſtertius, to the time of Gallienus; but the as is always of copper.

The imperial as, or *aſſarium*, was worth only an halfpenny. At firſt it weighed half an ounce, and was always of copper till the time of Gallienus, when it was made of braſs, and weighed only the eighth part of an ounce. From the time of Gallienus to that of Diocleſian, it continued to diminiſh ſtill more, the ſize being then twenty to an ounce. This was the ſame with the lepta, or ſmalleſt coins but the *νουμια*, which weighed only ten grains.

The parts of the as occur but ſeldom; which may, indeed, be well expected, conſidering the low value of it; though there ſtill occur ſome of thoſe called ſemis, triens, quadrans, ſextans, and uncia, coined in the times of Nero and Domitian. There is no ſmall braſs from the time of Pertinax to that of Gallienus, excepting that of Trajanus Decius; but in the time of Gallienus it becomes extremely common; and the coins of ſmall braſs, as well as the larger, are always marked S. C. ſuch as want it being univerſally accounted forgeries, and were plated with ſilver, though the plating be now worn off. The ſmall pieces ſtruck for ſlaves during the time of the Saturnalia muſt alſo be diſtinguiſhed from the parts of the as. The S. C. upon theſe moſt probably ſignifies *Saturni Conſulto*, and were ſtruck in redicule of the true coins, as the ſlaves on that occaſion had every privilege of irony.

The ſeſtertius diminiſhes from Pertinax to Gallienus ſo faſt that no parts of the as are ſtruck, itſelf being ſo ſmall. Trajanus Decius, indeed, coined ſome ſmall pieces, which went for the ſemis of the time. The ſmall braſs coins under Gallienus were called aſſaria, ſixty of which went to the ſilver denarius. They are about the ſize of the denarius, and ſome of them occur of the coinage of Gallus and his family, of half that ſize, which appear to have been ſtruck during the latter part of his reign, when the aſſarium was diminiſhed to a ſtill ſmaller ſize. It is probable, however, that ſome of theſe very ſmall coins had been ſtruck in all ages of the empire, in order to ſcatter among the people on ſolemn occaſions. Mr. Pinkerton is of opinion that they are the *miſſilia*, though moſt other medallifts think that they were medallions. "But if ſo (ſays our author), they were certainly called *miſſilia, a non mittendo*; for it would be odd if fine medallions were ſcattered among the mob. It is a common cuſtom juſt now to ſtrike counters to ſcatter among the populace on ſuch occaſions, while medals are given to peers of the kingdom; and we may very juſtly reaſon from analogy on this occaſion."

The *aſſarion* or *lepton* of the Conſtantinopolitan empire was, as we have already obſerved one of the ſmalleſt coins known in antiquity, weighing no more than 20 grains; and the *noumia* were the very ſmalleſt which have reached our times, being only one half of the former. By reaſon of their extreme ſmallneſs, they are very ſcarce; but Mr. Pinkerton informs us, that he has in his poſſeſſion a fine one of Theodoſius II. which has on it the emperor's head in profile. Theodoſius P. F. AV.; on the reverſe a wreath, having in the centre VOT. XX.: MULT. XXX.

The principal coin of the lower empire was the follis, which was divided into an half and quarter, named *ἡμιφολεος* and *τεταρτον*; the latter of which is ſhown by Du Cange to have been a ſmall braſs coin, as the other is ſuppoſed to have been by Mr. Pinkerton.—Beſides theſe, the follis was divided into 8 oboli, 16 aſſaria or lepta, and 32 noumia, though in common computation it contained 40 of theſe laſt. This coin, notwithſtanding ſo many diviſions, was of no more value than an halfpenny.

Mr. Pinkerton controverts an opinion, common among medalliſts, that the largeſt braſs coin or follis of the lower empire had 40 ſmall coins, expreſſed by the letter M upon it; the next had 30, expreſſed by the letter A; the half by the letter K; and the quarter marked I, which contained only 10. Mr. Pinkerton informs us, that he has three coins of Anaſtaſius, all marked M in large: one of them weighs more than half an ounce; the ſecond 40 grains leſs; and the third of 160 grains, or one-third of an ounce; but the ſize is ſo very unequal, that the laſt, which is very thick, does not appear above hal the ſize of the firſt. There are pieces of Juſtinian which weigh a whole ounce; but the ſize of copper was increaſed as the ſilver became ſcarcer; and the value of the coinage cannot be deduced from the weight of the coins, as it is plain that our own coinage is not of half the value with regard to the metal. A great number of medallions were ſtruck by Conſtantius II. but there is no other copper larger than the half ounce, excepting that of Anaſtaſius, when the follis began to be ſtruck larger. All medalliſts allow the others to be medallions.

The metal employed in theſe very ſmall coins, though at firſt of braſs, was always a baſe and refuſe kind; but copper is generally made uſe of in the parts of the as from the earlieſt times to the lateſt; and if braſs be ſometimes employed, it is never ſuch as appears in the ſeſtertii and dupondiarii, which is very fine and beautiful, but only the refuſe "Yellow braſs of the right ſort (ſays Mr. Pinkerton) ſeems totally to have ceaſed in the Roman coinage with the ſeſtertius, under Gallienus, though a few ſmall coins of very bad metal appear under that hue as late as Julian II."

Silver was coined in Rome only as late as the 485th year of the city, or 266 B. C. Varro indeed ſpeaks of ſilver having been coined by Servius Tullius, and the libella having been once in ſilver; but Pliny's authority muſt be accounted of more weight than that of this author, as he miſtakes the *λιτρα* of Sicily for Roman coins, having been current at Rome during the time of the firſt Punic war. Even Pliny, according to our author, very frequently miſtakes with regard to matters much antecedent to his own time; and among the moderns he criticiſes ſeverely Eraſmus and Hume. "Eraſmus (ſays he), who had been in England for ſome time, talks of leaden money being uſed here. Not even a leaden token was ſtruck in the reign of Henry VIII.; yet his authority has been followed with due deference to ſo great a name; for how could Eraſmus, who muſt have ſeen the matter with his own eyes, aſſert a direct falſehood? To give a later inſtance in a writer of reputation, Mr. Hume, in vol. vi. of his hiſtory, has theſe words, in treating of the reign of James I. "It appears that copper halfpence and farthings began to be coined in this reign. Tradeſmen had commonly carried on their retail buſineſs by leaden tokens. The ſmall ſilver penny was ſoon loſt; and at this time was nowhere to be found." Copper halfpence and farthings were not ſtruck till Charles II. 1672: there were ſmall tokens for farthings ſtruck in copper by James I. but not one for the halfpenny. The ſilver farthings had ceaſed with Edward VI. but the ſilver halfpence continued the ſole coins till Charles II It was by copper tokens that ſmall buſineſs was carried on. The ſilver penny was much uſed till the end of the reign of George I.; and, ſo far from being nowhere to be found, is ſuperabundant of every reign ſince that period, not excepting even the preſent reign of George III. From theſe inſtances the reader may judge how ſtrangely writers of all ages blunder, when treating a ſubject of which they are entirely ignorant."

The firſt ſilver denarii coined at Rome, are ſuppoſed by our author to have been thoſe which are impreſſed with the ROMA; and he inclines to account thoſe the moſt ancient which have a double female head on the one ſide, and on the reverſe Jupiter in

a car, with Victory holding the reins, and the word ROMA indented in a rude and ſingular manner. The double female head ſeems to denote Rome, in imitation of the Janus then upon the as. There are 15 of theſe in the cabinet of Dr Hunter; one of the largeſt weighs 98¼ grains: and the reſt, which ſeem to be of greateſt antiquity, are of various weights betwixt that and 8 :; the ſmaller and more modern weigh .8 or 59 grains; but Mr. Pinkerton is of opinion, that the large ones are of the very firſt Roman coinage, and ſtruck during that interval of time betwixt the coinage of the firſt ſilver denarius and the as of two ounces. He takes the indentation of the word ROMA to be a mark of great antiquity; ſuch a mode being ſcarcely known any where elſe, except in Caulonia, Crotona, and other towns of Italy; all of them allowed to be ſtruck at leaſt 400 B. C. As theſe large coins are not double denarii, they muſt have been ſtruck prior to the ſmall ones; and Newmann has given an account of one of them recoined by Trajan, in which the indentation of ROMA is carefully preſerved. The firſt denarius was in value 10 aſes, when the as weighed three ounces; and allowing 90 grains at a medium for one of theſe large denarii, the proportion of copper to ſilver muſt have been as 1 to 160; but when the as fell to one ounce, the proportion was as 1 to 80: when it fell to half an ounce, ſo that 16 aſes went to the denarius, the proportion was as 1 to 64, at which it remained. Copper with us, in coinage, is to ſilver as 1 to 40; but in actual value as 1 to 72.

At Rome the denarius was worth 8d.; the quinarius 4d.; and the ſeſtertius, whether ſilver or braſs, 2d. The denarius is the coin from which our penny is derived, and was the chief ſilver coin in Rome for 600 years. According to Celſus, ſeven denarii went to the Roman ounce, which in metals did not exceed 430 grains; but as all the denarii hitherto met with weigh at a medium only 60 grains, this would ſeem to make the Roman ounce only 420 grains; though perhaps this deficiency may be accounted for from the unavoidable waſte of metal even in the beſt preſerved of theſe coins. According to this proportion the Roman pound contained 84 denarii; but in tale there was a very conſiderable exceſs, for no fewer than 100 denarii went to the Roman pound. The Greek ounce appears to have been conſiderably larger than that of Rome, containing about 528 grains; yet notwithſtanding this apparently great odds, the difference in the coins was ſo ſmall, that the Greek money went current in Rome, and the Roman in Greece. The denarius at firſt went for 10 aſes, and was marked X; it was afterwards raiſed to 16; which Mr. Pinkerton ſuppoſes to have been about 175 B. C. Some are met with bearing the number XVI; nay, with every number up to CCCCLXXVI. Theſe large numbers are ſuppoſed to have been mint-marks of ſome kind or other. After being raiſed to 16 aſes, it continued at the ſame value till the time of Gallienus; ſo that till that time we are to look upon its conſtituent parts to be 16 aſes or aſſaria, eight dupondii, four braſs ſeſtertii, and two ſilver quinarii. Under the emperor Severus, however, or his ſucceſſor Caracalla, denarii were ſtruck of two ſizes, one of them a third heavier than the common: which we muſt of conſequence ſuppoſe to have borne a third more value. This large piece obtained the name of *argenteus*, and *argenteus Philippus*, or the "ſilver Philip;" the name of Philip having become common to almoſt every coin. The common denarii now began to be termed *minuti* and *argentei Philippi minutui*, &c. to expreſs their being ſmaller than the reſt. Some have imagined that the large denarii were of the ſame value with the ſmall, only of worſe metal; but Mr. Pinkerton obſerves, that among the few which have any difference of metal, the ſmalleſt are always the worſt. The firſt mention of the *minuti* is in the time of Alexander Severus, who reduced the price of pork from height minuti at Rome to two and to one. The *minutus argenteus* of that age was about 40 grains; and from the badneſs of the metal was not worth above 4d. of our money. Thus the price of meat was by this prince reduced firſt to 8d. and then to 4d. According to Zozimus and other writers, the purity of the Roman coin was reſtored by Aurelian: but Mr. Pinkerton controverts this opinion; thinking it more probable that he only made the attempt without ſucceſs; or that his reformation might be entirely confined to gold, on which there is an evident change after the time of this emperor. His ſucceſſor Tacitus is ſaid to have allowed no braſs to be mixed with ſilver on any account; yet the few coins of this emperor are very much alloyed. We are certain, however, that the emperor Diocleſian reſtored the ſilver to its ancient purity: the denarii ſtruck in his reign being very ſmall indeed, but of as fine ſilver as the moſt ancient coins of the empire. After Gordian III. the ſmall denarius entirely vaniſhed, while the large one was ſo much diminiſhed that it reſembled the *minutus*, or ſmall one of Caracalla in ſize. Gallienus introduced the *denariiærei* inſtead of the *ſeſtertii*. The *argenteus*, though reduced more than one third in ſize, contained ſix denarii ærei, the old ſtandard of ſeſtertii. According to the writers of this period, and ſome time afterwards, the denarius or argenteus contained 60 aſſaria; whence it follows, that each denarius æreus had 10; and from this it probably had its name. The aſſaria are of the ſize of the argentei already mentioned; and ſhow the copper to have retained nearly its old proportion of value to the ſilver, viz. 1 to 60.

A larger ſilver coin was introduced by Conſtantine I. who accommodated the new money to the pound of gold in ſuch a manner that 1000 of the former in tale were equal to the latter in value; ſo that this new piece from thence obtained the name of the *milliarenſis*, or "thouſander." Its weight at a medium is 70 grains, or 70 to the pound of ſilver: but Mr. Pinkerton is of opinion, that it might have contained 72 grains, of which two have now periſhed by the ſoftneſs of the ſilver; that the pound contained 72; or that two of the number might be allowed for coinage; while the alloy alone would pay for coining gold. The code ſays, that 60 went to the pound; but the numbers of this are quite corrupt. The *milliarenſis* was worth about a ſhilling ſterling. The argentei or denarii, however, were ſtill the moſt common currency; and having been originally rated at the 100 to the pound of ſilver in tale, they from thence began to be called *centenionales*, or "hundreders." Thoſe of Conſtantine I. and II. Conſtans, and Conſtantius, weigh from 50 grains down to 40; thoſe of Julian and Jovian, from 40 to 30; and of the ſucceeding emperors from that time to Juſtinian, from 30 to 20. Under Heraclius they ceaſed entirely; and from Juſtinian to their total abolition, had been brought down from 15 to 10 grains. A like decreaſe of weight took place in the milliarenſis; thoſe of Conſtantine and Conſtans being above 70 grains in weight; thoſe of Arcadius not above 60; and the milliarenſis of Juſtinian not more than 30 grains; but, from the weight of thoſe in Dr. Hunter's cabinet, Mr. Pinkerton deduces the medium to have been exactly $70\frac{5}{12}$ grains. Theſe coins were alſo called *majorinæ*.

The ſmaller ſilver coins of Rome were, 1. The *quinarius*, at firſt called *victoriatus*, from the image of Victory on its reverſe; and which it continued to bear from firſt to laſt. Its original value was five aſes, but it was afterwards raiſed to eight, when the value of the denarius increaſed to 16. According to Pliny, it was firſt coined in conſequence of the *lex Clodia*, about the 525th year of Rome. Some are of opinion, that it was called κερατιον under the Conſtantinopolitan empire, becauſe it was worth a κερατιον of gold, 144 of which went to the ounce: but this is denied by Mr. Pinkerton, becauſe at the time that the word κερατιον firſt appears in hiſtory, the denarius did not weigh above 50 grains; and of conſequence, as 25 muſt have gone to the gold ſolidus, of which there were ſix in the ounce, 150 denarii muſt have gone to the ounce of gold. He is therefore of opinion, that the word κερατιον was only another

name for the denarius when much reduced in ſize; probably owing to the great ſcarcity of ſilver in Conſtantinople, though in the ſame city there was plenty of gold; and of conſequence, the gold ſolidus was never diminiſhed. "For Monteſquieu (ſays our author) has well obſerved, that gold muſt be common where ſilver is rare. Hence gold was the common regulation of accounts in the Eaſtern empire." The δηναριον met with in ancient authors, according to Mr. Pinkerton, was merely an improper name for the *milliarenſis*; when, on account of the ſcarcity of ſilver, the denarius was reduced, and no milliarenſis coined: ſo that the current milliarenſis of former reigns happened to be double to the denarius or centenionalis. The quinarius diminiſhes in ſize along with the other coins: thoſe of Auguſtus weighing 30 grains, of Severus 25, of Conſtantine I. 20, of Juſtinian 12, and of Heraclius only 5. A new ſilver coinage ſeems to have taken place after the days of this emperor; as the little we then meet with, which in the beſt cabinets ſcarce exceeds a dozen of coins, conſiſts entirely of large unſhapely pieces of coarſe metal.

2. The conſular denarius had alſo four ſilver ſeſtertii, till the as fell to half an ounce, when it was thought proper to coin the ſeſtertius in braſs, as it continued to be ever afterwards. "The very laſt ſilver ſeſtertius (ſays Mr. Pinkerton) which appears, is one with a head of Mercury, and H. S.; on the reverſe a Caduceus P. SEPVLLIVS; who appears to be the P. SEPVLLIVS MACER of the denarii of Julius Cæſar. If ſo, as is moſt probable, the ſeſtertius was coined in ſilver down to Auguſtus; and it is of courſe not to be expected that any of braſs can appear till Auguſtus, under whom they are actually quite common. I have indeed ſeen no coin which could be a conſular braſs ſeſtertius; and though we have certainly braſs dupondii of Cæſar, yet it is reaſonable to infer, that the braſs ſeſtertius was firſt coined by Auguſtus. Not one ſilver ſeſtertius appears during the whole imperial period, yet we know that the ſeſtertius was the moſt common of all ſilver coins. The conſular ſeſtertii of ſilver, marked H. S. are not uncommon, nor the quinarii; but the latter are very ſcarce of all the emperors, if we except one inſtance, the ASIA RECEPTA of Auguſtus.

The Roman gold coinage was ſtill later than that of ſilver. Pliny tells us, that "gold was coined 62 years after ſilver; and the ſcruple went for 60 ſeſterces. It was afterwards thought proper to coin 40 pieces out of the pound of gold. And our princes have by degrees diminiſhed their weight to 45 in the pound." This account is confirmed by the pieces which ſtill remain; for we have that very coin weighing a ſcruple, which went for 20 ſeſterces. On one ſide is the head of Mars, and on the other an eagle; and it is marked XX. We have another coin of the ſame kind, but double, marked XXXX; and its triple, marked ψX or 60; the ψ being the old numeral character for 50." Mr. Pinkerton, the diſcoverer of this, treats other medalliſts with great aſperity. Savot and Hardouin are mentioned by name: the latter (he ſays) is "ignorant of common ſenſe; and neither he nor Savot could explain it but by reading backward; put the ψ for the Roman V, and thus making it XV. Other readings have been given by various medalliſts, but none have hit upon the true one excepting our author, though the coin itſelf led to it, being juſt three times the weight of that marked XX. We have likewiſe half the largeſt coin, which is marked XXX, and which weighs 26 grains; the ſmalleſt is only 17½; the XXXX weighs 34: and the LX. or drachma 53. There is alſo the didrachm of this coinage, of 106 grains.

The *aurei* or Roman gold coins, were at firſt 48 in the pound; but they were afterwards diminiſhed in number to 40, owing to an augmentation in the weight of each coin. In the time of Sylla, the aureus weighed no leſs than from 164 to 168 grains, and there were only 30 in the pound; but ſuch confuſion in the coinage was introduced by that conqueror, that no perſon could know exactly what he was worth. Till this time the aureus ſeems to have continued of the value of 30 ſilver denarii, about one pound ſterling; for about that time it was enlarged a whole third, that it might ſtill be equivalent to the full number of denarii. But after Sylla had taken Athens, and the arts and manners of Greece became objects of imitation to the Romans, the aureus fell to 40 in the pound, probably when Sylla had abdicated his dictatorſhip. Thus, being reduced near to the ſcale of the Greek χρυσος, it paſſed for 20 denarii, as the latter did for as many drachmas, being in currency 13s. 4d. ſterling. "This (ſays Mr. Pinkerton) is the more probable, becauſe we know from Suetonius, that the great Cæſar brought from Gaul ſo much gold that it ſold for nine times its weight of ſilver: but the Gallic gold was of a very baſe ſort."

In the time of Claudius, the aureus was valued at 100 ſeſtertii, or 25 ſilver denarii, at which it continued till the time of Heliogabulus, when it fell to about 9[illegible] grains at a medium, or roſe in number to 55 in the pound. In the reign of Philip, during which the city completed its thouſandth year, the aureus was coined of two or three ſizes. Theſe are impreſſed with a head of Rome on one ſide, and various figures on the other; but the workmanſhip is ſo rude, that they are ſuppoſed to have been ſtruck in ſome of the more uncivilized provinces of the empire. The practice of having different gold coins, however, continued under Valerian, Gallienus, and his ſucceſſors. In the time of Gallienus, they were of 30, 65, and from 86 to 93 grains, the double aurei being from 172 to 183½ grains; but the aureus properly ſo called was from 86 to 93; thoſe of 30 and 32 being the *trientes aurei* of the *Hiſtoriæ Auguſtæ Scriptores*; while the larger, from 62 to 65, are to be accounted double trientes, and were perhaps called *minuti aurei*. The value of theſe different ſizes of aurei is not known.

That Aurelian made ſome alteration in the coin is certain; but Mr. Pinkerton ſuppoſes it to have been only in the gold; becauſe under him, and his ſucceſſor Probus, the common aureus was of 100 grains, a ſize confined to thoſe emperors: there are likewiſe halves of about 50 grains; and double aurei, commonly of very fine workmanſhip, of upwards of 200 grains. In the time of Gallienus, the precious metal was ſo common, that this emperor vied in magnificence with Nero and Heliogabulus. Aurelian, who plundered the rich city of Palmyra, and thus became maſter of the treaſures of the eaſt, obtained ſuch a profuſion of gold, that he looked upon it to be produced by nature in greater plenty than ſilver. It is remarkable, that during this emperor's reign there was a rebellion among the money-coiners, which could not be quelled but by the deſtruction of ſeveral thouſands: which Mr. Pinkerton aſcribes to his having ordered the gold to be reſtored to its former ſize, but to go for no more ſilver than it formerly did. "So very little ſilver (ſays he) occurs of this period, that it is plain no alteration in the ſilver produced the war with the moneyers: and in the braſs he made no change; or if he had, it were ſtrange that ſuch commotions ſhould ariſe about ſo trifling a metal. But if, as appears from the coins, he ordered the aureus, which had fallen to 80 grains, to be raiſed to about 100, it is no wonder that the contractors ſhould be in an uproar; for a whole quarter of their coinage, amounting as would ſeem to all their profits, was loſt. Aurelian judged, that when he found gold ſo common in the eaſt, it was equally ſo in the weſt, and that the moneyers muſt have made a moſt exorbitant profit; but his ideas on this ſubject were partial and unjuſt: and after his ſhort reign, which did not exceed five months after the alteration, the gold returned to its former courſe; though a few pieces occur of Aurelian's ſtandard, ſtruck, as would ſeem, in the commencement of the reign of Probus his ſucceſſor.

From this time to that of Conſtantine I. the aureus weighed between 70 and 80 grains; but in his reign it was changed

for the ſolidus, of which ſix went to the ounce of gold, which went for 14 milliarenſes, and 25 denarii as before; the value of ſilver being now to gold as 14 to 1. This new coin continued of the ſame value to the final downfal of the Conſtantinopolitan empire; gold being always very plentiful in that city, though ſilver became more and more ſcarce. The ſolidus was worth 12s. ſterling. Here again our author moſt ſeverely criticiſes Mr. Clarke and Mr. Raper: the former (he ſays), with reſpect to the value of gold in the time of Conſtantine I. "has left all his ſenſes behind him. In page 267 he abſurdly aſſerts, that 20 denarii went to the ſolidus in the time of Theodoſius I. and proceeds with this deplorable error to the end of his work. He then tells us, that only 14 denarii went to the ſolidus under Conſtantine I. &c." To Mr. Raper, however, he is a little more merciful, as he owns, that "though he (Mr. Raper) has ſtrangely confounded the milliarenſis with the denarius, he has yet kept common ſenſe for his guide." Mr. Pinkerton argues, indeed with great probability, "that had any change in the coinage taken place between the time of Conſtantine and Theodoſius I. that is, in leſs than 50 years, the laws of that period, which are all in the Theodoſian code, muſt have noticed it." To this and other arguments upon the ſubject, Mr. Pinkerton adds the following obſervation upon the value of gold and ſilver: "As a ſtate advances to its height, gold increaſes in value; and as a ſtate declines, it decreaſes, providing the metals are kept on a par as to purity. Hence we may argue, that gold decreaſed in its relation to ſilver perhaps four or five centuries, furniſhed moſt European kingdoms with gold in coin, which otherwiſe would, from their want of arts, and of intercourſe with the eaſt, then the grand ſeminary of that metal, have almoſt been ignorant of what gold was. Theſe gold coins were called *Bezants* in Europe, becauſe ſent from Byzantium or Conſtantinople; and were *ſolidi* of the old ſcale, ſix to the ounce. In Byzantine writers, the ſolidus is alſo called *nomiſma*, or "the coin;" *cryſinos*, becauſe of gold; *hyperperos*, from its being refined with fire, or from its being of bright gold flaming like fire. The *ſolidi* alſo, as the *aurei* formerly, received names from the princes whoſe portraits they bore; as *Michelati*, *Manuelati*. *Solidus* is a term uſed alſo for the aureus by Apuleius, who lived in the time of Antoninus the philoſopher; nay, as early as in the Prætorian edicts of the time of Trajan. It was then a diſtinction from the ſemiſſis or half. In the time of Valerian, when aurei of different ſizes had been introduced, it became neceſſary to diſtinguiſh the particular aurei meant. Hence in the Imperial Reſcripts, publiſhed by the *Hiſtoriæ Auguſtæ Scriptores*, Valerian uſes the term *Philippeos noſtri vultus*, for the common aurei. Aurelian uſes the ſame term *aurei Philippei*, for the aurei which he had reſtored to their ſize in ſome degree. Gallienus uſes *aurei Valeriani* for his father's coins. *Aurei Antoniniani* are likewiſe put by Valerian for coins of the early Antonini, of ſuperior ſtandard to any then uſed.

In the firſt gold coinage at Rome, the aureus was divided into four parts; the ſemiſſis of 60 ſeſtertii; the tremiſſis, or third, of 40; the fourth, the name of which is not mentioned, of 30; and the ſcrupulum, of 20. But in a ſhort time all of theſe fell into diſuſe, except the ſemiſſis or half, which is extremely ſcarce; ſo that it is probable that few have been ſtruck. It is an erroneous opinion (according to Mr. Pinkerton) that the ſemiſſis was called a *denarius aureus*. The aureus itſelf indeed had this name; but the name of *quinarius* is applied to the ſemiſſis with greater propriety than the former. Trientes, or tremiſſes of gold, are found of Valerian and his ſon Gallienus, and weigh about 30 grains. Thoſe of Salonina, the wife of Gallienus, weigh 32 grains. Under the Conſtantinopolitan empire, tremiſſes again make their appearance: and from the time of Valentinian downwards, the thirds are the moſt common coins of gold, being worth about 4s. ſterling. The ſemiſſis is likewiſe mentioned, but none occur earlier than the time of Baſiliſcus. The gold tremiſſis was the pattern of the French and Spaniſh gold coins; as the ſilver denarius, in its diminiſhed ſtate, was of the Gothic and Saxon penny.

We ſhall cloſe this account of the Roman money with ſome remarks concerning the mint, and method of coinage. This at firſt ſeems to have been under the direction of the quæſtor. About the time that ſilver was firſt coined in Rome, viz. about 266 B. C. the *triumviri monetales* were created. They were at firſt of ſenatorial rank, but were by Auguſtus choſen from among the equeſtrian; and the title of *triumviri* was continued till after the time of Caracalla; but under Aurelian there was probably but one maſter of the mint called *Rationalis*: and Mr. Pinkerton is of opinion that the change took place under Gallienus. He ſeems alſo to have permitted the provincial cities to coin gold and ſilver, as well as to have altered the form of the mints in the capital, and to have ordered them all to ſtrike money with Latin legends, and of the ſame forms; as in his time we firſt meet with coins with mint-marks of cities and offices. The violent inſurrection which took place in his reign has already been mentioned, as well as its probable cauſe; and Mr. Gibbon has ſhown that the concealed enemies of Aurelian took ſuch advantage of this inſurrection, that it coſt 7000 of his beſt troops before it could be quelled. About this time the *procurator monetæ* ſeems to have ſucceeded the *rationalis* as director of the mint. In the colonies, the direction of the mint ſeems to have been given to the decemviri, whoſe names frequently occur on colonial coins; "which (ſays Mr. Pinkerton), though generally of rude invention, and ruder execution, are yet often intereſting and important."

The engraving of the ancient dyes uſed in coinage was a work of much genius and labour; and at Rome Greek artiſts were generally employed in it; but it has been thought a matter of great ſurpriſe that ſcarce any two ancient coins are to be found exactly the ſame. Hence ſome antiquaries have imagined, that only a ſingle coin was thrown off from each dye. M. Beauvais informs us, that the only two Roman imperial coins of the firſt times, which he had ſeen perfectly alike, were thoſe of the emperor Galba. It is, however, the opinion of the beſt judges, that a perfect ſimilarity betwixt two medals is a very great reaſon for ſuppoſing one of them to be forged. "It muſt alſo be obſerved (ſays Mr. Pinkerton), that the differences in coins, apparently from the ſame dye, are often ſo minute as to eſcape an eye not uſed to microſcopic obſervations of this ſort. But it would be ſurpriſing if any two ancient coins were now found ſtruck with the ſame dye; for out of each million iſſued, not above one has reached us. Dyes ſoon give way by the violence of the work; and the ancients had no puncheons nor matrices, but were forced to engrave many dyes for the ſame coin. Even in our mint, upon ſending for a ſhilling's worth of new halfpence, it will appear that three or four dyes have been uſed. Sometimes the obverſe of the dye gives way, ſometimes the reverſe; but among us it is renewed by puncheons, though with variations in the lettering or other minute ſtrokes; while the ancients were forced to recur to another dye differently engraven. The engravers of the dye were called *cælatores*; other officers employed in the mint were the *ſpectatores*, *expectatores*, or *nummularii*. The melters were ſtyled *fuſarii*, *flatuarii*, and *ſaturarii*; thoſe who adjuſted the weight were called *æquatores monetarum*; thoſe who put the pieces into the dye, *ſuppoſitores*; and thoſe who ſtruck them, *malleatores*. At the head of each office was an officer named *primicerius*, and the foreman was named *optio et exactor*."

In order to aſſiſt the high relief on the coins, the metal, after being melted and refined, was caſt into bullets, as appears from the ancient coins not being cut or filed on the edges, but but often cracked, and always rough and unequal. Theſe bullets were then put into the dye, and received the impreſſion

by repeated ſtrokes of the hammer, though ſometimes a machine appears to have been uſed for this purpoſe: for Boiterue informs us, that there was a picture of the Roman mintage in a grotto near Baiæ, where a machine was repreſented holding up a large ſtone as if to let it fall ſuddenly, and ſtrike the coin at once. None of the ancient money was caſt in moulds, excepting the moſt ancient and very large Roman braſs, commonly called *weights*, and other Italian pieces of that ſort; all the reſt being mere forgeries of ancient and modern times. Some Roman moulds which have been found are a proof of this; and from theſe ſome medalliſts have erroneouſly imagined that the ancients firſt caſt their money in moulds, and then ſtamped it, in order to make the impreſſion more clear and ſharp.

The ancients had ſome knowledge of the method of crenating the edges of their coins, which they did by cutting out regular notches upon them; and of this kind we find ſome of the Syrian and ancient conſular coins, with a few others. The former were caſt in this ſhape, and then ſtruck; but the latter were crenated by inciſion, to prevent forgery, by ſhowing the inſide of the metal: however, the ancient forgers alſo found out a method of imitating this; for Mr. Pinkerton informs us, that he had a Roman conſular coin, of which the inciſions, like the reſt, were plated with ſilver over the copper.

Sect. V. *Of the Preſervation of Medals.*

We now come to conſider what it is that diſtinguiſhes one medal from another, and why ſome are ſo highly prized more than others. This, in general, beſides its genuineneſs, conſiſts in the high degree of preſervation in which it is. This, by Mr. Pinkerton, is called the *conſervation* of medals, and is by him regarded as *good* and as *perfect*. In this, he ſays that a true judge is ſo nice that he will reject even the rareſt coins if in the leaſt defaced either in the figures or legend. Some, however, are obliged to content themſelves with thoſe which are a little rubbed, while thoſe of ſuperior taſte and abilities have in their cabinets only ſuch as are in the very ſtate in which they came from the mint; and ſuch, he ſays, are the cabinets of Sir Robert Auſtin, and Mr. Walpole of Roman ſilver at Strawberry-hill. It is abſolutely neceſſary, however, that a coin be in what is called *good* preſervation; which, in the Greek or Roman emperors, and the colonial coins, is ſuppoſed to be when the legends can be read with ſome difficulty; but when the conſervation is perfect, and the coin juſt as it came from the mint, even the moſt common coins are valuable.

The fine ruſt, like varniſh, which covers the ſurface of braſs and copper coins, is found to be the beſt preſerver of them; and is brought on by lying in a certain kind of ſoil. Gold cannot be contaminated but by iron mould, which happens when the coin lies in a ſoil impregnated with iron; but ſilver is ſuſceptible of various kinds of ruſt, principally green and red; both of which yield to vinegar. In gold and ſilver coins the ruſt muſt be removed, as being prejudicial; but in braſs and copper it is preſervative and ornamental; a circumſtance taken notice of by the ancients. "This fine ruſt (ſays Mr. Pinkerton), which is indeed a natural varniſh not imitable by the art of man, is ſometimes a delicate olive, like that of a turquoiſe; ſometimes of a bronze brown, equal to that obſervable in ancient ſtatues of bronze, and ſo highly prized; and ſometimes of an exquiſite green, a little on the azure hue, which laſt is the moſt beautiful of all. It is alſo found of a fine purple, of olive, and of a cream colour or pale yellow: which laſt is exquiſite, and ſhows the impreſſion to as much advantage as paper of cream colour, uſed in all great foreign preſſes, does copper-plates and printing. The Neapolitan patina (the ruſt in queſtion) is of a light green; and, when free from excreſcence or blemiſh, is very beautiful. Sometimes the purple patina gleams through an upper coat of another colour, with as fine effect as a variegated ſilk or gem. In a few inſtances a ruſt of a deeper green is found; and it is ſometimes ſpotted with the red or bronze ſhade, which gives it quite the appearance of the Eaſt Indian ſtone called the *blood-ſtone*. Theſe ruſts are all, when the real product of time, as hard as the metal itſelf, and preſerve it much better than any artificial varniſh could have done; concealing at the ſame time not the moſt minute particle of the impreſſion of the coin."

The value of medals is lowered when any of the letters of the legend are miſplaced; as a ſuſpicion of forgery is thus induced. Such is the caſe with many of thoſe of Claudius Gothicus. The ſame, or even greater, diminution in value takes place in ſuch coins as have not been well fixed in the dye, which has occaſioned their ſlipping under the ſtrokes of the hammer, and thus made a double or triple image. Many coins of this kind are found in which the one ſide is perfectly well formed, but the other blundered in the manner juſt mentioned. Another blemiſh, but of ſmaller moment, and which to ſome may be rather a recommendation, is when the workmen through inattention have put another coin into the dye without taking out the former. Thus the coin is convex on one ſide, and concave on the other, having the ſame figure upon both its ſides.

The medals ſaid by the judges in this ſcience to be *countermarked*, are very rare, and highly valued. They have a ſmall ſtamp impreſſed upon them, in ſome an head, in others a few letters, ſuch as Aug: n. probus, &c. which marks are ſuppoſed to imply an alteration in the value of the coin; as was the caſe with the countermarked coins of Henry VIII. and queen Mary of Scotland. Some have a ſmall hole through them; ſometimes with a little ring faſtened in it, having been uſed as ornaments; but this makes no alteration in their value. Neither is it any diminution in the value of a coin that it is ſplit at the edges; for coins of undoubted antiquity have often been found in this ſtate, the cauſe of which has already been explained. On the contrary, this cracking is generally conſidered as a great merit; but Mr. Pinkerton ſuſpects that one of theſe cracked coins has given riſe to an error with reſpect to the wife of Caraufius who reigned for ſome time in Britain. The inſcription is read Oriuna Aug: and there is a crack in the medal juſt before the O of oriuna. Without this crack Mr. Pinkerton ſuppoſes that it would have been read Fortuna Aug.

Some particular ſoils have the property of giving ſilver a yellow colour as if it had been gilt. It naturally acquires a black colour through time, which any ſulphureous vapour will bring on in a few minutes. From its being ſo ſuſceptible of injuries, it was always mixed by the ancients with much alloy, in order to harden it. Hence the impreſſions of the ancient ſilver coins remain perfect to this day, while thoſe of modern coins are obliterated in a few years. On this account Mr. Pinkerton expreſſes a wiſh, that modern ſtates would allow a much greater proportion of alloy in their ſilver coin than they uſually do. As gold admits of no ruſt except that from iron above-mentioned, the coins of this metal are generally in perfect conſervation, and freſh as from the mint.

To cleanſe gold coins from this ruſt, it is beſt to ſteep them in aquafortis, which, though a very powerful ſolvent of other metals, has no effect upon gold. Silver may be cleanſed by ſteeping for a day or two in vinegar, but more effectually by boiling in water with three parts of tartar and one of ſea-ſalt; on both theſe metals however, the ruſt is always in ſpots, and never forms an entire incruſtation as on braſs or copper. The coins of theſe two metals muſt never be cleanſed, as they would thus be rendered full of ſmall holes eaten by the ruſt. Sometimes, however, they are found ſo totally obſcured with ruſt, that nothing can be diſcovered upon them; in which caſe it is beſt to clear them with a graver; but it may alſo be done by

boiling them for 24 hours in water with three parts of tartar and one of alum; not ſea-ſalt as in ſilver coins.

The high ſtate of preſervation in which ancient coins are uſually found, is thus accounted for by Mr. Hancarville. He obſerves, that the chief reaſon is the cuſtom of the ancients always to bury one or more coins with their dead, in order to pay for their paſſage over the river Styx. "From Phidon of Argos (ſays he) to Conſtantine I. are 36 generations: and from Magna Græcia to the Euphrates, from Cyrene to the Euxine Sea, Grecian arts prevailed, and the inhabitants amounted to about 30,000 000. There died therefore, in that time and region, not leſs than ten thouſand millions of people, all of whom had coins of one ſort or other buried with them. The tombs were ſacred and untouched; and afterwards neglected, till modern curioſity or chance began to diſcloſe them. The urn of Flavia Valentina, in Mr. Towley's capital collection, contained ſeven braſs coins of Antoninus Pius and Eleagabalus. Such are generally black, from being burnt with the dead. The beſt and freſheſt coins were uſed on theſe occaſions from reſpect to the dead; and hence their fine conſervation. At Syracuſe a ſkeleton was found in a tomb, with a beautiful gold coin in its mouth; and innumerable other inſtances might be given, for hardly is a funeral urn found without coins. Other incidents alſo conſpire to furniſh us with numbers of ancient coins, though the above-recited circumſtance be the chief cauſe of perfect conſervation. In Sicily, the ſilver coins with the head of Proſerpine were found in ſuch numbers as to weigh 600 French livres or pounds. In the 16th century, 60,000 Roman coins were found at Modena, thought to be a military cheſt hid after the battle of Bedriacum when Otho was defeated by Vitellius. Near Preſt, in the year 760, between 20 and 30,000 Roman coins were found. A treaſure of gold coins of Lyſimachus was found at Deva on the Marus; and Strabo, lib. vii. and Pauſan. *in Attic.* tell that he was defeated by the Getæ; at which time this treaſure ſeems to have fallen into their hands."

Thus Mr. Pinkerton, from the authority of Mr. Hancarville and others: but conſidering theſe vaſt numbers of coins found in various places, it ſeems ſurpriſing how ſo few ſhould now remain in the cabinets of the curious, as the ſame author informs us that the whole of the different ancient coins known to us amount only to about 80,000, though he owns that the calculation cannot be eſteemed accurate.

Sect. VI. *Of the Arrangement of Medals.*

It has already been obſerved, that one of the principal uſes of medals is the elucidation of ancient hiſtory; hence the arrangement of medals is the firſt thing that muſt occur in the formation of a cabinet. The moſt ancient medals with which we are acquainted are thoſe of Alexander I. of Macedon, who began to reign about 501 years before Chriſt. The ſeries ought of conſequence to begin with him, and to be ſucceeded by the medals of Sicily, Caria, Cyprus, Heraclia, and Pontus. Then follow Egypt, Syria, the Cimmerian Boſphorus, Thrace, Bithynia, Parthia, Armenia, Damaſcus, Cappadocia, Paphlagonia, Pergamus, Galatia, Cicilia, Sparta, Paeonia, Epirus, Illyricum, Gaul, and the Alps, including the ſpace of time from Alexander the Great to the birth of Chriſt, and which is to be accounted the third medalli ſeries of ancient monarchs. The laſt ſeries goes down to the fourth century, including ſome of the monarchs of Thrace, Boſphorus and Parthia, with thoſe of Comagene, Edeſſa or Oſrhoene, Mauritania, and Judæa. A moſt diſtinct ſeries is formed by the Roman emperors, from Julius Cæſar to the deſtruction of Rome by the Goths; nay for a much longer period, were it not that towards the latter part of it the coins become ſo barbarous as to deſtroy the beauty of the collection. Many ſeries may be formed of modern potentates.

By means of medals we can with great certainty determine the various ornaments worn by ancient princes as badges of diſtinction. The Grecian kings have generally the diadem, without any other ornament; and though in general the ſide of the face is preſented to view, yet in ſome very ancient Greek and Roman conſular coins, full faces of excellent workmanſhip are met with. On ſeveral coins alſo two or three faces are to be ſeen, and theſe are always accounted very valuable.

The diadem, which was no more than a ribband tied round the head with a floating knot behind, adorns all the Grecian princes from firſt to laſt, and is almoſt an infallible mark of ſovereign power. In the Roman conſular coins it is ſeen in conjunction with Numa and Ancus, but never afterwards till the time of Licinius, the colleague of Conſtantine. Dioclesian, indeed, according to Mr. Gibbon, firſt wore the diadem, but his portrait upon coins is never adorned with it. So great an averſion had the Romans to kingly power, that they rather allowed their emperors to aſſume the radiated crown, the ſymbol of divinity, than to wear a diadem; but after the time of Conſtantine it becomes common. The radiated crown appears firſt on the poſthumous coins of Auguſtus as a mark of deification, but in ſomewhat more than a century became common.

The laurel crown, at firſt a badge of conqueſt, was afterwards permitted by the ſenate to be worn by Julius Cæſar, in order to hide the baldneſs of his head. From him all the emperors appear with it on their medals, even to our own times. In the lower empire the crown is ſometimes held by a hand above the head, as a mark of piety. Beſides theſe, the naval, mural, and civic crowns appear on the medals both of emperors and other eminent men, to denote their great actions. The laurel crown is alſo ſometimes worn by the Greek princes. The Arſacidæ of Parthia wear a kind of faſh round the head, with their hair in rows of curls like a wig. The Armenian kings have the *tiara*, a kind of cap which was eſteemed the badge of imperial power in the eaſt. Conical caps are ſeen on the medals of Xerxes, a petty prince of Armenia, and Juba the father, the former having a diadem around it.

The impious vanity of Alexander and his ſucceſſors in aſſuming divine honours is manifeſt on their medals, where various ſymbols of divinity are met with. Some of them have an horn behind their ear, either to denote their ſtrength, or that they were the ſucceſſors of Alexander, to whom this badge might be applied as the ſon of Jupiter Ammon. This, however, Mr. Pinkerton obſerves, is the only one of theſe ſymbols which certainly denotes an earthly ſovereign, it being doubted whether the reſt are not all figures of gods. According to Eckhel, even the horn and diadem belong to Bacchus, who invented the latter to cure his headachs; and, according to the ſame author, the only monarch who appears on coins with the horn is Lyſimachus. We are informed, however, by Plutarch, that Pyrrhus had a creſt of goats horn to his helmet; and the goat we know was a ſymbol of Macedon. Perhaps the ſucceſſors of Alexander wore this badge of the horn in conſequence. The helmet likewiſe frequently appears on the heads of ſovereigns, and Conſtantine I. has helmets of various forms curiouſly ornamented.

The diadem is worn by moſt of the Greek queens, by Orodaltis, daughter of Lycomedes, king of Bithynia; and though the Roman empreſſes never appear with it, yet this is more than compenſated by the variety of their head-dreſſes. Sometimes the buſt of an empreſs is ſupported by a creſcent, to imply that ſhe was the moon as her huſband was the ſun of the ſtate. The toga, or veil drawn over the face at firſt implied that the perſon was inveſted with the pontifical office, and accordingly we find it on the buſts of Julius Cæſar while Pontifex Maximus. It likewiſe implies the augurſhip, the augurs having a particular kind of gown called *laena*, with which they covered their heads when obſerving an omen. In latter times this implies only conſecration, and is common in coins of empreſſes. It is firſt met with on the coins of Cha-

dius Gothicus as the mark of conſecration of an emperor. The *nimbus*, or glory, now appropriated to ſaints, has been already mentioned. It is as ancient as Auguſtus, but is not to be met with on many of the imperial medals, even after it began to be appropriated to them. There is a curious coin, which has upon the reverſe of the common piece with the head of Rome URBS ROMA, in large braſs, Conſtantine I. ſitting amid victories and genii, with a triple crown upon his head for Europe, Aſia, and Africa, with the legend SECURITAS ROMÆ.

In general only the buſt is given upon medals, though ſometimes half the body or more; in which latter caſe the hands often appear with enſigns of majeſty in them; ſuch as the globe ſaid to have been introduced by Auguſtus as a ſymbol of univerſal dominion; the ſceptre ſometimes confounded with the conſular ſtaff, a roll of parchment, the ſymbol of legiſlative power, and an handkerchief expreſſive of the power over the public games, where the emperor gave the ſignal. Some princes hold a thunderbolt, ſhowing that their power on earth was equal to that of Jupiter in heaven; while others hold an image of Victory.

Medals likewiſe afford a good number of portraits of illuſtrious men; but they cannot eaſily be arranged in chronological order, ſo that a ſeries of them is not to be expected. It is likewiſe vain to attempt the formation of a ſeries of gods and goddeſſes to be found on ancient coins. Mr. Pinkerton thinks it much better to arrange them under the ſeveral cities or kings whoſe names they bear. A collection of the portraits of illuſtrious men may likewiſe be formed from medals of modern date.

The reverſes of ancient Greek and Roman coins afford an infinite variety of inſtruction and amuſement. They contain figures of deities at full length, with their attributes and ſymbols, public ſymbols and diverſions, plants, animals, &c. &c. and in ſhort almoſt every object of nature or art. Some have the portrait of the queen, ſon, or daughter of the prince whoſe image appears on the face or obverſe; and theſe are eſteemed highly by antiquaries, not only becauſe every coin ſtamped with portraits on both ſides is accounted valuable, but becauſe they render it certain that the perſon repreſented on the reverſe was the wife, ſon, or daughter of him who appears on the obverſe; by which means they aſſiſt greatly in the adjuſting of a ſeries. Some, however, with two portraits are common, as Auguſtus, the reverſe of Caligula; and Marcus Aurelius, reverſe of Antoninus Pius.

We find more art and deſign in the reverſes of the Roman medals than of the Greek: but, on the other hand, the latter have more exquiſite relief and workmanſhip. The very ancient coins have no reverſes, excepting a rude mark ſtruck into the metal reſembling that of an inſtrument with four blunt points on which the coin was ſtruck; and was owing to its having been fixed by ſuch an inſtrument on that ſide to receive the impreſſion upon the other. To this ſucceeds the image of a dolphin, or ſome ſmall animal, in one of the departments of the rude mark, or in an hollow ſquare: and this again is ſucceeded by a more perfect image, without any mark of the hollow ſquare. Some of the Greek coins are hollow in the reverſe, as thoſe of Caulonia, Crotona, Metapontum, and ſome other ancient cities of Magna Græcia. About 500 B. C. perfect reverſes appear on the Greek coins, of exquiſite relief and workmanſhip. "The very muſcles of men and animals (ſays Mr. Pinkerton) are ſeen, and will bear inſpection with the largeſt magnifier as ancient gems. The ancients certainly had not eyes different from ours; and it is clear that they muſt have magnified objects. A drop of water forms a microſcope; and it is probable this was the only one of the ancients. To Greek artiſts we are indebted for the beauty of the Roman imperial coins; and theſe are ſo highly finiſhed, that on ſome reverſes, as that of Nero's decurſion, the *adventus* and *progreſſio* of various emperors, the *fundator pacis* of Severus, the features of the emperor, riding or walking, are as exact as on the obverſe. But though the beſt Greek artiſts were called to Rome, yet the Greek coins under the Roman emperors are ſometimes well executed, and always full of variety and curioſity. No Roman or Etruſcan coins have been found of the globular form, or indented on the reverſe like the early Greek. The firſt Greek are ſmall pieces of ſilver, while the Roman are large maſſes of copper. The former are ſtruck; the latter caſt in moulds. The reverſes of the Roman coins are very uniform, the prow of a ſhip, a car, or the like, till about the year 100 B. C. when various reverſes appear on their conſular coins in all metals. The variety and beauty of the Roman imperial reverſes are well known. The medalliſt much values thoſe which have a number of figures; as the *Puellæ Fauſtinianæ*, of Fauſtina, a gold coin no larger than a ſixpence, which has 12 figures; that of Trajan, *regna aſſignata*, has four; the *congiarium* of Nerva, five; the allocution of Trajan, ſeven; of Hadrian, 10; of Probus, 12. Some Roman medals have ſmall figures on both ſides, as the *Apolloni ſancto* of Julian II. Such have not received any peculiar name among the medalliſts. Others have only a reverſe, as the noted *ſpintriati*, which have numerals I. II. &c. on the obverſe."

The *names* of the deities repreſented on the reverſes of Greek coins are never expreſſed; perhaps, as Mr. Pinkerton ſuppoſes, out of piety, a ſymbolical repreſentation of their attributes being all that they thought proper to delineate; but the Roman coins always expreſs the name, frequently with an adjunct, as VENERI VICTRICI, &c. In others, the name of the emperor or empreſs is added; as PUDICITIÆ AUGUSTÆ, round an image of Modeſty; VIRTUS AUGUSTI, a legend for an image of Virtue.

The principal ſymbols of the divine attributes to be met with on the Greek medals are as follow:

1. Jupiter is known on the coins of Alexander the Great by his eagle and thunderbolts; but when the figure occurs only on the obverſes of coins, he is diſtinguiſhed by a laurel crown, and placid bearded countenance. Jupiter Ammon is known by the ram's horn twiſting round his ear; a ſymbol of power and ſtrength, aſſumed by ſome of the ſucceſſors of Alexander the Great, particularly by Lyſimachus.

2. Neptune is known by his trident, dolphin, or being drawn by ſea-horſes; but he is ſeldom met with on the Grecian coins.

3. Apollo is diſtinguiſhed by an harp, branch of laurel, or tripod; and ſometimes by a bow and arrows. In the character of the Sun, his head is ſurrounded with rays; but when the buſt only occurs, he has a fair young face, and is crowned with laurel. He is frequent on the coins of the Syrian princes.

4. Mars is diſtinguiſhed by his armour, and ſometimes by a trophy on his ſhoulders. His head is armed with a helmet, and has a ferocious countenance.

5. Mercury is repreſented as a youth, with a ſmall cap on his head, wings behind his ears and on his feet. He is known by the cap, which reſembles a ſmall hat, and the wings. He appears alſo with the caduccus, or wand twined with ſerpents, and the *marſupium*, or purſe, which he holds in his hand.

6. Æſculapius is known by his buſhy beard, and his leaning on a club with a ſerpent twiſted round it. He ſometimes occurs with his wife Hygeia or Health, with their ſon *Teleſphorus* or Convaleſcence between them.

7. Bacchus is known by his crown of ivy or vine, his diadem and horn, with a tiger and ſatyrs around him.

8. The figure of Hercules is common on the coins of Alexander the Great, and has frequently been miſtaken for that of the prince himſelf. He appears ſometimes as a youth, and ſometimes with a beard. He is known by the club, lion's ſkin, and remarkable apparent ſtrength; ſometimes he has a cup in his hand, and a poplar tree, as a ſymbol of vigour, is ſometimes added to the portrait.

9. The Egyptian Serapis is known by his bushy beard, and a measure upon his head.

10. Apis is delineated in the form of a bull, with a flower of the lotos, the water-lily of the Nile, supposed by Macrobius to be a symbol of creation; and Jamblichus tells us, that Osiris was thought to have his throne in it.

11. Harpocrates, the god of silence, appears with his finger on his mouth; sometimes with the sistrum in his left hand; a symbol common to most of the Egyptian deities.

12. Canopus, another Egyptian deity, appears in the shape of an human head placed on a kind of pitcher. "This deified pitcher (says Mr. Pinkerton) seems to refer to an anecdote of ancient superstition, which, I believe, is recorded by Plutarch. It seems some Persian and Egyptian priests had a contest which of their deities had the superiority. The Egyptian said, that a single vase, sacred to Serapis, would extinguish the whole power of the Persian deity of fire. The experiment was tried; and the wily Egyptian, boring holes in the vase and stopping them with wax, afterwards filled the vase with water; which, gushing through the holes as the wax melted, extinguished the Persian deity. Hence the vase was deified."

13. The *Holy Senate* and *Holy People* appear frequently on Greek imperial coins, sometimes represented as old men with beards, at others as youths.

The goddesses represented on medals are,

1. Juno, represented by a beautiful young woman, sometimes with a diadem, sometimes without any badge, which is reckoned a sufficient distinction, as the other goddesses all wear badges. Sometimes she appears as the goddess of marriage; and is then veiled to the middle and sometimes to the toes. She is known by the peacock, a bird sacred to her from the fable of Argus.

2. Minerva is very common on the coins of Alexander the Great; and her bust has been mistaken by the celebrated painter Le Brun for the hero himself. Her symbols are, her armour; the spear in her right hand, and the ægis with a Medusa's head in her left; an owl commonly standing by her.

3. Diana of Ephesus is commonly represented on the Greek imperial coins; and appears with a great number of breasts, supposed to denote universal Nature. She is supported by two deer, and carries a pannier of fruit upon her head. The bust of this goddess is known by the crescent on her brow, and sometimes by the bow and quiver at her side.

4. Venus is known by an apple, the prize of beauty, in her hand. Sometimes she is distinguished only by her total want of dress; but is always to be known by her extraordinary beauty, and is sometimes adorned with pearls about the neck.

5. Cupid is sometimes met with on the Syrian coins, and is known by his infancy and wings.

6. Cybele is known by a turreted crown and lion: or is seen in a chariot drawn by lions.

7. Ceres is known by her garland of wheat, and is common on the Sicilian coins; that island being remarkable for its fertility. Sometimes she has two serpents by her, and is sometimes drawn in a chariot by them. She carries in her hands the torches with which she is fabled to have gone in search of her daughter Proserpine.

8. Proserpine herself is sometimes met with on coins with the name of κορη, or the *girl*.

9. The Egyptian Isis has a bud or flower on her head; a symbol of the perpetual bloom of the inhabitants of heaven. She carries also a sistrum in her hand.

10. The Sidonian Astarte appears on a globe supported on a chariot with two wheels, and drawn by two horses.

These are the deities most commonly represented on the Greek coins. The more uncommon are, Saturn with his scythe, or with a hook on the Heraclian coins; Vulcan with his tongs, on the reverse of a coin of Thyatira, represented at work in the presence of Minerva. Adranus, a Sicilian god, is sometimes represented on coins with a dog. Anubis, an Egyptian deity, has a dog's head. Atis is known by his Phrygian bonnet; Castor and Pollux by a star on the head of each; Dis, by his old face, dishevelled hair and beard, and a hook; Flora by a crown of flowers; Nemesis by her wheel; and Pan by his horns and ears belonging to some kind of beast.

There are likewise to be found on medals many different symbols by themselves; of the most remarkable of which we shall give the following table, with their significations:

Symbols.	*Signification.*
1. Vases with sprigs,	Solemn games.
2. Small chest or hamper, with a serpent leaping out,	Mystic rites of Bacchus.
3. Anchor on Seleucian medals,	Coin struck at Antioch, where an anchor was dug up.
4. Apollo on Syrian coins, on an inverted hamper,	Covered tripod.
5. Bee,	Aristeus the son of Apollo.
6. Laurel,	Apollo.
7. Reed,	A river.
8. Ivy and grapes,	Bacchus.
9. Poppy,	Ceres and Proserpine.
10. Corn,	Ceres.
11. Owl and olive,	Minerva.
12. Dove,	Venus.
13. Torch,	Diana, Ceres, or Proserpine.
14. Mudnis, or conic stone,	The Sun, Belus, or Venus.
Symbols of Countries, &c.	
15. Pomegranate flowers,	Rhodes.
16. Owl,	Athens.
17. Pegasus,	Corinth.
18. Wolf's head,	Argos.
19. Bull's head,	Bœotia.
20. Minotaur's head and labyrinth,	Crete.
21. Horse's head,	Pharsalia.
22. Lion,	Marseilles.
23. Tortoise,	Peloponnesus.
24. Sphinx,	Scio.
25. Three legs joined, as in the Isle of Man-money,	Sicily.
26. Horse,	Thessaly.
27. The crescent,	Byzantium.
28. Bull,	Supposed to be a river.
29. Ensign with the letters COL.	A colony drawn from one legion.
30. Bull,	Apis, strength or security.
31. Caduceus,	Peace and concord.
32. Cornucopia,	Abundance.
33. Pontifical hat,	Priesthood.
34. Parazonium,	Baton of command.
35. Globe on an altar with three stars,	The world preserved by the gods for the three sons of Constantine I.
36. Fort and gate,	Security.
37. Tribuli, a kind of chevaux de frize,	Unknown.

Symbols of Countries, &c.

38.	Altar or tripod, - -	Piety.
39.	Dolphin, - - -	Apollo.
40.	Lectiſternia, - - -	Feſtivals.
41.	Lituus, or twiſted wand, -	Augurſhip.
42.	Apex, or cap with ſtrings, -	Pontificate.
43.	Thenſa, or chariot employed to carry images, - -	Conſecration of an empreſs.
44.	Peacock, - - -	Ditto.
45.	Eagle, - - -	Conſecration of an emperor.

The legends put upon medals are deſigned as explanations of them; but as the compaſs of even the largeſt coins does not admit of any great length of inſcription, it has always been found neceſſary to uſe abbreviations; and in readily decyphering theſe, lies a conſiderable part of the difficulty of the ſcience. This, however, is greater in the Roman than in the Greek medals; for the Greeks commonly inſert as much of the word as is ſufficient to enable us eaſily to underſtand its meaning; but it is common for thoſe who attempt to explain letters that do not often occur, to fall into very ridiculous errors. Of this Mr. Pinkerton gives a moſt remarkable inſtance in Fortunius Licetus, a learned man, who finding upon a coin of Adrian the letters A. IΔ. ſignifying the 14th year of that emperor's reign, imagined that they ſignified *Lucernas invenit Delta*; "Delta invented lanthorns;" and thence aſcribed the origin of lanthorns to the Egyptians. Tables explaining the meaning of the abbreviations found upon medals have been publiſhed by Patin, Urſatus, and others.

Sect. VII. *Of Medallions, Medallets, &c.*

Beſides the ordinary coins of the ancients, which paſſed in common circulation through the country, there were others of a larger ſize, which are now termed *medallions*. Theſe were ſtruck on the commencement of the reign of a new emperor and other ſolemn occaſions: frequently alſo, by the Greeks in particular, as monuments of gratitude or of flattery. Sometimes they were mere trial or pattern pieces; and thoſe abound after the time of Maximian with the words *Tres Monetæ* on the reverſe. The common opinion is, that all the Roman pieces of gold exceeding the denarius aureus, all in ſilver exceeding the denarius, and all in braſs exceeding the ſeſtertius, went under the denomination of *medallions*: but Mr. Pinkerton thinks that many of theſe large pieces went in circulation, though not very commonly, as our five and two guinea pieces, ſilver crowns, &c. do in this country. The fineſt medallions were preſented by the mint-maſters to the emperor, and by the emperor to his friends, as ſpecimens of fine workmanſhip. The beſt we have at preſent are of braſs, and many of them compoſed of two ſorts of metal; the centre being copper, with a ring of braſs around it, or the contrary; and the inſcription is ſometimes confined to one of the metals, ſometimes not. There is a remarkable difference between the Greek and Roman medallions in point of thickneſs; the latter being frequently three or four lines thick, while the other ſeldom exceed one. Very few medallions, however, were ſtruck by the Greeks before the time of the Roman emperors; but the Greek medallions of the emperors are more numerous than thoſe of the Romans themſelves. All theſe pieces, however, are of ſuch high price that few private perſons are able to purchaſe them. In the laſt century Chriſtina queen of Sweden procured about 300. In the late king of France's collection there were 1200, number formerly ſuppoſed not to exiſt; but Dr. Hunter's collection contains about 400, excluſive of the Egyptian.

Beſides theſe large pieces, there are ſmaller ones of a ſize ſomewhat larger than our half-crowns; and by Italian medalliſts are called *medaglion cini*, or ſmall medallions. They are ſtill ſcarcer than the large kind.

There is ſtill a third kind, which have almoſt eſcaped the notice of medalliſts, viz. the ſmall coins or *miſſilia* ſcattered among the people on ſolemn occaſions; ſuch as thoſe ſtruck for the ſlaves on account of the Saturnalia; counters for gaming; tickets for baths and feaſts; tokens in copper and in lead; &c. Theſe are diſtinguiſhed by Mr. Pinkerton by the name of *medallets*. Many, or perhaps almoſt all, of thoſe ſtruck for the ſaturnalia were ſatirical; as the ſlaves had then a licence to ridicule not only their maſters but any perſon whatever. Mr. Pinkerton mentions one of the moſt common pieces of this kind, which has on the obverſe the head of an old woman veiled, with a laurel crown; the reverſe only S. C. within a wreath. Baudelot is of opinion that it is the head of Acca Laurentia, the nurſe of Romulus, to whom a feſtival was ordained. "Perhaps (ſays Mr. Pinkerton) it was ſtruck in ridicule of Julius Cæſar; for the manner of the laurel crown, and its high appearance over the head, perfectly reſemble that of Julius on his coins." Some have a ſhip upon one ſide; on the reverſe T, or a croſs, which was the image of Priapus; and occaſioned many falſe invectives againſt the firſt Chriſtians, who paid ſuch reſpect to the croſs. Some pieces have the heads of the emperors upon one ſide; on the reverſe only numerals III. IV. V. &c. and the noted *ſpintriati* of Tacitus. Both theſe kinds appear tickets for the baths, as the number ſeems to denote the particular bath. Some have the head of a girl, with a veſſel uſed at the baths in her hand. The ſpintriati are ſo immodeſt, that few will bear mention. But ſome are merely ludicrous; as one which has an aſs with a bell about his neck, and a ſoldier riding him; another with two figures hoiſting a woman in a baſket into the air. Of thoſe that will juſt bear mention, is a man with titles around him, as chief of the games; and a woman in ridicule of the modeſt bath-girl above-mentioned. There is alſo one marked XIX, on which appears an imperator triumphing in a car: this car is placed on the back of a camel; and behind the imperator is a monkey mimicking him.

A fourth claſs of medals are called *contorniati*, from the Italian *contorniato*, "encircled;" becauſe of the hollow circle which commonly runs around them. They are diſtinguiſhed from medallions by their thinneſs, faint relief, reverſes ſometimes in relief, ſometimes hollow; and in general by the inferiority in their workmanſhip. The opinions of medalliſts concerning theſe pieces are very various: ſome ſuppoſe them to have been ſtruck by Gallienus to the memory of illuſtrious men and celebrated *athletæ*, at the time that he cauſed all the conſecration coins of his predeceſſors to be reſtored; others aſcribe their invention to Greece, &c. but Mr. Pinkerton is of opinion that they were only tickets for places at public games. Many of them, notwithſtanding their inferior workmanſhip, are very valuable on account of their preſerving the portraits of ſome illuſtrious authors of antiquity no where elſe to be found. Much dependance, however, cannot be put on the portraits of Greek authors and eminent men found upon ſome of them; for, though we know that the buſts of Salluſt, Horace, &c. muſt have been ſtruck when their perſons were freſh in the memory of the artiſts, yet it was otherwiſe with Homer, Solon, Pythagoras, &c. which are to be found on ſome of them. Even theſe, however, are valuable, as being ancient and perhaps traditional portraits of theſe great men. The laſt whoſe portraits are ſuppoſed to have been delineated in this way, are Apollonius Tyaneus who flouriſhed in the time of Domitian, and Apuleius in that of Marcus Antoninus. Mr. Pinkerton thinks it a confirmation of his opinion concerning theſe medals, that the reverſes always contain ſome device alluding to public games, as that of a charioteer driving a chariot, &c.

Sect. VIII. *Directions for making Cabinets.*

We muſt now proceed to the laſt part of our ſubject, viz. that of giving directions for the formation of cabinets. As we have already ſeen that the formation of any one muſt be at-

tended with very conſiderable expence, it is neceſſary for every one who attempts this to proportion the cabinet to his own circumſtances. There are, properly ſpeaking, three kinds of cabinets. I. Thoſe meant to contain a coin of every ſort that has been iſſued from the mint in every age and country: but this, which may be called the large and complete cabinet, is not to be purchaſed by private perſons. That of Dr. Hunter already mentioned is perhaps one of the beſt private cabinets ever known; and coſt 23,00 l. but as many duplicates were ſold as coſt 2000l. by which means the expence was reduced to 21,000. The vaſt collection made by the king of France coſt upwards of 100,000l. The ſmaller cabinet may be ſuppoſed to conſiſt only of middle and ſmall Roman braſs, Engliſh pennies, groats, &c. with a few medals of the more valuable kind, and may be ſuppoſed to incur an expence of from 200 to 1000l. The ſmalleſt kind is called a *coffret* of medals, and does not conſiſt of above a thouſand at moſt of various kinds; and conſequently the expence muſt depend on the pleaſure of the proprietor.

In the formation of the grand cabinet, it muſt be obſerved that the Greek medals of every denomination do not admit of any arrangement by the metals like the Roman; not any regular ſeries of this kind being met with even in the moſt opulent cabinets. Hence in all collections the civic coins are ranged according to an alphabetical order; and the monarchic in a chronological one. The ſame rule is to be obſerved in the Roman conſular medals; they are ranged, like the coins of the Greek cities, in an alphabetical ſeries of the families. The Roman imperial coins are only thoſe capable of being arranged according to ſizes and metals. Even from this muſt be excepted the minimi, or very ſmalleſt coins; which are ſo ſcarce, that the only regular ſeries of them in the world is that belonging to the king of Spain, which was formed by a moſt ſkilful French medalliſt, and conſiſt of all the metals. The arrangement of a grand cabinet, according to Mr Pinkerton, is as follows:

"I. The coins of cities and of free ſtates in alphabetical order; whether uſing Greek, Roman, Punic, Etruſcan, or paniſh characters.

"II. Kings in chronological ſeries, both as to foundation of empire and ſeniority of reign.

"III. Heroes, heroines, founders of empires and cities.

"IV. Other illuſtrious perſons.

"V. Roman aſes.

"VI. Coins of families, commonly called conſular.

"VII. Imperial medallions.

"VIII. Imperial gold.

"IX. Imperial *minimi* of all metals.

"X. Imperial ſilver.

"XI. Imperial firſt braſs.

"XII. Second braſs.

"XIII. Third braſs.

"XIV. Colonial coins, which are all of braſs.

"XV. Greek cities under the emperors, of all metals and ſizes. In a ſmaller cabinet they may be put with the Roman, according to their metal and ſize. Thoſe without the emperor's head go to claſs I. though ſtruck in Roman times.

"XVI. Egyptian coins ſtruck under the Roman emperors, of all metals and ſizes. They are moſtly of a baſe metal called by the French *patin*; it is a kind of pot metal or brittle braſs.

"XVII. Contorniati, or ticket medals.

"XVIII. Coins of Gothic princes, &c. inſcribed with Roman characters.

"XIX. Coins of ſouthern nations uſing uncommon alphabets; as the Perſian, Punic, Etruſcan, and Spaniſh.

"XX. Coins of northern nations uſing uncommon characters, as the Runic and German.

"In the modern part no ſeries can be formed of copper that will go back above two centuries; but ſequences (chronological ſeries) of gold and ſilver may be arranged of all the different empires, kingdoms, and ſtates, as far as their ſeveral coinages will allow. Thoſe of England and France will be the moſt perfect. Modern ſilver is commonly arranged in three ſequences; the dollar, the groat, and the penny ſizes. The medals of each modern country ought of courſe to be ſeparated; though it is beſt to arrange each ſet in chronological order, let their ſize of metal be what it will. It may be remarked here, that our modern medals, of the ſize of a tea-ſaucer, are only ſo many monuments of barbariſm. The ancient medallions are almoſt univerſally but little larger than our crown-piece, though three or four of them may extend to about two inches diameter, but very many modern medals to four inches and more. A large medal always declares an ignorant prince or an ignorant artiſt. Into the ſize of a crown-piece the ancients threw more miracles in this way than will ever appear in theſe monſtrous productions."

Theſe directions will likewiſe apply to the formation of a cabinet of the ſecond kind: but if the collector means to form a ſeries of large Roman braſs, he will find the coins of four or five emperors ſo ſcarce as not to be attainable in that ſeries, even at any price. He muſt therefore ſupply their places with middle braſs, as is allowed with regard to Otho: even in the beſt cabinets, there not being above three coins of that emperor in large braſs known in the world; whereas of the middle braſs, two or three hundred may exiſt. For this reaſon Mr. Pinkerton concludes, that in cabinets of the ſecond claſs, the collector may mingle the large and ſecond braſs together as he thinks proper, in order to ſave expence; though it would not do ſo well to unite ſuch diſproportionate ſizes as the large and ſmall. "In the ſmall ſequence, however (ſays he), there can be no harm in his mixing gold, ſilver, and braſs, as chance or curioſity may lead him to purchaſe any of theſe metals. And though your ſtarched bigoted medalliſt may ſneer becauſe ſuch a ſequence would controvert his formal and narrow way of thinking, common ſenſe will authoriſe us to laugh at the pedant in our turn, and to pronounce ſuch a ſeries more various, rich, and intereſting, than if the collector had arranged only one metal, and rejected a curious article becauſe he did not collect gold or ſilver. In like manner, if, in the modern part of the ſmaller cabinet, any coin of a ſeries is of high price, or of bad impreſſion, there can be no impropriety in putting another of the ſame reign, which is cheaper, or better executed, though of a different denomination, or of a little larger ſize. In ſhort, the collector has no rules but in the Greek cities and Roman families, to obſerve alphabetical order and chronology in every thing elſe.

Tables *of Ancient Coins.*

The moſt ancient coins, according to Froelich, are diſtinguiſhed by the following marks, which he accounts infallible: 1. Their oval circumference, and globulous ſwelling ſhape. 2. Antiquity of alphabet. 3. The characters being retrograde, or the firſt diviſion of the legend in the common ſtyle, while the next is retrograde. 4. The indented ſquare already deſcribed. 5. The ſimple ſtructure of the mintage. 6. Some of the very old coins are hollowed on the reverſe, with the image impreſſed on the front. 7. The dreſs, ſymbols, &c. frequently of the rudeſt deſign and execution.

Table I. *Ancient Greek Coins.*

1. Thoſe without impreſſion.

2. With one or more hollow indented marks on one ſide, and an impreſſion in relief on the other.—Of Chalcedon on the Helleſpont, Leſbos, Abdera in Thrace, Acanthus in Macedon, thoſe ſaid to belong to Egium in Achaia. This claſs continues from about 900 to 700 B. C.

3. With an indented ſquare divided into ſegments, having a ſmall figure in one of them; the reſt blank, with a figure in re-

lief on the obverſe.—Of Syracuſe and other places adjacent. Continue from 700 to 600 B. C.

4. Coins hollow on the reverſe, with figures in relief on the obverſe.—Of Caulonia, Crotona, Metapontum, &c. Suppoſed by ſome to be a local coinage of Magna Græcia; but probably of equal antiquity with the former.

5. Coins in which a ſquare dye is uſed on one or both ſides.—Of Athens, Cyrene, Argos, &c.—Of Alexander I. and Archelaus I. of Macedon. Diſuſed in the reign of the latter about 420 B. C.

6. Complete coins, both in obverſe and reverſe, occur firſt in Sicily in the time of Gelo, about 491 B. C.

7. Coins of Alexander the Great and his ſucceſſors. About the time of this hero the Greek coins began to attain to perfection, and were ſtruck of uncommon beauty. It is remarkable, that on the coins of this monarch his own image ſeldom occurs. After his death many coins bear his portrait. Trebellius Pollio informs us, that ſome coins, particularly thoſe of Alexander, uſed to be worn as amulets; and many medals are met with in cabinets bored ſeemingly with that intention.

8. Coins of the ſucceſſors of Alexander.—Thoſe of the Syrian monarchs almoſt equal the coins of Alexander himſelf in beauty. Thoſe of Antiochus VI. are ſuppoſed to be the moſt perfect patterns of male beauty to be met with anywhere. The Egyptian Ptolemies are ſomewhat inferior.

9. The coins of the Arſacidæ of Parthia done by Greek workmen.

10. The Greek imperial coins, being ſuch as have the head of an emperor or empreſs; ſuch as have not theſe impreſſions being claſſed with the civic coins, though ſtruck under the Roman power. None of the imperial coins occur in gold. Of ſilver there are thoſe of Antioch, Tyre, Sidon, Tarſus, Berytus, Cæſarea. Egyptian ſilver coins of baſe metal. Syrian ſilver coins, which ſometimes bear on the reverſe the club of Hercules, or the Tyrian ſhell-fiſh. Thoſe of Sidon bear the image of the goddeſs Aſtarte, or her chariot. Thoſe of Cæſarea in Cappadocia of better work than the Syrian. Lycian coins of good workmanſhip: on the reverſe two harps and an owl ſitting upon them. Silver coins of Gelon in Sarmatia reſembling the Syrian. The ſituation of this town is very much unknown. It ſeems to have been ſituated on the north of the Euxine ſea, where ſome Sarmatic or Sclavonic tribes were mingled with the Scythians or Goths. The Greek imperial braſs coins are very numerous. A ſeries of almoſt all the emperors may be had from thoſe of Antioch, with a Latin legend on the obverſe and Greek on the reverſe. Thoſe of Bithynia and Phrygia remarkable for good workmanſhip. The coins of Tarſus, remarkable for their curious views of objects, almoſt in perſpective. The Egyptian coins, from the time of Auguſtus to Nero, are worſe executed than afterwards. From Nero to Commodus they are frequently of admirable workmanſhip, and in a peculiar ſtyle, diſtinct both from the Greek and Roman. From the time of Commodus they decline, and are loſt after the reign of Conſtantius I. The Egyptian braſs coins of the Roman period are likewiſe of excellent workmanſhip, eſpecially in the time of Antoninus Pius.

Table II. *Roman Coins.*

I. The conſular coins, called alſo the coins of familics, and arranged alphabetically in cabinets, according to the names of the families which appear on them. They are,

1. *Braſs Coins.*—Theſe conſiſt chiefly of large pieces of rude workmanſhip without any intereſting imagery. In cabinets they are generally kept in boxes apart by themſelves. The as bears the head of Janus; the ſemis of Jupiter with S; the triens of Minerva with four cyphers; the quadrans of Hercules with three cyphers; the ſextans of Mercury with two cyphers; and the uncia bears the head of Rome with one cypher. In all theſe pieces the prow of a ſhip is conſtantly the figure on the reverſe, with very few exceptions. Sometimes, indeed, they have a ſhell, two heads of barley, a frog, an anchor, or a dog, on the reverſe. About the time of Julius Cæſar both the obverſes and the reverſes of the coins began to be altered.

2. *Silver.*—Of this the denarius was the firſt and principal coin. It was ſtamped originally with X, denoting that the value was ten aſes. On the reverſe was Caſtor and Pollux, or a chariot of Victory. Afterwards the buſts of various deities make their appearance; and in the ſeventh century of Rome the portraits of illuſtrious perſons deceaſed are met with: but till the time of Julius Cæſar no figure of any living perſon is to be met with; Julius himſelf being the firſt who aſſumed that honour. The workmanſhip on the beſt and worſt ſilver is much the ſame. The reverſes are very curious, and point out many remarkable events in Roman hiſtory; but none of theſe occur till about a century before the Chriſtian era. The large denarii, with Roma, are the moſt ancient; and ſome of theſe bear the Pelaſgic A, not the Roman. The ſilver ſeſtertii have a head of Mercury, with a caduceus on the reverſe. The quinarii have always a head of Jupiter, with a Victory on the reverſe.

3. *Gold.*—Moſt of theſe are of great value. The number of theſe exceeds not 100; thoſe of braſs 200; and of ſilver 2000. The aureus is the general gold coin; but two or three gold ſemiſſes of families likewiſe occur.

II. Roman imperial coins.

1. *Braſs.*—This is of three ſizes; large, middle, and ſmall. The firſt forms a moſt beautiful ſeries, but very expenſive. The various colours of the patina have the fineſt effect. It is the moſt important of all the Roman coins, and exceeds even the gold in value.

The middle braſs is next in value to the former; and in it are many rare and curious coins, particularly intereſting to Britons, as elucidating the hiſtory of the iſland. Of theſe are the triumphal arch of Claudius; the Exerc. Britannicus of Adrian; the coins of Antoninus Pius, Commodus, Severus, with a Victory, Victoria Britan. but eſpecially thoſe perſonifying the country Britannia. "The number of Roman coins relating to Britain (ſays Mr. Pinkerton) is remarkable, more than 20 having been ſtruck at various times; while thoſe perſonifying Italy, Gaul, Spain, and other regions of the empire, exceed not four or ſix at moſt for each country. Only one country vies with Britain, and that is Dacia on the extreme north-eaſt of the empire, as Britain on the extreme north-weſt. No doubt this circumſtance of remoteneſs in theſe two countries recommended them to this particular attention, as more expreſſive of the Roman power.

The ſmall braſs ſeries abounds alſo with curious coins. They are ſcarce till the time of Valerian and Gallienus, but very common afterwards. Mr. Pinkerton recommends, therefore, to form a ſeries in ſilver as well as braſs; both being the cheapeſt of all the Roman coins. "In this ſeries (ſays he) it is a common fault to arrange many coins which have been plated with gold or ſilver, the forgeries of ancient times, but which time has worn off either wholly or in part. All real braſs coins have the s. c. till the time of Gallienus; as the ſenate alone had the power of ſtriking braſs, while the emperor himſelf had that of gold and ſilver. When the s. c. therefore is wanting, the coin was certainly once plated; as, in general, the different type and fabric, being thoſe of gold and ſilver, ſufficiently ſhow themſelves. With Pertinax, A. D. 192, there is a temporary ceſſation of ſmall braſs; nor after him do any princes occur in that ſeries till Valerian, A. D. 254, excepting Trajanus Decius, A. D. 250 only. After Valerian the ſeries is continuous and common. The braſs coinage gradually declined in ſize from the time of Severus; ſo that parts of

the as could not be ſtruck, or at leaſt it was held unneceſſary to ſtrike them. Trajanus Decius attempted in vain to reſtore the coinage; and Valerian and Gallienus were forced to iſſue denarii ærei and ſmall aſſaria. The ſeries of large and of middle braſs are of two fixed and known ſizes; the former about that of our crown, the latter of the half-crown: though after Severus they gradually leſſen. But the ſmall braſs takes in all parts of the as; and every braſs coin not larger than our ſhilling belongs to this ſeries. The *minimi*, indeed, or very ſmalleſt, it is proper to keep apart. The coins of Julius Cæſar in this ſize are of peculiarly fine workmanſhip. They bear his portrait reverſe of Auguſtus, or the reverſe has a crocodile EGYPTO CAPTA. There are ſeveral with Mark Anthony, and ſome with Cleopatra; but the more common pieces are thoſe with only numerals on the obverſe, which go the length of XIII; probably tickets for the baths. A great many occur in the time of Nero; of which Mr. Pinkerton particulariſes one which has "on the reverſe a table ornamented with griffins and other devices. Upon it is placed a wreath of laurel, and a beautiful vaſe, of which the embоſſed human figures are ſo minute, and finiſhed ſo ſurpriſingly, as to ſtamp theſe coins the moſt exquiſite productions of the ancient mint." From the time of Nero to that of Veſpaſian no ſmall braſs occurs: but there are many of this emperor and of his ſon Titus; while Domitian has as many as Nero, and Domitia his wife has almoſt as many. Succeeding emperors to the time of Pertinax have alſo many braſs coins; but from his time to that of Valerian there are no real ſmall braſs, excepting thoſe of Trajanus Decius. After Gallienus there are a great many coins of this kind; and Mr. Pinkerton mentions one in Dr. Hunter's cabinet, of an unknown perſon named Nigrianus. The coin ſeems to have been ſtruck at Carthage; and our author concludes that he was an African Uſurper, father to Nigrinianus.

2. *Silver.*—This ſeries is very complete, and the cheapeſt of any; eſpecially as the ſmall braſs becomes a fine ſupplement to it: the latter being had in plenty when the ſilver becomes ſcarce, and the ſilver being plentiful when the braſs is ſcarce.

3. *Gold.*—The Roman imperial gold coins form a ſeries of great beauty and perfection; but on account of their great price are beyond the purchaſe of private perſons.

4. *The colonial coins* occur only in braſs, none, excepting that of Nemauſus, having a right to coin ſilver. They begin in Spain with Julius Cæſar and Anthony, and ceaſe with Caligula, who took away the privilege of coinage from the Spaniſh colonies. The moſt beautiful are thoſe of Corinth. The other remarkable colonial coins are thoſe of Emerita, Ilice, Terraco, Caſſandria, Babba, Berytus, Cæſarea, Patræ, Emiſa, Heliopolis or Balhec, Ptolemais, Sidon, Tyre, Deulton, Dium, Troas, Rheſaina, Neapolis of Samaria, which bears a repreſentation of Mount Gerizzim with the temple on it, Hippo in Africa, &c. On many of theſe coins we meet with fine repreſentations of temples, triumphal arches, gods, goddeſſes, and illuſtrious perſons. But coins with thoſe repreſentations are by no means common; the colonial coins till the time of Trajan bearing only a plough, or ſome other ſimple badge of a colony. Camelodunum is the only colony in Britain of which we have any coins.

5. The *minimi.*—This includes the ſmalleſt coins of all denominations, moſt of which do not exceed the ſize of a ſilver penny. They are the moſt curious of all; but no ſeries of them was ever formed by any perſon except the Abbe Rothelin, whoſe collection formed of all metals paſſed to the queen of Spain. The reaſon of the ſcarcity of theſe ſmall coins is probably their diminutive ſize; by reaſon of which they are moſtly loſt.

It is ſurpriſing that numbers of Roman coins are found through all countries once ſubject to that powerful people. Some have been met with in the Orkneys, and many in the moſt remote parts of Europe, Aſia, and Africa, known to the ancients.

TABLE III. *Coins of other ancient Nations.*

1. The Lydians appear to have invented coinage; though, perhaps, this honour may be diſputed with them by the Greeks.

2. The Aſſyrians, Medes, Babylonians, Phœnicians, and Egyptians, had no coins. In the mouths of the mummies are only thin, unſtamped, and round pieces of gold to pay Charon's fare.

3. No Indian or Chineſe coins are to be met with till a very late period; and even then ſo rude as ſcarce to be worth notice. Voltaire mentions a collection of ancient Chineſe and Indian coins made by the emperor of China in 1700; but Mr. Pinkerton ſuppoſes it to have conſiſted only of the Greek and Roman money which had been introduced into theſe countries.

4. The Lydian coins have no legends; ſo that mere conjecture only determines the ancient coins of electrum and ſilver found in Aſia, and different from the Perſian, to belong to Lydia. Crœſus coined gold into a form which he called *ſtaters*; and Mr. Pinkerton mentions a very ancient gold coin in Dr. Hunter's cabinet, which he ſuppoſes to have been one of theſe. It has a globous figure, with indented marks on one ſide, and on the other a man kneeling, with a fiſh held out in the left hand, and a ſword depending in the right. It weighs four drams; which Joſephus tells us was the weight of the Lydian gold coins. In the ſame collection are other gold coins little inferior in antiquity; the moſt ancient of which, our author ſuppoſes, may have been coined by the cities of Aſia Minor, as coinage paſſed through them to Greece. They are of admirable workmanſhip, and as much ſuperior to the beſt Sicilian coins, as the latter are to all the reſt in the world. Theſe gold coins are all extremely pale; owing to the want of knowledge in refining gold.

5. Perſian coins.—Theſe were firſt ſtruck by Darius Hyſtaſpes, whence they had the name of *Darics*. They are of gold, and generally have the figure of an archer: they weigh about four drachms; and ſome occur with the indented mark on one ſide, while others have figures upon both. The ſilver coins have generally a king in a chariot of two horſes, with a charioteer, and ſometimes another figure on foot behind on the obverſe; while the reverſe preſents a ſhip, ſometimes a ram, bull, or other animal. The gold coins, which only had the title of *Darics*, are extremely ſcarce, having been melted down, as is ſuppoſed, and re-coined by Alexander the Great on his conqueſt of Aſia.

There is a ſecond ſeries of Perſian coins beginning with Artaxares, or Artaxerxes, who overthrew the Parthian monarchy about the year 210. Theſe are large and thin, with the king's buſt on one ſide and the altar of Mithras on the other; generally with a human figure on each ſide. Theſe coins continue till the year 636, when Perſia was conquered by the Saracens. They have only Perſian letters upon them, which have never been explained by any antiquaries. Mr. Pinkerton ſays that they ſeem to partake of the ancient Greek, Gothic, and Alanic.

6. The Hebrew ſhekels, originally didrachms, but after the time of the Maccabees tetradrachms, are almoſt all forgeries of modern Jews, as well as the braſs coins with Samaritan characters upon them. They have all a ſprig upon one ſide and a vaſe on the other. Mr. Pinkerton ſays, that the admiſſion of one of them into a cabinet would almoſt be a diſgrace to it.

7. Phœnician and Punic coins are very intereſting on account of the great power and wealth of theſe nations. The alphabets have been cleared by their relation to the Hebrew and Syriac languages.

8. The coins of Palmyra come under the ſame denomination with the former, Palmyra being a Syrian city.

9. The Etruſcan coins have the characters of that nation,

which have been explained by their affinity to the Pelaſgic, or oldeſt Greek and Latin.

10. The Spaniſh coins are inſcribed with two or three alphabets allied to the old Greek or Punic; but the inſcriptions have not been ſufficiently explained.

11. Gauliſh coins.—Theſe are numerous; but the moſt ancient have no legends; and even after the Greek letters were introduced into Gaul by a colony at Marſeilles, the legends are very difficult to be explained.

12. Britiſh coins.—From a paſſage in Cæſar's Commentaries, it has been inferred that the Britons uſed ſome kind of coins even in his time. Mr. Pinkerton informs us, that ſome rude coins of copper very much mingled with tin are frequently found in England; which, he ſuppoſes, may be ſome of the ancient Britiſh money. They are of the ſize of a didrachm, the common form of the nummus aureus among the ancients. After the time of Cæſar, coinage increaſed among the Britons; and there are many found of Cunobelinus mentioned in the Roman hiſtory. Moſt of theſe have on one ſide CUNO, with an ear of wheat, a horſe, a kind of head of Janus, or other ſymbol; and have frequently alſo the letters CAMU; ſuppoſed to mean Camelodunum. Sometimes the word TASCIA occurs; the meaning of which has not yet been explained.

13. Gothic coins of France, Italy, and Spain, to the time of Charles the Great.—Theſe have the Roman characters upon them. The Italian coins are moſtly of the ſize of ſmall braſs; and in this way we meet with coins of Athalaric, Theodahat, Witigez, and other Gothic princes. Many others occur, the inſcriptions of which, though meant for Roman, are ſo perverted as to be illegible.

TABLE IV. *Modern Coins.*

1. Of Japan.—Theſe are thin plates of gold and ſilver, of an oval figure, with ſmall marks or figures ſtamped on them.

2. China.—Theſe are only copper, about the ſize of a farthing, with a ſquare hole in the middle to put them on ſtrings. The inſcriptions on them do not expreſs the name of the ſovereign, but the year of his reign; as the *happy year*, the *illuſtrious year*, &c.

3. The Tartarian coins are rude, having only inſcriptions upon them; and they are all poſterior to the time of Jenghiz-khan.

4. Coins of Thibet, Pegu, and Siam, are much the ſame, preſenting only inſcriptions without any figures. They are alſo of late date.

5. India.—Some old coins have been found in the neighbourhood of Calcutta, of gold, ſilver, copper, and tin, all mixed together. Theſe have commonly a warrior with a ſword on one ſide, and an Indian female idol on the other; of the ſame form with the celebrated ſculptures in the iſland of Elephanta, but it is impoſſible to tell what antiquity they are of. The modern coins are the pagoda of gold, worth little more than ſix ſhillings; the rupee of ſilver, upwards of two ſhillings; and the caſh, of copper. There is a remarkable ſet of rupees, which ſhow the twelve ſigns; a lion on one, a bull on another, &c. but the occaſion on which they were ſtruck is unknown. The other coins of India have generally Perſian inſcriptions upon them.

6. Perſia.—The Perſic coins ſince its conqueſt by the Arabs continue on the Arabian model.

7. Arabia.—Some coins of the petty princes of Arabia are met with as old as the imperial ages of Rome; but till the time of Haroun Alraſhid, no regular coinage appears in the vaſt empire of the Saracens. Even then the reverſe has only an inſcription, and the obverſe is copied from any Greek or Syrian coin which happened to fall in the moneyer's way. The later Arabian coins are moſtly ſilver, with the name and titles of the prince on one ſide, and ſome inſcription from the Koràn on the other. The more modern coins of this country are in the ſhape of a fiſh-hook, with Arabic inſcriptions.

8. Turkey.—No regular coinage was formed by the Turks till they became maſters of Conſtantinople. They reſemble thoſe of Perſia and Arabia, having merely inſcriptions on both ſides.

9. The coins of the African ſtates, at leaſt ſuch as profeſs the Mohammedan religion, have merely inſcriptions without any figures: thoſe of the internal parts are unknown; and no coinage was uſed among the Mexicans and Peruvians, the only civilized nations in America; but La Hontan mentions an American ſavage who had a ſquare medal of copper depending from his neck. Mr. Pinkerton ſuppoſes it to have come from Japan.

10. Modern Italic coins.—Beſides the Gothic princes mentioned in the former tale, the exarchs of Ravenna coined money with the inſcription FELIX RAVENNA, &c. The Lombards iſſued no coins, but there are ſome ſtill extant of Charlemagne. The following liſt ſhows the origin of the coinage in various Italian ſtates.

Rome. Papal coinage originates with Hadrian I. Size of ſilver pennies, with the Pope's name on one ſide, and SCOS PETRUS on the other. No coins appear from 975 to 1099, excepting of Leo IX. In 1303 appear pennies of the ſenate and people of Rome, with Peter on the one ſide and Paul on the other. There are groats of Clement V. with his portrait three quarters length; but the ſide-head begins with Sixtus V. in 1470. Gold was firſt coined by John XXII. in 1316. The coins of Alexander VI. Julius II. and Leo X. are remarkable for beauty and elegance.

Milan. Coinage began with Charlemagne. The firſt coin of the family of Viſconti occurs in 1330 under Azo. The ſet finiſhes with Louis XII.

Naples. Coinage begins in 840 and 880, with duke Sergius and biſhop Athanaſius. The next coins are of Roger of Sicily, and Roger II. in 1130, William I. II. and Tancred. Naples and Sicily were ſubdued in 1194 by the emperor of Germany; in 1255 Manfred appears: in 1266 Charles of Provence; and others till Joan in 1414: after which follow the houſe of Arragon, and later kings.

Venice begins in the 10th century. The firſt coins are ſilver pennies marked VENECI. Then follow the coins of Henrico Dandulo in 1192, of Ziani in 1205, &c. Gold was firſt coined at Venice in 1280, and copper in 1471; but the ſilver groats are as old as 1192.

Florence. Silver was coined here in the 12th century, or before; but in 1252 the firſt gold coins ſtruck in Europe after the 8th century made their appearance, and were named *florins* from the flower of the lily upon them. They were imitated by the popes, by France, and England. They have on one ſide St. John the Baptiſt ſtanding, on the other a large *fleur de lis*, and it is not doubted that the French *fleurs de lis* took their origin from theſe coins. They weigh a drachm, and are no leſs than 24 carats fine according to Italian writers, and are worth about 12 ſhillings.

Geneva firſt began to coin money in 1129, under the government of Conrad. Thoſe of the dukes of Savoy began in the ſame century.

Aquileia. Coins were iſſued from this city by the patriarchs from 1204 to 1440.

Ferrara. Coins of the marquiſes from 1340.

11. French coins.—During the race of Clovis, from 490 till 751, the coins are chiefly gold *trientes*, with ſome *ſolidi* and *ſemiſſes* The former are of good workmanſhip, with the heads of kings. The reverſe has a croſs with the name of the town where they were ſtruck.

The coins of the ſecond race begin with Pepin in 751, and continue till Hugh Capet in 987. The coins of the firſt race are elegant, but thoſe of the ſecond entirely the reverſe, being almoſt all ſilver pennies, and ſeldom bearing the portrait of the king. Thoſe of Charlemagne have only CAROLUS in the

field; while the reverſe bears R. F. or ſome ſuch inſcription; though one piece ſtruck at Rome has a rude buſt of him. The coins of Louis le Debonnaire are better done.

The third race begins with Hugh Capet in 987, and extends to this time. The coinage did not begin to improve till 1226 under St. Louis, when the groat appears. Its name in Italian is *groſſo*, in French *groſſe*, in Engliſh *groat*, or great coin; ſo called from its ſize in compariſon with the penny; and it paſſed from Italy to France, to Germany, and to England. After the conqueſt of France by the Engliſh, baſe coins of many kinds were introduced; and in the year 1574, in the time of Henry III copper was firſt introduced into the French coinage. Beſides theſe, the other remarkable coins of France are, the blancs or billon groats, firſt iſſued in 1348; the *ecus à la couronne*, or crowns of gold, ſo called from the crown on one ſide, and begun by Charles VI. in 1384; thoſe of Ann of Bretagne in 1[illegible]: the *teſton*, or piece with the king's head, of Louis XII.; the *henri* of Henry II. with Gaul ſitting in armour, and a Victory in her hand. There are many coins of cardinal Bourbon, elected king in 1580; and in 1642, Louis XIV. takes the title of CATALONIÆ PRINCEPS. The firſt *louis d'or* made its appearance in 1640; but ſuch was the poverty of France, if we believe certain authors, that in 1719 the duke of Orleans regent ſtruck copper for ſilver.

12. Spaniſh coins. The moſt early ſeries of theſe conſiſts almoſt entirely of trientes, finely done. On one ſide they have the head of the king with his name, and on the other a croſs, with the name of the town, commonly in Bœtica, or the ſouth part of Spain, where there were a great many Roman colonies, and which was fertile to a proverb. The Moreſque coins of Spain, like thoſe of the reſt of the Mohammedan ſtates, preſent us only with inſipid inſcriptions on both ſides. Indeed the Mohammedan religion, by its abſolute refuſal to allow the repreſentation of any living creature, has prevented the progreſs of coinage in any degree throughout thoſe regions which it has overſpread. The inſcriptions on the ancient Spaniſh coins are in the Cufic or old Arabic characters.

13. Portugal. No deſcription of the coins of this kingdom has yet appeared.

14. Germany. No account of the German coins has been publiſhed; though it is well known that not only the emperors, but many of the cities, particularly thoſe called *Hanſe-towns*, iſſued money; and many of the coins iſſued by the cities were ſuperior in elegance even to thoſe iſſued by the emperors.

15 Denmark. Here the coinage begins with Canute the Great in 1014. The pieces are at firſt extremely rude, ornamented only with rings and Runic characters. Theſe are ſucceeded by copper pieces, ſome of which have a croſs, others a paſtoral ſtaff on one ſide, with the letter A on the other. Later coins have ſtrokes IIII, &c. all round them; but thoſe of Harold, Hardicanute, and Magnus Bonus, in 1041, are of neat workmanſhip, and have the portraits of the princes at half-length. The coins of Nicholas or Niel, as he is called by the Danes, are rude, as well as thoſe of Waldemar I. and the celebrated Margaret. In 1376 Olaf cauſed money to be ſtruck with a grinning full face, with a crowned O upon the other ſide. "The Swedes (ſays Mr. Pinkerton) took theſe coins extremely ill, as they thought they grinned at them." Silver was firſt coined in Denmark by Philippa queen of Eric, and daughter to Henry IV. of England.

16. Sweden. The coinage of this kingdom began in 818 under Biorno, on the plan of Charlemagne. Theſe coins are marked with a croſs. Next follow thoſe of Olaf in 1019; which Mr. Pinkerton ſuppoſes to have been the firſt true Swediſh coins; and that the art of coinage firſt paſſed from England into Denmark in the time of Canute the great, and from Denmark into Sweden. Theſe coins were ſtruck on the Engliſh model. During the time that Sweden was ſubject to Denmark, or miſerably haraſſed by the Danes, the coins of both kingdoms were the ſame; but after the time of Guſtavus Vaſa many elegant pieces appear. In 1634, dollars were coined with the portrait of Guſtavus Adolphus, who was killed two years before: On the reverſe they have the arms of Sweden, with the chemical marks of mercury and ſulphur. In 1716, 1717, and 1718, Charles XII. being in extreme want of money, iſſued ſmall copper coins with Saturn, Jupiter, Mars, &c. upon them, to go for dollars; and on account of this ſcheme, Baron Goertz, the ſuggeſter of it, was brought to the block.

17. Norway. The coins of this country begin with Olaf in 1006; after which time there are various coins of other princes; but copper was not coined till the year 1343.

Beſides the coins already mentioned, there are eccleſiaſtic coins of France, Germany, Denmark, Sweden, Norway, &c. Thoſe of Denmark and Sweden are numerous, but the Norwegian coins of this denomination are rare. Mr. Pinkerton deſcribes a ſilver one in his poſſeſſion as having arms and a mitre, with the inſcription on one ſide SANCTUS OLAWS REX NORVEY; on the reverſe OLAWS DEI GRA. ARCEP. NID'SEN, meaning NIDROSIENSIS, or archbiſhop of *Nidros*, now Drontheim.

18. Bohemia. The coinage of this kingdom appears at a very early date, viz. in the year 909, under duke Boleſlaus I. Theſe coins are followed by others of Boleſlaus II. and Emma his wife in 970; of Boleſlaus III. in 1002; Jaromir in 1020; Udalrich in 1030, and other princes. The *bracteate* money of Ottocar I. was coined in 1197.

19. Poland. The coinage of this country is nearly as ancient as that of Bohemia. The coins are on the German model, but no particular account of them has been publiſhed.

20. Ruſſia. None of the Ruſſian money appears to be more ancient than the 13th century. The firſt are the *kopecks* or ſilver pennies, which have upon them rude figures of animals on one ſide, and a man ſtanding with a bow or ſpear on the other. There are likewiſe coins of Moſcow ſtruck by Ariſtoteles the architect in 1482. The *roubles* or dollars and their halfs. There are ſome of the impoſtor Demetrius in 1605, which are very ſcarce.

21. Pruſſia. The firſt Pruſſian coins were ſtruck at Culm by the Teutonic knights in 1230. They were ſilver pennies, and upon the German plan. In the next century were ſtruck ſhillings, groats, and *ſchots*; the laſt were the largeſt, and are extremely rare. They have the Pruſſian ſhield, an eagle ſurmounting a croſs, with a roſe-ſhaped border, MONETA DOMINORUM PRUSSIÆ: on the reverſe is a croſs fleurie, within a border of a ſimilar kind, having the inſcription HONOR MAGISTRI, JUSTITIAM DILIGIT.—Gold coins were ſtruck in the ſame century. In the time of Copernicus the money was ſo debaſed, that 12 or 13 marks were worth but one of pure ſilver.

22. England. The Engliſh coins are of various kinds.

1ſt. *Heptarchic.* Theſe are only of two ſorts, viz. the *ſkeatta* or penny of ſilver, and the *ſtyca* of copper. Few of the pennies appear till after the year 700; though ſome are met with which bear the name of Ethelbert I. king of Kent, as old as 560. At firſt they had only rude figures of ſerpents, but in latter times legends were likewiſe added. Moſt of theſe pennies have pagan ſymbols upon them. The ſtyca was only coined in Northumberland, and was a very ſmall piece about the value of half a farthing.

2d. Coins of the *chief monarchs* of England. Mr. Pinkerton denies that an end was put to the heptarchy by Egbert in 832, as is commonly ſuppoſed; though he owns that he was *chief monarch* of the country, as ſeveral others had been before him. Edgar, who reigned in 959, according to him was the firſt king of England; and the coins of the chief monarchs form almoſt a complete ſeries from the time of Egbert to Edgar. The only chief monarch of whom there

are no coins is Ethelbald, who reigned in 857. Moſt of theſe coins bear rude portraits; but the reverſes are ſometimes curious and intereſting. Some have views of cathedrals and other buildings; particularly one of Edward the Elder in 900; which has the cathedral of York with three rows of windows, round arched as the other Saxon and Norman buildings; the Gothic arch being quite unknown till after the 12th century. Some coins of Anlaf king of Northumberland have the famous raven, the Daniſh enſign; and thoſe of other princes have frequently very curious reverſes.

3d. *Eccleſiaſtic* coins appear of the archbiſhops of Canterbury, Wulfred, in 804, Ceolnoth in 830, and Plegmund in 889.

4th. Coins of the *kings* of England. The ſilver penny, which had begun during the heptarchy, continued to be the general coin after the kingdom had been united under one head; and extends in a continued ſeries from Egbert almoſt to the preſent reign. The only kings wanting are Edmund Ironſide, Richard I. and John. At firſt the penny weighed 22½ grains; but towards the cloſe of the reign of Edward III. it fell to 18 grains; and in that of Edward IV. to 12. In the time of Edward VI. it was diminiſhed to eight grains; and in queen Elizabeth's reign to 7$\frac{23}{31}$; at which it ſtill continues.

Halfpennies and farthings were firſt ſtruck in ſilver by Edward I. in 1280; the former continued to the time of the commonwealth, but the latter ceaſed with Edward VI. The groat was introduced by Edward III. in 1354, and continues to this day, though not in common circulation. The half-groat or twopence is of the ſame date, and alſo continues to the preſent time.

Shillings were firſt coined by Henry VII. in 1503. At firſt it was called *teſtoon*, from the *teſte*, *tete*, or head of the king upon it: the name *ſhilling* being derived from the German *ſchelling*; under which appellation coins had been ſtruck at Hamburgh in 1407. The crown was firſt coined in its preſent form by Henry VIII. Formerly it had appeared only in gold, whence the phraſe of crowns of gold; though theſe indeed were the largeſt gold coins known for a long time in France and other countries on the continent, being worth about 10s. ſterling. They had their name from the crown ſtamped on one ſide, and were firſt coined by Charles VI. in 1384, and continued till the time of Louis XIV. The half-crown, ſixpence, and threepence, were coined by Edward VI. In 1558 queen Elizabeth coined three-halfpenny, and in 1561 three-farthing, pieces; but they were diſcontinued in 1582. From the year 1601 to the preſent time the coins of England remain the ſame.

Gold was coined in England by Henry III. in 1257; the piece was called a *gold penny*, and was larger than the ſilver one; and the execution is by no means bad for the time. The ſeries of gold coinage, however, commences properly from Edward III. In 1344 this monarch firſt ſtruck florins, in imitation of thoſe in Italy; and it is remarkable, that though theſe coins at the time they were firſt iſſued bore only ſix ſhillings value, they are now intrinſically worth 19s. ſo much has the value of gold increaſed ſince that time. The half and quarter florin were ſtruck at the ſame time, but only the laſt has been found. The florin, however, being found inconvenient, gave place to the noble of 6s. 8d. value, and exactly half a mark. The latter had its name from being a limited ſum in accounts; and was eight ounces in weight, two-thirds of the money pound. It is ſometimes alſo called *ſelibra*, as being one half of the commercial pound of 16 ounces. The noble had its name from the nobility of the metal; the gold of which it was coined being of the fineſt ſort. Sometimes it is called *roſe noble*, from both ſides being impaled in an undulating circle. It continued with the half and quarter noble to be the only gold coin till the angels of Edward IV. appeared in 1465. Theſe had their name from being ſtamped with the image of Michael and the dragon. The angelets of 3s. 4d. value were ſubſtituted in their place. In 1527 Henry VIII. added to the gold coins the crown and half-crown at their preſent value; and the ſame year he gave *ſovereigns* of 22s. 6d. and *ryals* of 11s. 3d. angels at 7s. 6d. and nobles at their old value of 6s. 8d. In 1546 he cauſed ſovereigns to be coined of the value of 20s. and half ſovereigns in proportion. His gold crown is about the ſize of our ſhilling, and the half-crown of ſixpence, but thin. All his coins, however, gold as well as ſilver, are much debaſed; and it was not without much labour and trouble that Edward VI. brought it back to its former ſtandard. On the union of the two crowns, James gave the ſovereign the name of *unite*; the value continuing of 20s. as before. He coined alſo roſe-ryals of 30s. value, ſpur-ryals of 15s. angels of 10s. and angelets of 5s. Under the commonwealth, the ſovereign got the name of the *twenty-ſhilling* piece, and continued current till the coinage of guineas. Theſe were ſo called from their being coined of Guinea gold, and were at firſt only to go for 20s. though by an univerſal but tacit conſent they always paſſed for 21s. Half-guineas, double guineas, and five guinea pieces, were alſo coined during the ſame reign; which ſtill continue, though the two latter are not in common circulation. Quarter guineas were coined by George I. and likewiſe by his preſent majeſty; but they were found ſo troubleſome on account of their ſmall ſize, that they were ſtopped within a year or two when received at the Bank of England; and thus are not to be met with at preſent. A few pieces of 7s. value have likewiſe been coined, and are known by the lion above the helmet; but none have been iſſued. In 1688 the guinea roſe to 21s. 6d. and continued to increaſe in value till 1696, when it was as high as 30s. but after the recoinage in 1697 and 1698 it fell by degrees, and in 1717 was at its old ſtandard of 21s. and at that time ſilver was fixed at its preſent ſtandard value, viz. as 1 to 15½ in weight.

Though the firſt money coined in Britain, as we have already obſerved, was copper, yet, excepting the Northumbrian ſtycas, no copper coin was found in England from the time of the Saxon conqueſt till the year 1672. An averſion to a copper coinage, it ſeems, was prevalent throughout the nation; and queen Elizabeth, who without heſitation uſed baſe money for Ireland, yet ſcrupled at coining copper for England. This want of ſmall coin occaſioned ſuch an increaſe of private tokens for halfpennies and farthings, that it became a ſerious object to government; and in 1594 a copper coinage was ſeriouſly thought of. This year a ſmall copper coin was ſtruck about the ſize of a ſilver two-pence, with the queen's monogram on one ſide, and a roſe on the other; the running legend on both ſides being THE PLEDGE OF A HALFPENNY. Of this there are patterns both in copper and ſilver, but both of them ſoon fell into diſuſe. On the 19th of May 1613, king James, by royal proclamation, iſſued farthing tokens. They are generally of the ſame ſize with the twopence, with two ſceptres in ſaltier ſurmounted with a crown, and the harp upon the other; with an intention, as it would ſeem, that if they were refuſed in England they might paſs in Ireland. In 1635 Charles I. coined thoſe with the roſe inſtead of the harp; but the circulation of theſe was entirely ſtopped by the vaſt number of counterfeits which appeared, and by the king's death in 1648. After this the private tokens began again to circulate, till put a ſtop to by the coinage of farthings in 1672. The workmanſhip of the tokens is quite contemptible. In 1672 the halfpence as well as the farthings which had been ſtruck two years before began to circulate. They were of pure Swediſh copper, the dyes engraved by Roettier; and they continued till the year 1684, when ſome diſputes aroſe about the copper lately obtained from the Engliſh mines. Tin farthings were coined with a ſtud of copper in the centre, and inſcribed round the edge as the crown pieces, with NUMMORUM FAMULUS, 1685 or 1686,

In 1685 halfpence of the ſame kind were coined; and the tin coinage continued till the year 1692, to the value of more than 65,000l. but next year the tin was all called in by government, and the copper coinage recommenced. The farthings of queen Anne are all trial pieces, excepting thoſe of 1714, the laſt year of her reign. They are (ſays Mr. Pinkerton) of exquiſite workmanſhip, exceeding moſt copper coins either ancient or modern, and will do honour to the engraver, Mr. Croker, to the end of time. The one, whoſe reverſe is Peace in a car, PAX MISSA PER ORBEM, is the moſt eſteemed; and next to it the BRITANNIA under a portal. The other halfpence and farthings are leſs valuable.

23. Scotland. Silver pennies of Alexander I. who reigned in 1107, are believed to exiſt; and there certainly are ſome of Alexander II. in 1214. There are likewiſe coins of David in 1124, but perhaps none of Malcolm IV. his ſucceſſor, whoſe reign was very ſhort. There are many coins of William I. in 1165, and a large hoard of his pennies was found at Inverneſs in 1780.

The money of Scotland continued to be of the ſame value with that of England till the country was drained by the vaſt ranſom of David II. after which it became neceſſary to reduce its ſize; and ſo much did this diminution affect England, that Edward III. found himſelf obliged to leſſen the Engliſh coin alſo. The diminution of the Scottiſh coin, however, continued ſtill to go on until it became impracticable to keep par with that of England. In the firſt year of Robert III. it paſſed only for half its nominal value in England: in 1393 Richard II. ordered it only to go for the weight of the genuine metal it contained. In 1600 it had ſunk to ſuch a degree as to paſs only for a twelfth part of the Engliſh money, and continued at that low ebb till the coinage of Scotland was entirely cancelled by the union of the two kingdoms.

Of ſilver coins we have only pennies till the year 1293, when Edward I. having coined halfpence and farthings, Alexander III. of Scotland coined alſo halfpence, of which we have a few, but no farthings are to be met with; but there are ſilver farthings of Robert I. and David II. The latter introduced the groat and half-groat, which completed the ſet of Scottiſh ſilver. It continued unaltered till the time of queen Mary, when they all ceaſed to be coined in ſilver, on account of the high price of that metal. In 1553 ſhillings were firſt coined, with the buſt of the queen on one ſide, and the arms of France and Scotland on the other. The ſilver crown was firſt coined in 1565, which went for 30s. Scots; leſſer pieces of 20s. and 10s. having likewiſe been ſtruck, and marks of ſilver worth 3s. 4d. Engliſh, were alſo coined about the ſame time. Theſe coins have upon them the marks xxx. xx. x. to denote their value. They are commonly called Cruickſtone dollars, from the palm-tree upon them, miſtaken for a remarkable yew at Cruickſtone near Glaſgow, where Henry Darnley reſided. It is deſcribed, however, in the act as a palm, with a "ſhell-padoc" (a tortoiſe) crawling up. This alludes to Darnley's marriage with the queen, as the motto from Propertius, DAT GLORIA VIRES, alſo implies. The motto NEMO ME IMPUNE LACESSET firſt appears on the Scottiſh coins in 1578, and the invention is given to the celebrated Buchanan. In 1582, the crown of an ounce weight went for 40s. Scots, and was accordingly marked XL. in 1597 the mark was L. the Scottiſh money being then only one-tenth of the Engliſh: the mark was LX. in 1601, the value being then reduced to one-twelfth, at which it has ever ſince continued. In the time of Charles I. half marks, 40 and 20 penny-pieces, were coined. In 1675 the Scottiſh dollars firſt appeared, in value 56s. Scots, with halves and quarters of proportional value. In 1686 James VII. coined 60, 40, 20, 10, and 5s. pieces; but only thoſe of 40 and 10s. are known, with theſe numbers under the buſt. At the union of the kingdoms all the Scottiſh coins were called in, and recoined at Edinburgh, with the mark E under the buſt to diſtinguiſh it; ſince which there has been no coinage in Scotland. The Scottiſh ſilver coins are in general equal, if not ſuperior, in the workmanſhip to the Engliſh.

Gold was firſt iſſued by Robert II. about 30 years after Edward III. of England had coined the ſame metal in that country. The pieces were at firſt called St. Andrews, from the figure of that tutelar ſaint upon the croſs, and who appears on the obverſe with the arms of Scotland, and on the reverſe a lion in a ſhield. The lion was another name for the largeſt gold coin in Scotland, from the arms of the kingdom upon it. The next was the unicorn, under James III. which were followed by the bonnet-pieces of James V. Theſe laſt are of admirable workmanſhip, being almoſt equal to the ancient coins in this reſpect. In imitation of the French, the monarch we ſpeak of diminiſhed the ſize of the coin without leſſening its weight; an improvement not adopted by the Engliſh for a whole century. The laſt gold coined in Scotland was the piſtole and half piſtole, of twelve and ſix pounds Scots. Theſe coins have the ſun under the head. The gold coins of Scotland fell in the ſame proportion with the ſilver.

The copper coinage of Scotland is of more early date than that of England. It was preceded by money of *billon*, or copper waſhed with ſilver, called black money. James III. firſt coined black farthings in 1466; and this is recorded by hiſtorians as one of his greateſt faults. This kind of coinage, however, continued as late as the reign of James VI. In his time the true copper coinage began; but as the value of Scottiſh money was now declined almoſt to the utmoſt, the pieces ſuddenly aſſumed a form almoſt reſembling that of the French coins. The *bodle*, ſo called from Bothwell the mintmaſter, being equal in ſize to the *liard*, and worth two pennies Scottiſh, was ſtruck. The billon coin, formerly called *bas-piece*, and worth ſix pennies Scots, was now coined in copper, and termed the *baw-bee*. Thus it correſponded with the French half ſol and Engliſh halfpenny, the Scots penny being now equivalent to the French *denier*. Some pieces named *Atkinſons* were coined by James VI in 1582, when the Scottiſh money was to the Engliſh as 1 to 8; but on its being ſtill farther reduced, they went for 8 pennies, a third more than the value of the baw-bee. Beſides theſe there were the hardie and plack, the former being worth three and the latter four pennies Scots. This coinage continued through the reigns of Charles I. and II. but Scottiſh coins of the former are, perhaps, the ſcarceſt of any.

24. Ireland. The firſt coins introduced into this kingdom ſeem to have been thoſe of the Danes, and which have only a number of ſtrokes around them inſtead of letters. In the tenth century, however, this coinage had been conſiderably improved; and in 930 and 994 there are pennies ſtruck in Dublin, with the inſcription ON DVFLI or DYFLI, *Duflin* or *Dyflin* being the Daniſh name of that city. There are likewiſe coins of the Iriſh princes themſelves, and of the Engliſh monarchs, ſtruck in Ireland as early as the ninth century; and it is aſſerted by ſome, that Ireland even in theſe days had been conquered by England; of which, indeed, theſe coins ſeem to be a proof. None of the Iriſh coins of Henry II. are to be met with, but we have ſome of the coins of John; and from his time to that of Henry V. the Iriſh coins are known by a triangle incloſing the king's head, which appears alſo upon the coins of other nations at this period. The harp does not appear upon the Iriſh coins till the time of Henry VIII. Till the time of this monarch, the Engliſh and Iriſh coins are the ſame; but the ſame debaſement of the coin which at that time took place in England extended alſo to Ireland; but in 1601 copper halfpence and farthings were coined alſo for this kingdom. Theſe circulated in Ireland when

James VI. iſſued his farthing-tokens of copper, the latter being of two ſizes, that if they failed in England they might be ſent to Ireland as pennies and halfpence. In 1635 a mint was eſtabliſhed in Dublin by Charles I. but it was ſtopped by the Iriſh maſſacre, and the many diſturbances which followed; ſince which time the ſcheme has not been reſumed. After the maſſacre, St. Patrick's halfpence and farthings were coined by the Papiſts, bearing the legends FLORFAT REX, and on the reverſe ECCE GREX; on the farthing QUIESCAT PLEBS. Copper-tokens were ſtruck by towns and tradeſmen, as in England and Scotland. In 1680, halfpence and farthings were iſſued by authority, with the harp and date. In 1689, James II. having invaded Ireland, inſtituted a mint, and coined ſhillings and half-crowns of all the refuſe metal he could find, particularly ſome braſs guns were employed, whence the coinage is commonly called *gun-money*. Even this metal, however, ſoon became ſo ſcarce, that a diminution in its ſize is quite apparent from June 1689 to July 1690; and as the month of their mintage is marked upon them, this decreaſe is eaſily perceived. In March 1690, pennies of lead mixed with tin were iſſued; and on the 15th of June the ſame year, crowns of white metal were coined; but theſe are now very ſcarce. In 1722, the patent for coining halfpence and farthings was given to William Wood, which excited ſuch diſcontent in Ireland. From the ſmall ſize allowed by the patent to theſe pieces, it was ſuppoſed that the patentee would have gained 60,000l. but as he cauſed them to be ſtruck of a ſize ſtill ſmaller, his gains were eſtimated at 100,000l. The coins, however, are of admirable workmanſhip, and very fine copper, bearing the beſt portrait of King George I. to be found any where. Sir Iſaac Newton, at that time at the head of the mint, declared that they were ſuperior to the Engliſh coins in every thing except the ſize. In 1737 the Iriſh halfpence and farthings, with the harp on the reverſe, were coined, and continue to the preſent time. In 1760 there was ſuch a ſcarcity of copper coin, that ſome private perſons applied for leave to coin halfpence, which appeared with a very bad portrait of George II. and the words VOCE POPULI around it. No gold or ſilver has been coined in Ireland ſince the Maſſacre of 1641.

TABLE V. *Modern medals, properly ſo called.*

1. Scottiſh medals. Theſe take the lead in the preſent article, the firſt modern medals of gold being thoſe of David II. ſtruck between the years 1330 and 1370. Only two of them now exiſt; one in the collection of Mr. Barker of Birmingham, and the other in that of Dr. Hunter. In 1478 there is a medal of James III. ſent to the ſhrine of St. Amboiſe in France. It is deſcribed as of two inches and a third in diameter; the weight near two ounces; having on the obverſe a beardleſs king, with long hair, ſitting on a throne, holding in one hand a naked ſword; in the other a ſhield, with the Scottiſh arms. On the borders of the canopy above the throne is an inſcription in Gothic letters, IN MI DEFFEN, being corrupt French for *In my defence*; a common motto in the Scottiſh arms. Above the canopy is VILLA BERWICI: the reverſe bears St. Andrew and his croſs, SALVUM FAC POPULUM TUUM, DOMINE. There is alſo a medal of James IV. in the collar of St. Michael, having on the reverſe a Doric pillar ſurmounted by a young Janus, ſtanding on a hill, beyond which is the ſea, and land on either ſide. This, however, is by ſome ſuſpected to be a forgery.

The moſt remarkable Scottiſh medals are thoſe of the unfortunate Mary. The firſt is properly French, having been iſſued at her coronation as queen of France, along with her huſband king Francis II. On the obverſe of this piece there are portraits of Francis and Mary, face to face, with three legends around them, the outermoſt containing their titles; the middle one the following ſentence: HORA NONA DOMINUS J. H. S. EXPIRAVIT HELLI CLAMANS; the innermoſt the name of the city (Paris). On the reverſe are the arms of France and Scotland. Fine teſtoons were alſo coined upon the ſame plan, and are now ſo rare that Dr. Hunter gave ten guineas for one he has in his collection. The ſame portraits appear on the fine crown of Mary and Henry, in 1565, which is ſo rare as to be eſteemed a medal of the higheſt value; and Mr. Pinkerton imagines, that if brought to a ſale it would bring 40 or 50 guineas.

Another remarkable medal of Mary repreſents her full faced, and weeping, with the inſcription, O GOD GRANT PATIENCE IN THAT I SUFFER VRANG. The reverſe has in the centre, QUHO CAN COMPARE WITH ME IN GRIEF? I DIE AND DAR NOCHT SEEK RELIEF; with this legend around, HOURT NOT THE (figure of a heart) QUHAIS JOY THOU ART. There are alſo many counters of this unfortunate princeſs, being thin ſilver-pieces of the ſize of a ſhilling. "They all appear (ſays Mr. Pinkerton) to have been done in France by Mary's direction, who was fond of devices. Her cruel captivity could not debar her from intercourſe with her friends in France, who muſt with pleaſure have executed her orders, as affording her a little conſolation."

The coronation medal of Charles I. ſtruck at Edinburgh for his inauguration, June 18, 1663, is remarkable, as being the only one ever coined of Scottiſh gold, and the firſt in Britain ſtruck with a legend on the edge. With reſpect to the workmanſhip, it is inferior to Simon's. Of theſe medals only three are known to exiſt, of which one is in the Muſeum. It is not uncommon in ſilver; in which caſe it ſometimes wants the legend on the edge.

2. Italian medals. Theſe appear in the 15th century, and from that time ſucceſſively in moſt European countries. Vittore Piſano, a painter of Verona, is celebrated as the reſtorer of the art; but it remains to be accounted for how the medals of king David already mentioned came to exiſt ſo long before. Mr. Pinkerton conſiders this artiſt rather as an inventor than a reſtorer, his medals having no reſemblance to the ancient coins, as being large, and all caſt. They were firſt modelled in wax, then a mould taken from the model in fine ſand, and other ingredients. After a good caſt was procured, it was touched up, and made a model for the reſt. Theſe medals of Piſano are almoſt always inſcribed *Opus Piſani Pictoris*. The portraits of a great number of illuſtrious men were done by him in this manner; and in the Britiſh Muſeum is a large braſs medal of Piſano by himſelf.—Other artiſts were Boldu, Mareſcotto, Matthæus de Paſtus, Sperandes, Miſaldone, &c. Towards the end of the century, however, the medals began to aſſume a more elegant appearance; and the papal ones are not only the moſt elegant but the moſt ancient ſeries of all the modern medals. The improvement began in the reign of Alexander VI. ſo famous for his own crimes, and thoſe of his his nephew Cæſar Borgia. His ſucceſſors, Julius II. Leo X. Hadrian VI. and Clement VII. had many of their medals deſigned by Raphael, Julio Romano, and other eminent painters, and the engraving executed by artiſts of equal merit. Among theſe were the celebrated Cellini, and the noted Paduan forgers of Roman coins, Cavino and Baſſiano. In 1644 Cormanni, a medallic artiſt, was impriſoned on account of a piece which repreſented the Pope upon one ſide, and Olympia Maidalchina, the *relation* of his holineſs, on the other. The unfortunate Cormanni poiſoned himſelf. About this time the family of the Hamerani, originally from Germany, began to engrave the papal medals; which they did with ſurpriſing merit for ſeveral generations. Each of the daughters did a fine medal, as we are informed by Venuti.

Beſides the papal medals, there are many iſſued by the various ſtates of Italy. There are medals of Frederic II. of Sicily in 1501, of ſeveral Venetian generals in 1509, of Alfonſo

duke of Ferrara in 1515, and of the celebrated Andrew Daria in 1528.

3. French medals. Till the reign of Louis XIV. the medals of this country are neither fine nor numerous; but this monarch exceeds all modern princes in this way. Many of his pieces are well deſigned and executed, though objectionable on account of their falſehood.

4. Daniſh medals. Theſe appear of Chriſtian II. in 1516, of Frederic and Sophia in 1532, of Frederic I. and Chriſtian III. in bonnets worn in the 16th century. The elephant of the houſe of Oldenburg is frequent upon Daniſh medals.

5. Swediſh medals. Theſe begin with Guſtavus Vaſa; and ſeveral of Chriſtina are likewiſe to be met with. There are alſo ſome curious ones of Charles XII.

6. Dutch medals. Theſe begin in 1566; and many of them are remarkable for maps and plans, which muſt be very intereſting to poſterity. "Had the Greeks and Romans (ſays Mr. Pinkerton) given us maps and plans, what a fine ſyſtem of ancient geography and topography a cabinet of medals muſt have been!"

7. Medals of Spain, Portugal, and Germany. The Spaniſh medals began with Gonſalo in 1503, many of which are curious and intereſting. Under Charles V. there are many curious Spaniſh medals; but thoſe of Germany begin with Frederic in 1453. They are extremely numerous; as we may eaſily ſuppoſe from the greatneſs of the empire, and the various ſtates which compoſe it. There is a famous medal of Sebaſtian king of Portugal, famous for his unfortunate expedition into Africa in 1578; with his buſt, full face, and three quarters in length. On the reverſe is a ſhell-fiſh in the ſea, with the moon and ſeven ſtars, bearing the inſcription SERENA CALSA FAVENT. There is alſo a curious lozenge-ſhaped coin of the ſame with the arms of Portugal, and the king's name and title: On the reverſe is a croſs with the inſcription IN HOC SIGNO VINCES, 1578.

8. Satiric medals. Theſe began almoſt as ſoon as the knowledge of the art of coining medals was revived. They ſeem to have been almoſt unknown to the ancients. One indeed of the Emperor Gallienus is ſuppoſed to have been ſatiric. It has on the front the emperor's buſt, with the inſcription GALLIENÆ AUG. the reverſe is Peace in a car, PAX UBIQUE; but this has been proved to be only a blundered coin. Some other ancient medals, however, are not liable to this objection. The firſt modern ſatiric medal publiſhed was that of Frederic king of Sicily in 1501, againſt his antagoniſt Ferdinand king of Spain. It has on one ſide the head of Ferdinand, with the inſcription FERDINANDUS R. AR. VETUS VULPES ORBIS; on the reverſe a wolf carrying off a ſheep, JVGVM MÆVM SVAVE EST, ET ONVS MEVM LEVE. Many others have been ſtruck, of which the wit would now perhaps be difficult to be found out: but of all nations the Dutch have moſt diſtinguiſhed themſelves in this way; and paid very dear for their conduct, as they brought upon themſelves by one or two ſatiric medals the whole power of France under Louis XIV.

9. Engliſh medals. The firſt of theſe is in the duke of Devonſhire's collection. It is of a large ſize, and done on the plan of the early Italian medals. It has on the reverſe the arms of Kendal, with the inſcription TEMPORE OBSIDIONIS TURCORUM, MCCCCLXXX. On the other ſide is a portrait with IO. KENDAL RHODI TVRCOPELLERIVS. It was found laſt century in Knareſborough foreſt; but Mr. Pinkerton has no doubt of its having been done in Italy. The next is that of Henry VIII. in 1545, and is of gold, larger than the crown-piece, with the king's head upon the obverſe, and three legends within each other, including his titles, &c. The reverſe contains two inſcriptions, declaring him to be the head of the church; the one in Hebrew, the other in Greek. It was imitated exactly by Edward VI. whoſe coronation medal is the firſt we have. There are two medals of Philip and Mary, whoſe execution is tolerably good; but thoſe of Elizabeth are very poor. There are good medals of James I. and his queen; with a fine one of Charles I. and Henrietta, though the workmanſhip is much inferior to the antique. There are many good medals of Charles, with various devices upon their reverſes. Under the commonwealth the celebrated Simon produced medals which are deſervedly reckoned the moſt admirable pieces of modern workmanſhip. There are many good medals of Charles II. James II. and William III. Some are alſo found of James after his abdication. Some fine gold, ſilver, and copper medals, were iſſued in the time of Queen Anne; the two laſt affording a ſeries of all the great actions of the duke of Marlborough. About the year 1740, a ſeries of medals was engraved in London by Daſſier, a native of Geneva, containing all the kings of England; being 36 in number. They are done upon fine copper, and executed with great taſte. There are beſides many medals of private perſons in England; ſo that it may juſtly be ſaid, that this country for medals exceeds almoſt every other in Europe.

To this account of modern coins and medals we ſhall add that of another ſet called *ſiege-pieces*, and which were iſſued during the time of a ſiege in caſes of urgent neceſſity. Theſe were formed of any kind of metal; ſometimes of no metal; and Patin mentions a remarkable one ſtruck at Leyden in 1574, when the place was beſieged by the Spaniards. It was of thick paper or paſteboard, having a lion rampant, with this inſcription, PVGNO PRO PATRIA, 1574; and on the reverſe, LVGDVNVM BATAVORUM. There are various ſiege-pieces of Charles I. both in gold and ſilver, ſome of the latter being of the value of 20 ſhillings.

The *nummi bracteati* are a ſpecies of modern coins ſomewhat between counters and money; and have their name from the word BRACTEA, a ſpangle or thin bit of metal. They are commonly little thin plates of ſilver, ſtamped as would ſeem with wooden dies upon one ſide only, with the rude impreſſion of various figures and inſcriptions. Moſt of them are eccleſiaſtic, and were ſtruck in Germany, Switzerland, Denmark, Sweden, Norway, and a few in Poland. They continued to be in uſe in Germany till the end of the 15th century; and ſome are ſtill uſed in Switzerland at this day.

Table of Abbreviations uſed in the Legends of Medals; from Mr. Pinkerton.

Greek Coins.

Α

A. Athens, Argos, Aulus, Aſylum; primi or firſt; as Εφεσιων Α Ασιας, "Epheſians, firſt people of Aſia"
A Abbaſſus, Abdera, Abydus on Helleſpont
AB. Abydus in Egypt
ABY. Abydus on Helleſpont
AΘ. AΘE. Athens
AIΓ. Aegina
AIΓOΣΠO. Aigoſpotamos
AIA. Aelius, Aelia Capitolina
AIN. Aenos
AK.—AKPAΓAN. Agrigentum
AKI. Acilium
AKT. Actium
AAE. Alexandria
AM. Amyntas
AMBP. Ambracia
AMΦI. Amphilochia
ANΘ. Ανθυπατον, Proconſul
ANTIΣ. Antiſſa
ANA. Anactoria
ANTI. Antium
AN. Ancyra
ANT. Antoninus, Antioch
AΞ. Axus in Crete
AON. Aonitæ
AOYE. Avenio, *Pell.*
API. Appius
APA. Apamea
APO. Apollonia
APTA. Aptara
AP. Aradus, Harma
APΓE. Argennos
APΓ. Argos
API. Aricanda
APIM. Ariminum

ΑΡΣΙ. Arſinoe
ΑΡΥ. Aryca
ΑΡΧ. Αρχιερευς or Αρχον, high prieſt or magiſtrate
ΑΣΙΑΡΧ. Aſiarchæ, preſidents of the games of Aſia *
ΑΣ. Aſylum
Α. Σ Προτοι Συριας, Firſt of Syria
ΑΣΚ. Aſcalon
ΑΤ. Atabyrium
ΑΤΑΡ. Atarnæ
ΑΥΓ. Auguſtus
ΑΥΡΗΛ. Aurelius
ΑΥ. ΑΥΤ. Αυτοκρατορ, Emperor
ΑΥΤΟΝ. Αυτονομοι, enjoying their own laws
ΑΦΙ. Aphyta
ΑΦΡ. Africanus
ΑΧ. Achaii

B

Β Βουλης, Council: Berytus: Bithynia
ΒΑΓΗΔΑΟ. Bagadaonia
ΒΑΛ. Valerius
ΒΗ. Berytus
ΒΙΤΟΝ. Bitontum
ΒΟΙ. Bœotia
ΒΡΥΝ. Brundufium
ΒΥ. Byzantium

Γ

Γ. ΓΡ. ΓΡΑΜ. Grammaticus, or keeper of the records
Γ. Gaius, or Caius
ΓΑ. Gallus, Galerius, Gallienus
Γ. Γνωριμου, Illuſtrious
ΓΕΛ. Gelas
ΓΕΡ. Germanicus
ΓΝ. Gneius
ΓΟΡΤΥ. Gortyna
ΓΡΑ. Graviſca

Δ

Δ. Decimus, Dymæ
ΔΑΚ. Dacicus
ΔΑΜ. Damaſcus
ΔΑΡ. Dardanum
ΔΗ. Δημος, the people
ΔΗΜΑΡΧ. ΕΞΟΥΣ. with Tribunitian power
ΔΕ. Decelia
ΔΕΚ. Decius
ΔΕΡ. Derbe in Lycaonia
ΔΗ. Delos
ΔΙ. Dioſpolis
ΔΡΕ. Drepanum
ΔΥΡ. Dyrrachium

E

Ε. Eryce
Ε. ΕΡΕΣ. Ereſus
ΕΛΕΥ. Eleuſis
ΕΛΕΥΘ. Ελευθεροι, Free
ΕΠΙ. Epidaurus
ΕΡΙ. Eriza in Caria
ΕΡΧ. Erchia
ΕΡΥ. Erythræ
ΕΤ. ΕΤΟ. Ετους, Year
ΕΤ. Etenna in Pamphylia
ΕΧ. Εχουσια, Power
ΕΥ. ΕΥΒΟ. Eubœa
ΕΥΣ. Ευσεβης, Pious
ΕΥΤ. Ευτυχης, Happy
ΕΦ. ΕΦΕ. Epheſus

Z

ΖΑ. Zacynthus
ΖΑΝΚΛ. Zancle, Meſſana anciently ſo called

H

Η. Elium
ΗΓ. Ηγεμονος, Preſident
ΗΡΑΚ. Heraclea

Θ

ΘΑ. Thaſus
ΘΕ. Theſpiæ
ΘΕΣ. Theſſalonica
ΘΗ. ΘΗΒ. Thebæ

I

Ι. ΙΕΡ. Ιερας, Sacred
ΙΕΡΑΠΥ. Hyerapytha
ΙΚΑΡ. Hiccara
ΙΛΙ. Ilium
ΙΟΥ. Iulis a city, or Julius
ΙΟΥΛ. Julia
ΙΠΠ. Hippana
ΙΡ. Irene Inſ. *Pellerin.*
ΙΣ. Iſus, Iſtiæa

K

Κ. Caius; Κουιντος, Quintus
Κ. ΚΑΙΣ. Cæſar
Κ. Κ. Κοινον Κιλικιας, Community of Cicilia
ΚΑΙΛ. Cælius
ΚΑΛ. Chalcedon
ΚΑΛΛΙ. Callipolis
ΚΑΜΑ. Camara
ΚΑΝ. Canata
ΚΑΠ. Capua
ΚΑΠΠ. Cappadocia
ΚΑΡ. Carrhæ
ΚΑΡΤ. Carthago
ΚΑΥ. Caulonia
ΚΕ. Ceos
ΚΕΦ. Cephalædis
ΚΙ. Cianus, Cibæum
ΚΙΛ. Cilbiani
ΚΛ. Clæonæ, Claudius
ΚΛΑ. Clazomene
ΚΝΙ. Cnidus
ΚΟ. Corinth
ΚΟΙΝ. Κοινον, Community
ΚΟΛ. Κολονιας, Colony, Colophon
ΚΟΜ. Commodus
ΚΟΡ. Corcyra
ΚΡ. Cragus in Lycia
ΚΡΑ. Cranos
ΚΡΗ. Crete
ΚΤΗ. Ctemenæ, *Pell.*
ΚΥ. Cuma, Cydonium, Cyon
ΚΥΘ. Cythnus
ΚΥΠ. Cyprus
ΚΥΡ. Cyrene

Λ

Λ. or L. Λυκαβαντος, Year
Λ. Lucius
ΛΑ. Lacedæmon
ΛΑΜ. Lamea; Lampſacus
ΛΑΡ. Lariſſa
ΛΑΡΙ. Larinum
ΛΕ. ΛΕΥ. Leucas
ΛΕΟΝ. Leontium
ΛΗΜ. Lemnos
ΛΙΠ. Lipara
ΛΙΥΙ. Liviopolis
ΛΟ. ΛΩΚ. Locri
ΛΟΓ. Longone
ΛΥΓ. ΛΥΚ. Lyctus

M

Μ. Marcus, Malea, Megalopolis, Mazaka
ΜΑ. Maronea, Maſſilia, Macedonia
ΜΑΓ. Magneſia
ΜΑΚΡΟ. Macrocephali
ΜΑΜ. Mamertini
ΜΑΣΣ. Maſſilia
ΜΑΖ. Mazara
ΜΕ. Menelais, on Syrian regal coins
ΜΕΝΕΚ. Menecrates
ΜΕ. ΜΕΓ. Megara, Megalopolis, Melite
ΜΕΓ. Μεγαλος, Great
ΜΕΣ. Meſſana
ΜΕΤΑ. Metapontum
Μ. ΜΗΤΡΟ. Metropolis
ΜΙ. Miletus
ΜΚ. Mazaka of Cappadocia, on coins of Mithridates VI.
ΜΟΡ. Morgantia
ΜΥ. Mycenæ
ΜΥΡ. Myrlea
ΜΥΤΙ. Mytilene

N

Ν. Naupactos
ΝΑΞ. Naxos
ΝΑΥΑΡΧ. Ναυαρχιδοι, enjoying a ſea-port
ΝΕ. Nemea
Ν. ΝΕΩΚ. Neocori
ΝΕΟΠ. Neopolis
ΝΕΡ. Nerva
ΝΙΚ. Nicæum, Nicomedia
ΝΥΞ. Nyſæi, on coins of Scythopolis, *Pell.*

O

ΟΙ. Oethæi
ΟΝ. Οντος, being
ΟΠΕΛ. Opelius
ΟΠ. Opus
ΟΡΥ. Orycus
ΟΡΧ. Orchomenus
ΟΥΠ. or ΥΠ. Ουπατος or Υπατος, Conſul
ΟΥΕΡ. Verus
ΟΥΗ. Vetus
ΟΥΕΣΠ. Veſpaſianus
ΟΥΙΤΕΛ. Vitellius
ΟΦΡΥ. Ophrynium

Π

Π. Παρα, Προς, upon
Π. ΠΟΠΛ. Publius
Π. ΠΑ. Paphos or Paros
ΠΑΙΣ. Pæſtum
ΠΑΝ. Panormus
ΠΑΡ. Paropinum
ΠΑΡΙ. Paros
ΠΑΡΘ. Parthicus
ΠΕ. Perinthus
ΠΕΛ. Pella
ΠΕΡ. Pergus
ΠΕΡΤ. Pertinax
ΠΕΣΚ. Peſcennius
Π. ΠΗ. Peluſium
ΠΙΝ. Pinamytæ
ΠΛΑ. Plateæ
ΠΟ. Pontus
ΠΟΛΥ. Polyrrhenum
ΠΟΣ. Poſidonia
ΠΡΑΣ. Praſſus
Π. ΠΡΥ. Πρυτανος, Præfect
ΠΡ. ΠΡΕΣ. Πρεσβιος, Legate
ΠΡΟ. Proconneſus
ΠΡΟΔΙ. Προδικος, Curator
Π. ΠΡΩΤ. Πρωτος, Firſt
ΠΤ. Ptolemais
ΠΥ. Pylos

P

ΡΟ. Rhodes

Σ

Σ. ΣΑ. Salamis, Samos, Syria
ΣΑ. Samoſate
ΣΑΛΑΠ. Salapia
ΣΑΡ. Sardis
ΣΕ. Seriphus, Segeſte
ΣΕΒ. Σεβαστος, Auguſtus
ΣΕΛ. Selinus, Seleucia
ΣΕΠΤ. Septimius
ΣΙ. Siphnos
ΣΙΔ. Side
ΣΙΝΩ. Sinope
ΣΜΥ. Smyrna
ΣΤΡ. ΣΤΡΑ. Στρατηγος, Prætor
ΣΥΒ. Sybaris
ΣΥ. ΣΥΡΑ. Syracuſe
ΣΥΡ. Syria
ΣΩ. Solæ

T

Τ. Titus
ΤΑΒΑΛ. Tabala
ΤΑ. ΤΑΝΑ. Tanagra
ΤΑΡ. Tarentum, Tarſus
ΤΑΥΡ. Tauromenum
ΤΕ. Tementis
ΤΕΡ. Terina

* There were alſo Syriarchæ, Lyciarchæ, Galatarchæ, Bithyniarchæ, Cappadociarchæ, &c. *Morel. Spec.*

ΤΗ. Tenus
ΤΙ. ΤΙΒ Tiberius
ΤΡΑ. Trallis
ΤΡΙ. Tripolis
ΤΡΟ. Troizene
ΤΥΑΝ. Tyana
ΤΥ. Tyndaris
ΤΥΡ. Tyre (monogram)

Υ

ΥΕ, ΥΕΛ. Velia
ΥΠ. ΥΠΑΤ. Υπατος, Conſul

Φ

Φ. Philip; Phœſtus, Philuntium
ΦΑ. Phaſelis
ΦΑΡ. Pharſalus
ΦΙ. Vibius, Philippopolis
ΦΙΝΕ. Phineium
ΦΛ. Flavius
ΦΟΚ. Phocæum
ΦΟΥΛ. Fulvia
ΦΥ. Phycus in Cyrene

X

Χ. Chios
ΧΑΛ. Chalcis
ΧΕΡ. Cherſoneſus
ΧΙ. Chytri in Crete.

Greek Numerals.

Α.	1.	Ι.	10.	Ρ.	100.
Β.	2.	Κ.	20.	Σ. or C	200.
Γ.	3.	Λ.	30.	Τ.	300.
Δ.	4.	Μ.	40.	Υ.	400.
Ε.	5.	Ν.	50.	Φ.	500.
ϛ. or ≍	6.	Ξ.	60.	Χ.	600.
Ζ.	7.	Ο.	70.	Ψ.	700.
Η.	8.	Π.	80.	Ω.	800.
Θ.	9.	ϙ or ϟ	90.	ϡ.	900.

Examples. I is 10: add A to I, and IA makes 11: ſo IB, 12; IΓ, 13, &c. K is 20, KA, 21, &c. PIA makes 111. The Engliſh word AIR marks the grand initial numerals. On coins the numerals are often placed in retrograde order; which makes no difference in the value, as every letter is appropriated to its number. Thus ΤΑΓ or ΓΑΤ imply the ſame, 333. But this advantage being unknown to the Roman numerals and Arabic ciphers, is apt to puzzle the beginner.

Roman Coins.

A

A. AULUS: in the exergue it implies the firſt mint, as ANT. A. coined at Antioch in the firſt mint
A. A. A. F. F Auro, Argento, Ære, Flando, Feriundo
A. or AN. Annus
A. A. Apollo Auguſti
A. F. A. N. Auli filius, Auli nepos
ABN. Abnepos
ACT. Actiacus, or Actium
AD FRV. EMV. Ad fruges emundas
ADIAB. Adiabenicus
ADOP. Adoptatus
ADQ. Adquiſita
ADV. Adventus
AED. Ædes
AED P. Ædilitia poteſtate
AED. S Ædes ſacræ
AED. CVR. Ædili Curulis
AED. PL. Ædilis Plebis
AEL. Ælius
AEM. or AIMIL. Æmilius
AET. Æternitas
AFR. Africa, or Africanus
ALBIN Albinus
ALIM. ITAL. Alimenta Italiæ
ANN AVG. Annona Auguſti
A. N. F F. Annum Novum Fauſtum Felicem
ANIC Anicius
ANN. DCCCLXIIII. NAT. VRB. P. CIR. CON. Anno 864. Natali Urbis Populo Circenſes conſtituti
ANT. AVG. Antonius Augur
ANT. Antonius, or Antoninus
AP. Appius
A. P. F. Argento Publico Feriundo
A POP. FRVG. AC. A Populo Fruges Acceptæ
AQ or AQL. Aquilius
AQVA MAR. Aqua Martia
ARAB ADQ. Arabia Adquiſita
ARR. Arrius
AVG. Augur, Auguſtus, Auguſta
AVG. D. F. Auguſtus Divi Filius
AVGG Two Auguſti
AVGGG. Three Auguſti
AVR. or AVREL. Aurelius

B

B. The mark of the ſecond mint in any city
BON. EVENT. Bonus Eventus
B F. P. NAT. Bono Reipublicæ Nato
BRIT. Britannicus.
BRVT. Brutus

C

C. Caius, Colonia
C. A. Cæſarea Auguſta
C. CAE. or CAES. Cæſar
CAESS. Cæſares
CARTH. Carthage
CEN. Cenſor
CENS. P. Cenſor Perpetuus
CEST. Ceſtius, or Ceſtianus
CIR. CON. Circum Condidit, or Circenſes Conceſſit
CIVIB. ET SIGN. MILIT. A. PARTH. RECVP. Civibus et Signis Militaribus a Parthis Recuperatis
CN. Cneius
COEL. Cœlius
CON. OB. Conſtantinopoli Obſignata, or Conſtantinopoli Officina ſecunda, or Conflata Obryzo
COL. Colonia
CON. SVO. Conſervatori ſuo
CONCORD. Concordia
CL. V. Clypeus Votivus
COMM. Commodus
CLOD. Clodius
CL. or CLAVD. Claudius
COS. Conſul
COSS. Conſules
CORN. Cornelius
CVR. X. F. Curavit Denarium Faciendum

D

D. Decimus, Divus, Deſignatus
DAC. Dacicus
D. F. Dacia felix
D. M. Diis Manibus
DES. or DESIG. Deſignatus
DICT. Dictator
DOMIT. Domitianus
D. N. Dominus noſter
DID. Didius
D. P. Dii Penates
DV. Divus

E

EID. MAR. Idus Martiæ
EX. CONS. D. Ex Conſenſu Decurionum
EX. S. C. Ex Senatus Conſulto
EQ. ORDIN. Equeſtris Ordinis
EX. A. PV. Ex Argento, or Auctoritate Publica
EXER. Exercitus
ETR. Etruſcus

F

F. Filius, or Filia, or Felix, or Faciundum, or Fecit
FEL. Felix
FELIC. Felicitas
FL. Flavius
FLAM. Flamen
FORT. RED. Fortunæ Reduci
FOVRI. Fourius for Furius
FONT. Fonteius
FRVGIF. Frugiferæ (Cereri)
FVL. Fulvius
FVLG. Fulgerator

G

G. Gneius, Genius, Gaulium
GA. Gaditanus
G. D. Germanicus Dacicus
GEN. Genius
GERM. Germanicus
GL. E. R. Gloria Exercitus Romani
GL. P. R. Gloria Populi Romani
GOTH. Gothicus
G. P. R. Genio Populi Romani
G. T. A. Genius Tutelaris Ægypti, or Africæ

H

HEL. Helvius
HEL. Heliopolis
HER. Herennius, or Herennia
HO. Honos
HS. Seſtertius

I

I. Imperator, Jovi, Julius
IAN. CLV. Janum cluſit for cluſit
IMP. Imperator
IMPP. Imperatores
I. S. M. R. Juno Soſpita, Mater or Magna Regina
IT. Italia, Iterum
ITE. Iterum
IVL. Julius or Julia
IVST. Juſtus
I. I. S. Seſtertius
I. O. M. SACR. Jovi Optimo, Maximo, Sacrum
II. VIR. Duumvir
III. VIR. R. P. C. Triumvir Reipublicæ Conſtituendæ
IIII. VIR. A. P. F. Quatuorvir, or Quatuorviri, Auro, or Argento, or Ære, Publico Feriundo
IVN. Junior

L

L. Lucius
LAT. Latinus
LEG. PROPR. Legatus Proprætoris
LEG. I. &c. Legio Prima, &c.
LEP. Lepidus
LENT. CVR. X. F. Lentulus Curavit Denarium Faciundum.
LIBERO P. Libero Patri
LIB. PVB. Libertas Publica
LIC. Licinius
L. S. DEN. Lucius Sicinius Dentatus
LVC. Luciſera
LVD. CIR. Ludi Circenſes
LVD. EQ. Ludi Equeſtres
LVD. SAEC. F. Ludos Sæculares Fecit

M

M. Marcus, or Marius
MAR. CL. Marcellus Clodius
M. I. Marci Filius
M. OTACIL. Marcia Otacilia
MAG. or MAGN. Magnus
MAC. Macellum
MAX. Maximus
MAR. Martia (aqua)
MAR. VLT. Marti Ultori
MES. Meſſius
METAL. Metallum
MINAT. Minatius
MINER. Minerva
M. M. I. V. Municipes Municipii Julii Uticenſis
MON. or MONET. Moneta

N

N. Nepos or Noſter
N. C. Nobiliſſimus Cæſar
NAT. VRB. Natalis Urbis
NEP. Nepos
NEP. RED. Neptuno Reduci

O

O. Optimo
OB. C. S. Ob Cives Servatos
OF. Officina
OPEL. Opelius
ORB. TERR. Orbis Terrarum

P

P. or POT. Poteſtate
PAC. ORB. TER. Pacatori Orbis Terrarum
PAPI. Papius or Papirius
PARTH. Parthicus
PERP. Perpetuus
PERT. or PERTIN. Pertinax
PESC. Peſcennius
P. F. Pius Felix
PLAET. Plætonius
P. L. N. Pecunia Londini Notata
P. LON. S. Pecunia Londini Signata
P. M. or PONT. MAX. Pontifex Maximus
POMP. Pompeius
P. P. Pater Patriæ
PR. Prætor
P. R. Populus Romanus
PRAEF. CLAS. ET OR. MARIT. Præfectus Claſſis et Oræ Maritimæ
PRINC. IVVENT. Princeps Juventutis
PRIV. Privernum
PROC. Proconſul
PRON. Pronepos
PROP. Proprætor
PROQ. Proquæſtor
PROV. DEOR. Providentia Deorum
PVPIEN. Pupienus

Q

Q. Quintus, or Quæſtor
Q. C. M. P. I. Quintus Cæcilius Metellus Pius Imperator
Q. DESIG. Quæſtor Deſignatus
Q. P. Quæſtor Prætorius
Q. PR. Quæſtor Provincialis

R

R. Roma, Reſtituit
RECEP. Receptis, or Receptus
REST. Reſtituit
ROM. ET AVG. Romæ et Auguſto
R. P. Reſpublica

S

SAEC. AVR. Sæculum Aureum
SAEC. FEL. Sæculi Felicitas
SAL. Salus
SALL. Salluſtia
SARM. Sarmaticus
S. C. Senatus Conſulto
SCIP. ASIA. Scipio Aſiaticus
SEC. ORB. Securitas Orbis
SEC. PERP. Securitas Perpetua
SEC. TEMP. Securitas Temporum
SEN. Senior
SEPT. Septimius
SER. Servius
SEV. Severus
SEX. Sextus
SIC. V. SIC X. Sicut Quinquennalia, ſic Decennalia
SIG. Signis
S. M. Signata Moneta
S. P. Q. R. Senatus Populuſque Romanus
STABIL. Stabilita (terra)
SVL. Sulla

T

T. Titus, Tribunus
TER. Terentius, or Tertium
TEMP. Temporum
TI. Tiberius
TR. or TREV. Treveris
TREB. Trebonianus
TR. MIL. Tribunus Militaris
TR. P. or TRIB. POT. Tribunicia Poteſtate

V

V. Quintum
V. C. Vir Clariſſimus
VESP. Veſpaſianus
VIB. Vibius
VICT. Victoria
VII. VIR. EPVL. Septemvir Epulonum
VIL. PVB. Villa Publica
VIRT. Virtus
VN. MR. Venerandæ Memoriæ
VOT. X. MVLT. XX. Votis Decennalibus Multiplicatis Vicennalibus

X

X. Decem, Denarius
XV. VIR SACR. FAC. Quindecim Vir Sacris Faciundis

Abbreviations on the Exergue; from Banduri and Monaldini. Pinkerton.

A. Officina Prima
ALE. Alexandria
AMB. Antiochenſis Moneta Secundæ Officinæ
AN. ANT. ANTI. Antiochia
ANB. Antiochiæ Secunda Officina: to ANH. Antiochiæ Octava Officina
A. P. L. (In officina) Prima percuſſa Lugduni
AQ. AQL. Aquileiæ
AQ. O. B. F. Aquileiæ Officinæ Secundæ Fabrica
AQ. P. S. Aquileiæ Pecunia Signata
AQ. S. Aquileiæ Signata
A. AR. ARL. Arelate
A. SISC. Prima (in officina) Siſciæ
B. SIRM. Secunda Sirmii
B. S. L. C. Secunda Signata Lugduni
C. Θ. Conſtantinopoli Nona
COMOB. Conflata Moneta Obryzo. Only on gold or ſilver from a gold dye
CON. Conſtantinopoli
CONOB. Conflata Obryzo. Only on gold
CONS. Conſtantinopoli
KART. Carthago
K. O. Carthaginenſis Officina
L. LC. LVC. LVG. Lucduni, Lugduni
L. LON. Londini
L. P. Lugdunenſis vel Londinenſis Pecunia
LVC. P. S. Lugduni Pecunia Signata
MDPS. Mediolani Pecunia Signata
M. K. V. T. Moneta Kartaginenſis Urbis (in officina) Tertia
M. L Moneta Lugdunenſis vel Londinenſis
MOSTT. Moneta Officinæ Secundæ Treverorum
MSTR. Moneta Signata Treveris
O. Officina
OFF. III. CONST. Officina Tertia Conſtantinopoli
PARL. Percuſſa or Pecunia Arelate
PLON. Pecunia Londinenſis
PLVG. Pecunia Lugdunenſis
P. R. Pecunia Romana, or Percuſſa Romæ
P. T. Pecunia Treverenſis
Q. AR. Quincta Arelatenſis (officina)
R. RO. ROM. Romæ
RA. Ravennæ
ROPS. Romæ Pecunia Signata
S. AR. Signata Arelate
S. CONST. Signata Conſtantinopoli
SIS. Siſciæ
SS. P. Siſcienſis Pecunia
SISC. V. Siſcia Urbs
SMA. Signata Moneta Antiochiæ
S. M. HER. Signata Moneta Heracleæ
S. M. N. Signata Moneta Nicomediæ
S. M. R. Signata Moneta Romæ
S. T. Signata Treveris
TESOB. Teſſalonicæ Officina Secunda
THEOPO. Theopoli
TR. Treveris Officina Secunda

A Liſt of Roman Colonies whoſe Coins remain; and Abbreviations on theſe Coins.

Abdera in Spain
Acci in Spain
Achulla in Africa
Ælia Capitolina in Judæa
Agrippina in Germany
Antiochia in Piſidia
in Syria
Apamea in Bithynia
Arna in Theſſaly
Aſtigi in Spain
Babba in Mauritania Tingitana
Berytus in Phœnicia
Bilbilis in Spain
Boſtra in Arabia
Bracara Auguſta in Spain
Buthrotum in Epirus
Cabellio in Gaul
Cæſar-Auguſta in Spain
Cæſarea in Paleſtine
Calagurris in Spain
Calpe in Spain
Camelodunum in Britain
Carrhæ in Meſopotamia
Carteia in Spain
Carthago in Africa
Carthago Nova in Spain
Caſcantum in Spain
Caſſandria in Macedon
Celſa in Spain
Clunia in Spain
Coillu in Numidia
Comana in Cappadocia
Corinthus in Greece
Cremna in Piſidia
Culla in Thrace
Damaſcus in Cœleſyria
Dertoſa in Spain

Deulton in Thrace
Dium in Macedon
Ebora in Spain
Edeſſa in Meſopotamia
Emerita in Spain
Emeſa in Phœnicia
Ergavica in Spain
Germe in Galatia
Graccuris in Spain
Hadrumetum in Africa
Heliopolis in Cœleſyria
Hippo Regius in Africa
Iconium in Lycaonia
Ilerda in Spain
Illergavonia in Spain
Illeci in Spain
Iol in Mauritania
Italica in Spain
Laelia in Spain
Laodicea in Syria
Leptis in Africa
Lugdunum in Gaul
Neapolis in Paleſtine
Nemauſus in Gaul
Nefibis in Meſopotamia
Norba Cæſarea in Mauritania
Obulco in Spain
Oea in Africa
Olba in Pamphylia
Oſca in Spain
Oſicarda in Spain
Panormus in Sicily
Parium in Myſia
Parlais in Lycaonia
Patricia (Corduba) in Spain
Pella in Macedon
Philippi in Macedon
Philippopolis in Arabia
Ptolemais in Phœnicia
Ruſcino in Gaul
Romula (Hiſpalis) in Spain
Rheſæna in Meſopotamia
Sabaria in Hungary
Saguntum in Spain
Sebaſte in Paleſtine
Segobriga in Spain
Sidon in Phœnicia
Singara in Meſopotamia
Sinope in Pontus
Stobi in Macedon
Tarraco in Spain
Theſſalonica in Macedon
Traducta (Julia) in Spain
Troas in Phrygia
Turiaſo in Spain
Tyana in Cappadocia
Tyrus in Phœnicia
Valentia in Spain
Vienna in Gaul
Viminacium in Mœſia
Utica in Africa

Abbreviations on Colonial Coins.

ACCI. Accitana Colonia, *Guadiz in Spain*
ADI. Adjutrix *legio*
AEL. MVN. COEL. Ælium Municipium Cœla, *near Seſtos on the Helleſpont*
AST. Aſtigitana, *Eceja* in Andaluſia
B. A. Braccara Auguſti, *Brague in Portugal*
C. A. Cæſaria Antiochiæ
C. A. A. P. or FATR. Colonia Auguſta Aroe Patrenſis
CAB. Cabellio
C. A. BVT. Colonia Auguſti Buthrotum, *in Epirus*
C. A. C. Colonia Auguſta Cæſarea
C. A. I. Colonia Auguſta Julia, *Cadiz*
C. A. E. Colonia Aug. Emerita, *Merida*
CAL. Calaguriis, *Calahorra in Spain*
C. A. O. A. F. Colonia Antoniana Oea Aug. Felix, *Tripoli in Africa*
C. A. PI. MET. SID. Colonia Amelia Pia Metropolis Sidon
C. A. R. Colonia Auguſta Rauracorum, or Colonia Aſta Regia: Augſt in Switzerland, or Aſt near Xeres de la Frontera in Spain
C. C. A. Colonia Cæſarea Auguſta, *Saragoſſa in Spain*
C. C. COL. LUG. Claudia Copia Colonia Lugdunenſis
C. C. I. B. Colonia Campeſtris Julia Babba, *in Mauritania*
C. C. I. B. D. D. Colonia Campeſtris Julia Babba, Decreto Decurionum
C. C. I. H. P. A. Colonia Concordia Julia, Hadrumetina, Pia Auguſta
C. CIV. D. D. P. Corona Civica data Decreto Publico
C. C. N. A. Colonia Carthago Nova Auguſta
C. C. N. C. D. D. Colonia Concordia, Norba Cæſareana, Decreto Decurionum
C. COR. Colonia Corinthus
C. C. T. Ducenteſima Remiſſa
C. C. S. Colonia Claudia Sabaria, *in Hungary*
C. F. P. D. Colonia Flavia Pacenſis Develtum, *Develtum in Thrace*
C. G. I. H. P. A. Colonia Gemella Julia Hadriana, Pariana, Auguſta
C. I. C. A. Colonia Julia Concordia, Apamea
C. I. A. D. Colonia Julia Auguſta Dertona, *Tortona near Milan*
C. I. A. V. Colonia Julia Aug. *Cadiz*
C. I. AVG F. SIN. Colonia Julia Auguſta Felix Sinope
C. I. B. Colonia Julia Balba, *in Mauritania*
C. I. C. A. P. A. Colonia Julia Carthago Auguſta Pia Antiqua, or Corinth, or Carthago Nova
C. I. CAL. Colonia Julia Calpe, *Gibraltar*
C. I. F. Colonia Julia Felix, *Cadiz*
C. I. G. A. Colonia Julia Gemella * Auguſta
C. I. I. A. Colonia Immunis Illice Auguſta, *Elche in Spain*
C. I. N. C. Colonia Julia Norba Cæſareana, or Alcantara: ſometimes it means Col. Julia Nova Carthago
C. I. V. Colonia Julia Valentia, *Valencia in Spain*
C. V. T. Colonia Victrix Tarraco
C. L. I. COR. Colonia Laus Julia Corinthus
C. L. I. N. AVG. Colonia Laus Julia Nova Auguſta, *Laus or Lodi in Lucania*
C. M. L. Colonia Metropolis Laodicea, *in Cœleſyria*
CO. DAM. METRO. Colonia Damaſcus Metropolis
COHH. PRET. VII. P. VI. F. Cohortes Prætorianæ Septimum Piæ, Sextum Felices
COH. I. CR. Cohors prima Cretenſis
COH. PRET. PHIL. Cohors Prætoriana Philippenſium
COL. AEL. A. H. MET. Colonia Ælia Auguſta Hadrumetina Metropolis, *in Africa*
COL. AEL. CAP. COMM. P. F. Colonia Ælia Capitolina Commodiana Pia Felix
COL. ALEX. TROAS. Colonia Alexandriana Troas
COL. AMAS. or AMS. Colonia Amaſtriana, *in Paphlagonia*
COL. ANT. *Antioch in Piſidia*
COL. ARELAT. SEXTAN. Colonia Arelate Sextanorum, *Arles*
COL. AST. AVG. Colonia Aſtigitana Auguſta, *Eceja in Spain*
COL. AVG. FEL. BER. Colonia Auguſta Felix Berytus
COL. AVG. FIR. Colonia Aug. Firma, *Eceja*
COL. AVG. IVL. PHILIP. Colonia Auguſta Julia Philippenſis
COL. AVG. PAT. TREVIR. Colonia Auguſta Paterna Trevirorum, *Treves in Germany, ſent from Paternum in Italy*
COL. AVR. KAR. COMM. P. F Colonia Aurelia Karrhæ Commodiana Pia Felix, or Carneatum Commagene, or *Carrhæ in Aſia*
COL. B. A. Colonia Braccara Auguſta, *Brague*
COL. BRYT. L. V. Colonia Berytus Legio Quinta
COL. CABE. Colonia Cabellio
COL. CAES. AVG. Colonia Cæſarea Auguſta, *in Paleſtine*
COL. CAMALODVN. Colonia Camalodunum, *England*
COL. CASILIN. Colonia Caſilinum, *Caſtellazo in Italy*
COL. CL. PTOL. Colonia Claudia Ptolemais, *Acre in Phœnicia*
COL. DAMAS. METRO. Colonia Damaſcus Metropolis
COL. F. I. A. P. BARCIN. Colonia Flavia Julia Auguſta Pia, Barcino *or Barcelona*
COL. FL. PAC. DEVLT. Colonia Flavia Pacenſis Deultum, *Develtum in Thrace*
COL. HA. ME. T. Colonia Hadriana Mercurialis Thænitana, Mercuriali, *Fermo in Italy, and Thenes in Africa*

* Gemella implies a colony drawn from two others.

COL. H. (or HEL.) LEG. H. Colonia Heliopolis Legio Heliopolitana
COL. HEL. I. O. M. H. Colonia Heliopolis Jovi Optimo Maximo Heliopolitano
COL. IVL. AVG. C. I. F. COMAN. Colonia Julia Auguſta Concordia Invicta Felix Comanorum, *drawn from Concordia in Italy, and ſent to Comana in Cappadocia*
COL. IVL. AVG. FEL. CREMNA. Colonia Julia Auguſta Felix Cremna, *in Pamphylia*
COL. IVL. CER. SAC. AVG. FEL. CAP. OECVM. ISE. HEL. Colonia Julia Certamen Sacrum Auguſtum Felix Capitolinum Oecumenicum Iſelaſticum Heliopolitanum
COL. IVL. CONC. APAM. AVG. D. D. Colonia Julia Concordia Apamea Auguſta Decreto Decurionum
COL. IVL. PATER. NAR. Colonia Julia Paterna Narbonenſis
COL. NEM. Colonia Nemauſus
COL. NICEPH. COND. Colonia Nicephorium Condita, *in Meſopotamia*
COL. PATR. Colonia Patrenſis *or* Patricia, *Patras in Greece*, or *Cordova in Spain*
COL. P. F. AVG. F. CAES. MET. Colonia Prima Flavia Aug. Felix Cæſarea Metropolis, *in Paleſtine*
COL. PL. F. AVG. CAES. METROP. P. S. P. *ſame as above*, P. S. P. *is* Provinciæ Syriæ Paleſtinæ
COL. PR. F. A. CÆSAR. Colonia Prima Flavia Auguſta Cæſarea, *in Paleſtine*
COL. R. F. AVG. FL. C. METROP. Colonia Romana Felix Aug. Flavia Cæſarea Metropolis. *The ſame*
COL. ROM. Colonia Romulea, or *Seville*
COL. ROM. LVG. Colonia Romana Lugdunum
COL. RVS. LEG. VI. Colonia Ruſcino Legio Sexta, *Rouſſillon in France*
COL. SABAR. Colonia Saburiæ
COL. SABAS. Sebaſte *in Paleſtine*
COL. SER. G. NEAPOL. Colonia Servii Galbæ Neapolis, *in Paleſtine*
COL. V. I. CELSA, or COL. VIC. IVL. CELSA. Colonia Victrix Julia Celſa, *Kelſa in Spain*
COL. VIC. IVL. LEP. Colonia Victrix Julia Leptis, *in Africa*
COL. VIM. AN. I. or II, &c. Colonia Viminacium Anno primo. *Widin in Servia*
COL. VLP. TRA. Colonia Ulpia Trajana: *Kellen*, or *Warbal in Tranſilvania*
CO. P. F. CAE. METRO. Colonia Prima Flavia Cæſarea Metropolis
CO. P. I. A. Colonia Pacenſis Julia Auguſta, *or* Col. Octaviana
C. R. I. P. S. Colonia Romana Julia Felix Sinope
C. T. T. Colonia Togata Tarraco
C. V. IL. Colonia Victrix Illice, *Elche in Spain*
D. Decuriones
D. C. A. Divus Cæſ. Aug.
DERT. Dertoſa
GEN. COL. NER. PATR. Genio Coloniæ Neronianæ Patrenſis
G. L. S. Genio Loci Sacrum
M. H. ILLERGAVONIA DVRT. Municipium Hibera Illergavonia Dertoſa, *Tertoſa in Catalonia*
M. M. I. V. Municipes Municipii Julii Uticenſis
M. R. Municipium Ravennatium
MVN. CAL. IVL. Municipium Calagurris Julia, *in Spain*
MVN. CLVN. Municipium Clunia, *Cruna in Spain*
MVN. FANE. ÆL. Municipium Faneſtre Aelium. *Fano*
MVN. STOB. Municipium Stobenſe, *Sobi in Macedon*
MV. TV. Municipium Turiaſo, *in Spain*
N. TR. ALEXANDRIANÆ COL. EOSTR. Nerviæ Trojanæ Alexandrianæ Coloniæ Boſtræ, *in Paleſtine*
SEP. COL. LAVD. Septimia Colonia Laudicea, *or* Laodicea
SEP. TYR. MET. Septima Tyrus Metropolis

Explanation of Plates 23 and 24.

Fig. 1. A Perſian Daric
2. A drachm of Egina
3. A ſilver hemidrachm of Alexander the Great
4. Tigranes the younger of Armenia, with his ſiſter
5. One of the coins of the Arſacidæ of Parthia
6. A coin of the Saſſanidæ of Perſia. Firſt publiſhed by Mr. Pinkerton
7. Denarius of Cneius Pompey from Mr. Pinkerton, reverſe. Received by Spain
8. A braſs coin of Cunobelinus
9. Peſcennius Niger. Struck at Antioch; unique. In Dr. Hunter's cabinet; publiſhed by Mr. Pinkerton
10. A ſilver coin of Carauſius
11. Reverſe of Claudius in firſt braſs
12. Reverſe of Adrian
13. Of Antoninus Pius
14. Of Commodus
15. Of Severus
16. A Saxon penny
17. A Saxon ſtyca
18. 19. Ancient pennies, ſuppoſed to be Scottiſh
20. A penny of William of Scotland
21. A penny of Robert the Great
22. An Iriſh penny
23. The gold penny of Henry III.
24. The large noble of the firſt coinage of Edward III.
25. The gold medal of David II. of Scotland
26. The ryal of Queen Mary of Scotland
27. Letters on Anglo-Saxon coins
28. Abbreviations on ditto
29. Monetarius
30. A reverſe of Commodus in firſt braſs, from Dr. Hunter's cabinet. The Apollo Monetæ was the deity of art and elegant deſign in coinage
31. A reverſe of Maximian I. in third braſs. The ſame reverſe occurs of Diocletian, Severus Cæſar, and Conſtantine I.

MED

Impreſſions of MEDALS. See CASTING.

MEDALLION, or MEDALION, a medal of an extraordinary ſize, ſuppoſed to be anciently ſtruck by the emperors for their friends, and for foreign princes and ambaſſadors. But, that the ſmallneſs of their number might not endanger the loſs of the devices they bore, the Romans generally took care to ſtamp the ſubject of them upon their ordinary coins. Medallions, in reſpect of the other coins, were the ſame as modern medals in reſpect of modern money: they were exempted from all commerce, and had no other value than what was ſet upon them by the fancy of the owner. Medallions are ſo ſcarce, that there cannot be any ſet made of them, even though the metals and ſizes ſhould be mixed promiſcuouſly.

MEDE (JOSEPH), a very learned Engliſh divine of the 17th century, was educated at Cambridge, and ſoon diſtinguiſhed himſelf to great advantage; for by the time he had taken the degree of maſter of arts in 1610, he had made an uncommon progreſs in all academical ſtudies. His firſt appearance as a writer was by an addreſs to Dr. Andrews, then biſhop of Ely, in a Latin tract *De Sanctitate Relativa*, which was highly ap-

proved of by that prelate, who defired him to be his domeſtic chaplain. This Mr. Mede very civilly refuſed; valuing the liberty of his ſtudies above any hopes of preferment, and eſteeming that freedom which he enjoyed in his cell, ſo he uſed to call it, as the haven of all his wiſhes. And indeed theſe thoughts had poſſeſſed him betimes; for, when he was a ſchool-boy, he was ſent to by his uncle, Mr. Richard Mede, a merchant, who, being then without children, offered to adopt him for his ſon, if he would live with him: but he refuſed the offer, preferring, as it ſhould ſeem, a life of ſtudy to a life of gain.

He was not choſen fellow of his college till after he was maſter of arts, and then not without the aſſiſtance of his friend biſhop Andrews: for he had been paſſed over at ſeveral elections, on account of a cauſeleſs ſuſpicion which Dr. Cary, then maſter of the college, afterwards biſhop of Exeter, had conceived of him, that "he looked too much towards Geneva." Being made fellow, he became an eminent and faithful tutor. After he had well grounded his pupils in humanity, logic, and philoſophy, ſo that they were able to walk as it were alone, he uſed to ſet every one his daily taſk; which he rather choſe, than to confine himſelf and them to preciſe hours for lectures. In the evening they all came to his chamber; and the firſt queſtion he put to each was, *Quid dubitas?* "What doubts have you met with in your ſtudies to-day?" For he ſuppoſed, that to doubt nothing and to underſtand nothing was juſt the ſame thing. This was right, and the beſt method to make young men exerciſe their rational powers, and not acquieſce in what they learn mechanically, and by rote, with an indolence of ſpirit which prepares them to receive and ſwallow implicitly whatever is offered to them. As to himſelf, he was ſo entirely devoted to the ſtudy of all excellent knowledge, that he made even the time he ſpent in his amuſements ſerviceable to his purpoſe. He allowed himſelf little or no exerciſe but walking; and often, in the fields or college garden, would take occaſion to ſpeak of the beauty, ſignatures, virtues, or properties of the plants then in view: for he was a curious floriſt, an accurate herbaliſt, and thoroughly verſed in the book of nature. The chief delight he took in company was to diſcourſe with learned friends.

Mr. Mede was a curious inquirer into the moſt abſtruſe parts of learning, and endeavoured after the knowledge of thoſe things which were moſt remote from the vulgar track. Among other things, he ſpent no ſmall pains and time in ſounding the depths of aſtrology, and blotted much paper in calculating the nativities of his near relations and fellow-ſtudents: but this was in his younger years, and he afterwards diſcovered the vanity and weakneſs of this fanciful art. He applied himſelf to the more uſeful ſtudy of hiſtory and antiquities; particularly to thoſe myſterious ſciences which made the ancient Chaldeans, Egyptians, and other nations, ſo famous; tracing them as far as he could have any light to guide him in their oriental ſchemes and figurative expreſſions, as likewiſe in their hieroglyphics, not forgetting to inquire alſo into the oneirocritics of the ancients: which he did the rather, becauſe of that affinity he conceived they might have with the language of the prophets. He was a curious and laborious ſearcher of antiquities relating to religion, Ethnic, Jewiſh, Chriſtian, and Mahometan: to which he added other attendants, neceſſary for underſtanding the more difficult parts of Scripture.

In 1620 he refuſed the provoſtſhip of Trinity-college, Dublin, into which he had been elected at the recommendation of archbiſhop Uſher, who was his particular friend; as he did alſo when it was offered to him a ſecond time, in 1630. The height of his ambition was only to have had ſome ſmall donative ſinecure added to his fellowſhip, or to have been thrown into ſome place of quiet; where, retired from the noiſe and tumults of the world, and poſſeſſed of a competency of fortune, he might have been entirely at leiſure for ſtudy and acts of piety. In the mean time, although his circumſtances were ſcanty, for he had nothing but his fellowſhip and a college lecture, his charity was diffuſive and uncommon; and, ſtrange as it may now ſeem, he devoted the tenth of his income to pious and charitable uſes. But his frugality and temperance always afforded him plenty. His prudence or moderation, either in declaring or defending his private opinions, was very remarkable; as was alſo his freedom from partiality, prejudice or prepoſſeſſion, pride, anger, ſelfiſhneſs, flattery, and ambition. He was meek, patient, equally remote from ſuperſtition and licentiouſneſs of thinking; and, in ſhort, poſſeſſed every virtue. This great and good man died in 1638, in his 52d year, having ſpent above two-thirds of his time in college.

MEDEA, in fabulous hiſtory, a celebrated ſorcereſs, daughter of Æetes king of Colchis. Her mother's name, according to the more received opinion of Heſiod and Hyginus, was Idyia, or, according to others, Ephyre, Hecate, Aſterodia, Antiope, and Neæra. She was the niece of Circe. When Jaſon came to Colchis in queſt of the golden fleece, Medea became enamoured of him, and it was to her well-directed labours that the Argonauts owed their preſervation. Medea had an interview with her lover in the temple of Hecate; where they bound themſelves by the moſt ſolemn oaths to eternal fidelity. No ſooner had Jaſon overcome all the difficulties which Æetes had placed in his way, than Medea embarked with the conquerors for Greece. To ſtop the purſuit of her father, ſhe tore to pieces her brother Abſyrtus, and left his mangled limbs in the way through which Æetes was to paſs. This act of barbarity ſome have attributed to Jaſon, and not to her. When Jaſon reached Iolchos his native country, the return and victories of the Argonauts were celebrated with univerſal rejoicings; but Æſon the father of Jaſon was unable to aſſiſt at the ſolemnity on account of the infirmities of his age. Medea, at her huſband's requeſt, removed the weakneſs of Æſon; and by drawing away the blood from his veins, and filling them again with the juice of certain herbs, ſhe reſtored him to the vigour and ſprightlineſs of youth. This ſudden change in Æſon aſtoniſhed the inhabitants of Iolchos; and the daughters of Pelias were alſo deſirous to ſee their father reſtored by the ſame power to the vigour of youth. Medea, willing to revenge the injuries which her huſband's family had ſuffered from Pelias, increaſed their curioſity; and betrayed them into the murder of their father as preparatory to his rejuveneſcence, which ſhe afterwards refuſed to accompliſh. This action greatly irritated the people of Iolchos; and Medea with her huſband fled to Corinth to avoid their reſentment. Here they lived for 10 years with mutual attachment, when the love of Jaſon for Glauce the king's daughter interrupted their harmony, and Medea was divorced. Medea revenged the infidelity of Jaſon, by cauſing the death of Glauce, and the deſtruction of her family. She alſo killed two of her children in their father's preſence; and when Jaſon attempted to puniſh the barbarity of the mother, ſhe fled through the air upon a chariot drawn by winged dragons. From Corinth Medea came to Athens, where, after ſhe had undergone the neceſſary purification of her murder, ſhe married king Ægeus, or (according to others) lived in an adulterous manner with him. From her conduct with Ægeus, Medea had a ſon who was called *Medus*. Soon after, when Theſeus wiſhed to make himſelf known to his father, Medea, jealous of his fame and fearful of his power, attempted to poiſon him at a feaſt which had been prepared for his entertainment. Her attempts, however, failed of ſucceſs, and the ſight of the ſword which Theſeus wore by his ſide convinced Ægeus that the ſtranger againſt whoſe life he had ſo baſely conſpired was his own ſon. The father and the ſon were reconciled; and Medea, to avoid the puniſhment which

her wickedneſs deſerved, mounted her fiery chariot and diſappeared through the air. She came to Colchis; where, according to ſome, ſhe was reconciled to Jaſon, who had ſought her in her native country after her ſudden departure from Corinth. She died at Colchis, as Juſtin mentions, when ſhe had been reſtored to the confidence of her family. After death ſhe married Achilles in the Elyſian fields, according to the traditions mentioned by Simonides. The murder of Mermerus and Pheres, the youngeſt of Jaſon's children by Medea, is not to be attributed to the mother, according to Elian; but to the Corinthians, who aſſaſſinated them in the temple of Juno Acræa. To avoid the reſentment of the gods, and to deliver themſelves from the peſtilence which viſited their country after ſo horrid a maſſacre, they engaged the poet Euripides for five talents to write a tragedy, which cleared them of the murder, and repreſented Medea as the cruel aſſaſſin of her own children. And beſides, that this opinion might be the better credited, feſtivals were appointed, in which the mother was repreſented with all the barbarity of a Fury murdering her own ſons.

MEDEOLA, CLIMBING AFRICAN ASPARAGUS, in botany: a genus of the hexandria order, belonging to the trigynia claſs of plants; and in the natural method ranking under the 11th order, *Sarmentaceæ*. There is no calyx; the corolla is ſexpartite and revoluted; the berry triſpermous. Its characters are theſe: The flower has no empalement; it has ſix oblong oval petals, and ſix awl-ſhaped ſtamina terminated by incumbent ſummits; and three horned germina terminating the ſtyle; the germina afterward turn to a roundiſh trifid berry with three cells, each containing one heart-ſhaped ſeed. There are two ſpecies.

MEDIA, now the province of GHILAN in Perſia, once the ſeat of a potent empire, was bounded, according to Ptolemy, on the north by part of the Caſpian Sea; on the ſouth by Perſis, Suſina, and Aſſyria; on the eaſt by Parthia and Hyrcania; and on the weſt by Armenia Major. It was anciently divided into ſeveral provinces, *viz.* Tropatene, Charomithrene, Darites, Marciane, Amariace, and Syro-Media. By a later diviſion, however, all theſe were reduced to two; the one called *Media Magna*, the other *Media Atropatia*, or ſimply *Atropatene*. Media Magna was bounded by Perſis, Parthia, Hyrcania, the Hyrcanian Sea, and Atropatene, and contained the cities of Ecbatan, Laodicea, Apamea, Raga, Rageia or Ragea, &c. Atropatene lay between the Caſpian mountains and the Caſpian Sea.

This country originally took its name from Madai, the third ſon of Japhet; as is plain from Scripture, where the Medes are conſtantly called *Madai*. Among prophane authors, ſome derive the name *Media* from one Medus the ſon of Jaſon and Medea; others from a city called *Media*. Sextus Rufus tells us that in his time it was called *Medena*, and from others we learn that it was alſo called *Aria*. The moſt probable hiſtory of the Medes is as follows:

This people lived in ſubjection to the Aſſyrians till the reign of Sennacherib, when they threw off the yoke, and lived for ſome time in a ſtate of anarchy. But at laſt, rapine and violence, the natural conſequences of ſuch a ſituation, prevailed ſo much that they were conſtrained to have recourſe to ſome kind of government, that they might be enabled to live in ſafety. Accordingly, about 699 B. C. one Dejoces having procured himſelf to be choſen king, united the ſcattered tribes into which the Medes were at that time divided; and having applied himſelf as much as poſſible to the civilization of his barbarous ſubjects, left the throne to his ſon Phraortes, after a reign of 53 years.

The new king, who was of a warlike and enterpriſing diſpoſition, ſubdued almoſt all the Upper Aſia lying between Mount Taurus and the river Halys, which runs through Cappadocia into the Euxine Sea. Elated with this good ſucceſs, he invaded Aſſyria, the empire of which was now much declined, and greatly weakened by the revolt of many nations which had followed the example of the Medes. Nebuchodonoſor or Chyniladan, however, the reigning prince, having aſſembled what forces he could, engaged Phraortes, defeated and took him priſoner, and put him to death; after which, entering Media, he laid waſte the country, took the metropolis of Ecbatan itſelf, and levelled it with the ground.

On the death of Phraortes, his ſon Cyaxares was placed on the throne. He was no leſs valiant and enterpriſing than his father, and had better ſucceſs againſt the Aſſyrians. With the remains of that army which had been defeated under his father, he not only drove the conquerors out of Media, but obliged Chyniladan to ſhut himſelf up in Nineveh. To this place he immediately laid cloſe ſiege; but was obliged to give over the enterpriſe on account of an irruption of the Scythians into his own country. Cyaxares engaged theſe new enemies with great reſolution, but was utterly defeated; and the conquerors over-ran not only all Media, but the greateſt part of Upper Aſia, extending their conqueſts into Syria, and as far as the confines of Egypt. They continued maſters of all this vaſt tract of country for 28 years, till at laſt Media was delivered from their yoke by a general maſſacre at the inſtigation of Cyaxares.

After this deliverance, the Medes ſoon repoſſeſſed themſelves of the territories they had loſt; and once more extended their frontiers to the river Halys, their ancient boundary to the weſtward. After this we find the Medes engaged in a war with the Lydians; which, however, ended without any remarkable tranſaction: but on the concluſion of it, Cyaxares having entered into a ſtrict alliance with Nebuchadnezzar king of Babylon, returned in conjunction with the Babylonians before Nineveh; which they took and levelled with the ground, putting moſt of the inhabitants to the ſword.

After this victory the Babylonian and Median empires ſeem to have been united: however, after the death of Nebuchadnezzar, or rather in his life-time, a war enſued, which was not extinguiſhed but by the diſſolution of the Babylonian empire. The Medes, under Aſtyages the ſon of Cyaxares I. withſtood the power of the Babylonian monarchs; and under Cyrus and Cyaxares II. utterly deſtroyed their empire by the taking of BABYLON, as is related under that article. After the death of Cyaxares, the kingdom fell to Cyrus, by whom the ſeat of the empire was transferred to PERSIA, under which article the hiſtory of Media now falls to be conſidered, as alſo the manners, &c. of the inhabitants.

MEDIANA, the name of a vein or little veſſel, made by the union of the cephalic and baſilic, in the bend of the elbow.

MEDIASTINUM, in anatomy, a double membrane, formed by a duplicature of the pleura; ſerving to divide the thorax and the lungs into two parts, and to ſuſtain the viſcera, and prevent their falling from one ſide of the thorax to the other. See ANATOMY.

MEDIATE, or INTERMEDIATE, ſomething that ſtands betwixt and connects two or more terms conſidered as extremes; in which ſenſe it ſtands oppoſed to *immediate*.

MEDIATOR, a perſon that manages or tranſacts between two parties at variance in order to reconcile them. The word, in Scripture, is applied, 1. To Jeſus Chriſt, who is the only interceſſor and peace-maker between God and man; 1 Tim. ii. 5. 2. To Moſes, who interpoſed between the Lord and his people, to declare unto them his word; Deut. v. 5. iii. 19.

MEDICAGO, SNAIL-TREFOIL, in botany: a genus of the decandria order, belonging to the diadelphia claſs of plants; and in the natural method ranking under the 32d order, *Papi-*

lionaceæ. The legumen is compreſſed and ſcrewed; the carina of the corolla luring down from the vexillum. There are nine ſpecies, though only five are commonly cultivated in this country. They are low trailing plants, adorned with ſmall yellow flowers, ſucceeded by ſmall round ſnail-ſhaped fruit, which are downy, and armed with a few ſhort ſpines. They are all eaſily propagated by ſeeds. For the properties and culture of LUCERN, a ſpecies of this genus, ſee HUSBANDRY.

MEDICINAL, any thing belonging to medicine.

MEDICINAL *Springs*, a general name for any fountain, the waters of which are of uſe for removing certain diſorders. They are commonly either chalybeate or ſulphureous. See SPRINGS and WATER.

MEDICINE,

THE art of preventing, curing, or alleviating, thoſe diſeaſes to which the human ſpecies are ſubjected. It conſiſts, according to Boerhaave, in the knowledge of thoſe things by whoſe application life is either preſerved ſound and healthy, or when diſordered is again reſtored to its priſtine healthineſs.

Galen defines medicine, the art of preſerving preſent health, and of retrieving it when loſt; Hippocrates, the addition of what is wanting, and the retrenchment of what is redundant; and Herophilus, the knowledge of things good, indifferent, and ill, with regard to health.

Medicine muſt have been nearly coeval with the world. The injuries and viciſſitudes of the air, the nature and qualities of foods, the violence of external bodies, the actions of life, and, laſtly, the fabric of the human compages, muſt have rendered diſeaſes almoſt as old as mankind; and the preſence of a diſeaſe, as it brings with it a painful ſenſation, or the loſs, perhaps, of the uſe of a limb, does, by a neceſſary mechanical impulſe, both in brutes and men, compel the diſeaſed to ſeek for help, and to apply remedies, either by mere experiment, or by inſtinct, and ſpontaneous appetite: hence aroſe the art of medicine, which, in this ſenſe, has been always every where among mankind.

Ancient hiſtories and fables tell us, that, in a little time from the flood, medicine was ſo well cultivated by the Aſſyrians, Babylonians, Chaldæans, and Magi, that they were able to remove preſent diſeaſes, and prevent future ones. Hence it paſſed into Egypt, Lybia Cyrenaica, and Crotona; and thence into Greece, where it flouriſhed, principally in the iſlands of Cnidus, Rhodes, and Cos, and in Epidaurus.

The firſt foundations of the art were laid by chance, natural inſtinct, and events unforeſeen; theſe were improved by the memory of the ſucceſs of former experiments: by writing down diſeaſes, their remedies, and events, on columns, paintings, and the walls of their temples: by expoſing the ſick in the markets, and public ways, that thoſe who paſſed by might enquire into the diſeaſe, and communicate a remedy, if they knew any: and, laſtly, by analogy, or reaſoning, from a compariſon of things already obſerved, with things preſent, and things to come.

The art at length received a much greater degree of perfection, by the appointing of phyſicians; ſome for the cure of particular diſeaſes, and others for diſeaſes in general; by an accurate obſervation of the diſeaſe, and its ſymptoms; and by an exact deſcription of the remedy, and its uſe: immediately upon which, it got among the prieſts, and at length was confined to particular families; deſcending, by way of inheritance, from father to ſon: which again proved a great bar to its progreſs. The extiſpicy, or inſpecting the entrails of beaſts, uſed by the prieſts; the cuſtom of embalming dead carcaſes; and even butchery itſelf, promoted the knowledge of the human fabric, and of the cauſes both of health, diſeaſes, and death.

Laſtly, the diſſecting of live animals for philoſophical purpoſes, diſtinct narratives of the cauſe, riſe, increaſe, criſis, declenſion, end, and effect of diſeaſes; and the knowledge of medicines, their choice, preparation, application, powers, and events, ſeemed to have almoſt brought the art to its perfection.

Hippocrates, who was contemporary with Democritus, and perfectly acquainted with every thing then diſcovered, and beſides furniſhed with a great number of obſervations of his own, collecting into one all that was valuable and uſeful, compiled a body of Greek medicine; and was the firſt who deſerves the title of a true *phyſician*: for, being a maſter of the εμπειρια, experience, as well as of analogy and reaſon, and withal well verſed in a pure philoſophy, he firſt made phyſic rational, and laid the foundation of the *dogmatical* medicine, which has ever ſince obtained.

What Hippocrates had done continued a long time ſacred and unaltered, and was the ſtanding practice of many ages: at length Aretæno the Cappadocian digeſted it into a more orderly body; whence, in various places, at various times, and by various hands, particularly the Alexandrian ſchool, it was farther altered and improved, till at length it came into the hands of Claud. Galen; who, collecting the ſcattered parts, digeſting thoſe which were confuſed, and explaining every thing by the rigid doctrines of the Peripatetics, did both a great deal of ſervice and a great deal of injury to the noble art; he being the firſt who introduced the doctrine of the elements, the cardinal qualities, and their degrees, the four humours, &c. into medicine: and on theſe he made the whole art to depend.

After the ſixth century, the arts were not only extinguiſhed, but almoſt all memory of them was loſt, till the ninth; from which to the thirteenth, medicine was vigorouſly cultivated, by the Arabs, in Aſia, Africa, and Spain; who, applying themſelves particularly to the ſtudy of the materia medica, and its preparations, and to the operations of ſurgery, rendered both more juſt and more copious at the ſame time: and yet Galen's errors became now more predominant than ever.

The revival of learning, however, which in the 17th and 18th centuries took place throughout Europe, contributed greatly to remove theſe, and to promote the advancement of medicine as well as other ſciences; while, at the ſame time, the introduction of the art of printing rendered the communication of new opinions as well as new practices ſo eaſy a matter, that, to enumerate even the names of thoſe who have been juſtly rendered eminent for medical knowledge, would be a very tedious taſk. It was not, however, till 1628 that Dr. William Harvey of London demonſtrated and communicated to the public one of the moſt important diſcoveries reſpecting the animal œconomy, the circulation of the blood. This diſcovery, more effectually than any reaſoning, overturned all the ſyſtems which had ſubſiſted prior to that time. It may juſtly be reckoned the moſt important diſcovery that has hitherto been made in the healing art: for there can be no doubt that it puts the explanation of the phenomena of the animal body,

both in a ſtate of health and diſeaſe, on a more ſolid and rational footing than formerly. It has not, however, prevented the riſe of numerous fanciful and abſurd ſyſtems. Theſe, though faſhionable for a ſhort time, and ſtrenuouſly ſupported by blind adherents, have yet in no long period fallen into deſerved contempt. And, notwithſtanding the abilities and induſtry of Stahl, Hoffman, Boerhaave, and Cullen, we may eaſily venture to aſſert, that no general ſyſtem has yet been propoſed which is not liable to innumerable and unſurmountable objections. Very great progreſs has indeed been made in explaining the philoſophy of the human body, from aſcertaining, by deciſive experiment, the influence of the circulating, the nervous, and the lymphatic ſyſtems in the animal economy. But every attempt hitherto made to eſtabliſh any general theory in medicine, that is, to conduct the cure of every diſeaſe on a few general principles, has equally deviated from truth with thoſe of Hippocrates and Galen; and has equally tended to miſlead thoſe who have adopted it. Indeed we may with confidence venture to aſſert, that, from the very nature of the ſubject itſelf, medicine does not admit of ſuch ſimplicity. No one can deny that the human body conſiſts of a very great number of different parts, both ſolids and fluids. It is, however, equally certain, that each of theſe is from many different cauſes liable to deviations from the ſound ſtate. And although ſome ſlight changes may take place without what can be called a morbid affection, yet we well know that every change taking place to a certain degree in any one part will neceſſarily and unavoidably produce an affection of the whole. Hence we may without heſitation venture to affirm, that every general theory which can be propoſed, attempting to explain the phenomena, and conduct the cure of all diſeaſes on a few general principles, though for ſome time it may have ſtrenuous advocates, will yet in the end be found to be both ill-grounded and pernicious.

The art of medicine has been much more uſefully improved by careful attention to the hiſtory, theory, and practice of particular diſeaſes, and by endeavouring to aſcertain from cautious obſervation the ſymptoms by which they are to be diſtinguiſhed, the cauſes by which they are induced, and the means by which they are to be prevented, alleviated, or cured. On this footing, therefore, we ſhall endeavour to give a brief account of at leaſt the moſt important affections to which the human body is ſubjected, delivering what appear to us to be the beſt eſtabliſhed facts and obſervations reſpecting each.

But before entering on the conſideration of particular diſeaſes, or what has commonly been ſtyled the practice of medicine, it is neceſſary to give a general view of the moſt important functions of the animal body, and of the chief morbid affections to which they are ſubjected; a branch, which has uſually been named the *Theory* or *Inſtitutions of Medicine*.

THEORY OF MEDICINE; OR, A NATURAL HISTORY OF THE HUMAN BODY.

WHILE the functions of living animals, but particularly of the human ſpecies, are very numerous, the accounts given of theſe both in a ſtate of health and diſeaſe are very various. Without, therefore, pretending to enumerate the contradictory opinions of different authors, we ſhall here preſent the reader with a view of this ſubject, extracted from one of the beſt publications reſpecting it, the "Elements of the Practice of Phyſic" of that venerable and eſteemed practitioner and teacher of medicine in London, Dr. George Fordyce.

CHAP. I. CHEMICAL PROPERTIES *of the* FLUIDS.

THE fluids may be divided into, 1. The blood. 2. Thoſe formed during digeſtion, before the food is converted into blood. 3. The ſecreted fluids.

The blood conſiſts of, 1. The ſerum. 2. The coagulable lymph. 3. The red part. 4. The ſuperfluous water. 5. Extraneous ſubſtances introduced.

The ſerum, coagulable lymph, and ſuperfluous water, are diffuſed through one another, and the red part is mechanically mixed with them. Some of the extraneous ſubſtances are alſo mechanically mixed with them, and ſome diffuſed through them *.

§ 1. *Properties of the Serum.*

THE ſerum is fluid in any degree of heat between 30 and 160 of Fahrenheit's thermometer. In a leſs heat it freezes, in a greater it coagulates.

Coagulation is a ſeparation of an animal or vegetable matter from the water in which it was diſſolved; and is at the ſame time a change of the properties of that matter, rendering it inſoluble in water again by commixture alone.

The ſerum conſiſts chemically of a coagulable matter, and water in which common ſal ammoniac, and phoſphoric ammoniac, and generally common ſalt, and frequently ſelenites, and fixed ammoniac, are diſſolved; but it is a queſtion whether the water chemically combined in the ſerum be alſo united with thoſe neutral ſalts, or whether the ſerum, and the ſolution of theſe, are only diffuſed through one another.

It is probably in itſelf colourleſs and inodorous; but it receives a yellowiſh or browniſh hue from the putreſcent mucilage † of the blood, and acquires a ſmell from the eſſential oil.

If it contained no neutral ſalts, it would be inſipid, and incapable of ſtimulating.

The ſuperfluous water may be ſeparated from it by filtration in the body, but that which is chemically combined with the

* It is very neceſſary, to underſtand the three modes of combination, to comprehend the mixture of the fluids in the veſſels of animals: they are, 1. *Chemical combination*, when the particles of one ſubſtance attract the particles of another ſtronger than they attract one another, and the two ſubſtances are only capable of ſeparation by elective attraction, or deſtroying attraction by heat. 2. *Diffuſion*, when the particles of one ſubſtance attract thoſe of another as ſtrongly as they do one another, ſo that the ſubſtances are broken down into their ſmalleſt integrant parts, and are uniformly mixed, but may be ſeparated by filtration in animals, or by eliquation or freezing. 3. *Mechanical mixture*, when the particles of the one body attract one another more ſtrongly than thoſe of the other body; in this caſe the ſubſtance, in the ſmalleſt quantity, is broken into ſmall maſſes, which are ſurrounded by the particles of the other, and the two ſubſtances are ſeparable by ſubſiding.—In the firſt of theſe, the properties of the compound have no relation to the properties of the elements. In the two laſt, viz. *diffuſion* and *mixture*, the properties of the elements remain perfect in the compound.

† An animal mucilage is a ſubſtance, ſolid and brittle when free from water, capable of being combined with water, ſo as to make a flexible ſolid or a fluid: and always found ſo combined in animals: it is inflammable; and empyreumatic oil, and volatile alkali, may be obtained from it by heat. There being no term in uſe to expreſs theſe ſubſtances generally, it was neceſſary to give this definition; and mucilage will always be uſed in this ſenſe.

other parts cannot. All the water may be evaporated from it by a leſs heat than 140 degrees of Fahrenheit's thermometer, if it be expoſed to the air. The other parts remain after this operation ſolid, and ſoluble again in water by commixture alone.

The ſeparation or addition of ſuperfluous water does not affect its viſcidity, ſo far as that is of any conſequence in the circulation; but the ſeparation of that water which is in chemical combination may render it more viſcid.

The water in chemical combination is never ſeparated while the ſerum is contained in the blood-veſſels; and of conſequence this part of the blood is always equally viſcid, ſo far as its viſcidity can affect the circulation or ſecretions.

It may be coagulated by acids, oils, alcohol, &c. but no ſubſtance can get into the blood-veſſels in a ſufficient degree of concentration to coagulate it, excepting by injection. It may be coagulated by a juice, ſecreted in the ſtomach. It has ſeldom, if ever, been found coagulated in the body.

The only perceptible difference which has appeared in the coagulable part of the ſerum, from any obſervation hitherto made public, is, that ſometimes, in coagulating, its parts adhere more or leſs firmly.

§ 2. *Properties of the Coagulable Lymph.*

Coagulable lymph is a compound of water and a coagulable mucilage. As long as it continues in the courſe of circulation, it is fluid in any degree of heat between 30 and 120 degrees of Fahrenheit's thermometer. When it is taken out of the blood-veſſels it coagulates; whether it be in motion or at reſt, expoſed to the air or not, or in the heat of the human body, or in any other degree of heat.

If it be retained in a blood-veſſel, it continues fluid for more than three hours in any degree of heat between 30 and 120 of Fahrenheit's thermometer, and that whether it be in motion or at reſt. The ſmaller the blood-veſſel, the longer it continues fluid.

It has hardly ever been found coagulated in the blood-veſſels of a living animal, unleſs they have been enlarged into aneuriſms or varices.

It has generally been found coagulated in the large veſſels of the human body on diſſection, and ſometimes ſeparated from the other parts; but, to all appearance, theſe coagulations have always taken place after death.

This part of the blood coagulating, when taken out of the veſſels, or after death, in the ſame chemical circumſtances in which it remained fluid when the animal was alive, has given occaſion to an opinion, that this fluidity is one of thoſe properties ſuperadded to the matter of the body by life.

When it is taken out of the blood veſſels, it may be prevented from coagulating by ſaturating the whole blood with common ſea-ſalt, and perhaps by ſome of the other neutral ſalts.

Although the coagulable part of the ſerum and coagulable lymph have different properties, the coagulum formed from both is pretty nearly the ſame. The coagulum may be diſſolved in water by boiling or putrefaction; and may be united with concentrated acids, with cauſtic alkalis, and calcareous earth, and with ſome metallic ſalts, into a ſubſtance ſoluble in water; but none of theſe can get into the ſyſtem by abſorption, either from the inteſtines, or any other part, ſo as to produce this effect.

Both the ſuperfluous water and ſerum are capable of being ſeparated from the coagulable lymph, by filtration in the body.

When the blood is received into a proper veſſel, the coagulation of this part gives an appearance of ſolidity to the whole: but ſoon after the whole becomes thus apparently ſolid, part of the ſerum, of the ſuperfluous water, and of the water which was contained in the coagulable lymph, oozes out from the whole maſs, and brings along with it part of any extraneous fluid that may have been in the blood-veſſels; leaving behind what is commonly called the red globules, the mucilage of the coagulable lymph, and any ſolid particles that may have been in the blood. This is called the ſpontaneous ſeparation.

When the arteries are acting ſtrongly, whether the whole habit be ſtrong or not, the coagulable lymph is more fluid, and longer in coagulating. Of conſequence, it lets the red particles, which are the heavieſt part of the blood, fall down towards the bottom, before it coagulates; and upon the ſpontaneous ſeparation the coagulum is divided into two parts; the upper, conſiſting of the coagulum of the coagulable lymph alone (which has in this caſe been called the buff); the under, conſiſting partly of this and partly of the red particles.

Although part of the coagulable lymph would ſeparate from the red particles, it may be prevented by taking the blood from a ſmall veſſel, or from a ſmall orifice, or by letting it run along the ſkin before it falls into the veſſel into which it is received, or by receiving it into a veſſel, the ſurface of which is large in proportion to its contents; as in all theſe caſes the coagulation is forwarded. On the other hand, if it ſtagnate in the blood-veſſel for ſome time before it is taken out, there will be a ſeparation, when none would otherwiſe have happened.

Whether the coagulable lymph ſeparate in part from the red particles or not, it coagulates ſometimes into a firmer, ſometimes into a looſer maſs, generally in proportion to the ſtrength of the ſyſtem.

All the ſubſtances which coagulate the ſerum have the ſame effect on the coagulable lymph; but none can be applied to it in the blood-veſſels, in a ſufficient degree of concentration to coagulate it, excepting by injection.

The coagulable lymph is probably in itſelf colourleſs, inſipid, inodorous, and incapable of ſtimulating.

Whilſt it remains in the blood-veſſels it is chemically combined with a certain proportion of water, from which it cannot be ſeparated but by coagulation, neither will it combine with a larger proportion. Water mechanically mixed with it does not alter its viſcidity, ſo far as that affects the circulation or ſecretions. No other differences beſides thoſe already taken notice of, are obſervable in its properties.

The coagulable lymph and ſerum are both capable of putrefaction, and are converted by it into a mucilaginous matter not coagulable by heat. If this mucilaginous matter ſhould undergo a further putrefaction, it emits a fœtid vapour, and is converted into ſaline ſubſtances, calcareous earth, and water.

§ 3. *Properties of the Red Part.*

Upon viewing this part of the blood with a deep magnifier, in the ſolar microſcope, as it circulates in the blood-veſſels of a living animal, it appears to be divided into a number of ſmall particles, which are apparently annular, and exceedingly flexible.

While the animal is reſpiring, and the blood circulating, it is of a ſcarlet colour in the arteries, and of a Modena red in the veins; but if the reſpiration be ſtopped, that blood which circulates afterwards through the lungs continues of a Modena red. If it be taken out of the veins, kept moiſt, and expoſed to reſpirable air, it becomes of a ſcarlet colour; if it be taken out of the arteries, and covered from the air, or if it ſtagnate in them, its colour is changed to a Modena red. A light ſhade of Modena red is not ſcarlet, neither is a deep ſcarlet a Modena red *. Various other ſubſtances alter the colour of this part.

* Scarlet is a mixture of Modena red and yellow, ſo that the alteration of the colour of the red blood cannot ariſe from dilution.

It ſeems to have a ſweetiſh taſte, to be inodorous, and void of ſtimulus. Its ſpecific gravity is but a very little more than that of the ſerum or coagulable lymph. It is readily ſoluble in water, but not in the ſerum. It is not ſoluble in a ſaturated ſolution of neutral ſalts. It is capable of undergoing the putrefactive fermentation, the firſt ſtage of which breaks it down into ſmaller particles, and renders it of a dark colour. It is afterwards converted into a mucilage, ſoluble in the ſerum.

§ 4. *Of the ſuperfluous Water in the Blood.*

A QUANTITY of water is diffuſed through the ſerum and coagulable lymph; and it contains a part, perhaps the whole of the ſalts. Theſe ſalts are chemically combined with a part of it only, and this ſolution is diffuſed through the remaining part. The water diffuſed may be ſeparated from the ſolution by filtration in the body.

The ſolid part of the blood, left after evaporation of the water by a heat leſs than that of boiling water, amounts to from one fourth to one fifth of the whole.

§ 5. *Of extraneous Subſtances in the Blood.*

A GREAT variety of extraneous ſubſtances, both fluid and ſolid, may be introduced into the blood-veſſels by abſorption; but none of them in ſuch proportion as to produce any alteration in the blood, except by fermentation.

When any ferment is introduced into the blood-veſſels, it acts upon a part of the blood only; the greateſt part remaining to all experiment exactly the ſame as before.

It may be doubted, whether any ferment acts on any part of the blood in the blood-veſſels, or whether ferments only act on extravaſated fluids.

§ 6. *Of the Putrefaction of the Blood.*

FERMENTATION ſignifies the converſion of one compound into another, by a new arrangement or manner of combination of its elements. What is commonly called putrefaction conſiſts of two fermentations, which we ſhall call by the names of the firſt and ſecond ſtage.

All animal ſolids and fluids may be reduced by the firſt into a mucilaginous maſs, ſoluble in water, and diffuſible through any quantity of it.

The red part of the blood firſt breaks down into ſmaller particles, before it is formed into a perfect putrefcent mucilage.

The firſt ſtage takes place without any effervescence. The ſecond ſtage converts this mucilage into earths, and ſalts, a fœtid vapour, gas and water. The firſt and ſecond ſtage of putrefaction take place in a ſmall part of the blood, or it is deſtroyed by ſome other operation; for,

After having coagulated the ſerum, if we ſqueeze out the water, and evaporate it, there is left a mucilaginous matter ſimilar to that formed by putrefaction.

The ſalts formed in the blood-veſſels, excepting phoſphoric ammoniac, may be formed by the laſt ſtage of putrefaction; and thoſe formed by the laſt ſtage are found in the blood-veſſels, excepting nitrous ſelenites, and nitrous ammoniac.

This mucilage, and theſe ſalts, are always carrying off by urine; the preſent blood is always diminiſhing, and the veſſels require a freſh ſupply from the food.

The blood is always in the moſt powerful circumſtances of putrefaction; which are, a heat of 98 degrees of Fahrenheit's thermometer, fluidity, a moderate expoſure to air, and motion: but it is prevented from putrefying by the action of the veſſels; nor can any ferment, or other circumſtance, induce the fermentation, till this action is altered, except perhaps the introduction of chyle, intermixed with putrid matter.

In diſeaſes, the firſt ſtage often takes place in part of the blood; the ſecond ſtage ſometimes, although but ſeldom.

§ 7. *Of the Proceſs of Digeſtion.*

DIGESTION is the converſion of the food into chyle, and afterwards into blood. The food may conſiſt of farinaceous or mucilaginous vegetable ſubſtances, or native vegetable acid, or ſugar, or expreſſed oil, or animal ſolids, or animal fluids, containing a mucilaginous matter. Theſe ſubſtances may be digeſted, if they be taken ſingly, or if they be mixed together.

The blood formed does not differ ſenſibly in its properties, whether the one or the other of them be uſed ſingly, or ſeveral of them together; provided the organs of digeſtion be ſufficiently powerful to convert them into blood.

If the food be ſolid, it is generally broken down by the teeth, or by ſome other apparatus. But maſhing it down with water is not ſufficient to alter its chemical properties, and convert it into chyle and blood.

It is mixed in the ſtomach with the watery fluids we drink, and with the mucilaginous watery fluids ſecreted by the ſalivary and other glands. It is ſometimes diſſolved in water before it is uſed: but it is often rendered ſolid by a previous preparation, or coagulated by a ſubſtance ſecreted in the ſtomach. Simple ſolution in water does not convert it into chyle or blood.

If it be previouſly diſſolved in water, it affords leſs nouriſhment than if exhibited ſolid.

It is neceſſary that it remain in the ſtomach for ſome time, in order to its digeſtion; and the only proceſs it can go through in the organs of digeſtion, that is capable of altering its chemical properties, is fermentation. Its fermentation is not attended with effervescence in a healthy ſtomach. Neither is there any vapour found in the inteſtinal canal in health.

If vegetable food be uſed, an acid is often produced, but not in perfect health. This acid is deſtroyed in the duodenum by the bile. If animal food be uſed alone, no acid is produced. But the ſtronger the ſtomach, and the more perfect the digeſtion, the leſs acid is formed from vegetable food.

No ſtage of the putrefactive fermentation takes place, during the converſion of it into chyle and blood, if the digeſtion be perfect.

The fermentation which takes place is peculiar to the organs of digeſtion, and has never been produced by any artificial means yet attempted.

The fermentation, which takes place in the ſtomach, forwards the ſolution of ſolid food in the watery menſtruum: and theſe diſſolve ſooner in the ſtomach than they can be diſſolved in water in the ſame heat, by any means hitherto found out.

If the ſtomach does not act properly, ſolid food remains undiſſolved; vegetable, and mixtures of vegetable and animal ſubſtances become acid; animal ſubſtances putrefy; a quantity of air is ſeparated; and the food is not digeſted and converted into chyle.

Only that part of the food which is digeſted affords nouriſhment; the nouriſhment therefore is in proportion to the food and the digeſtion. But when food, either from its quantity or quality, cannot be digeſted, it is apt to occaſion great diſturbances in the ſyſtem, while it is contained in the ſtomach and inteſtines.

The only ſenſible alterations produced in the blood by different foods, are in its quantity; or in the proportion of ſuperfluous water; or that ſometimes a long uſe of animal food, eſpecially if it be preſerved by ſalt, brings on a degree of putrefaction.

§ 8. *Of the Chyle.*

THE chyle is formed from the food in the inteſtines, and abſorbed by the lacteals.

The whole fluid abſorbed is not chyle, but a mixture of chyle, and the ſolution of thoſe ſubſtances which were ſimply diſſolved in water without being digeſted.

Quere, Whether a ſimple ſolution of mucilaginous, animal, or vegetable ſubſtances can be converted into blood, without being formed into chyle in the ſtomach and inteſtines?

Chyle is fluid while in the lacteals; when expoſed to the air it coagulates; it is rendered white from a mixture of expreſſed oil.

When coagulated, a fluid may be ſqueezed out, which probably contains a coagulable matter, and ſugar.

§ 9. *Of the Fluids ſecreted in the Body.*

The ſecreted fluids either exiſt in the blood-veſſels, being mechanically mixed with, or diffuſed through the other fluids, and require only a mechanical ſeparation; or they do not exiſt in the blood-veſſels, their elements only being contained there: but theſe elements are not combined, ſo as actually to form the ſecreted fluid. It is therefore requiſite that ſome chemical operation ſhould take place in the ſecretory organ, by which the elements ſhall be combined, ſo as to form the matter ſecreted.

The chemical operation, by which they are formed, is fermentation.

The fluids *ſeparated mechanically* are, 1. The matter of the inſenſible perſpiration. 2. The urine. 3. The ſweat. 4. Perhaps the milk. All theſe are *evacuated* from the body.

The fluids *formed* in the *ſecretory organ*, by a chemical operation, are, 1. The mucus. 2. The ſaliva. 3. The pancreatic juice. 4. The ſemen. 5. The bile. 6. The wax in the ear. 7. The ſebaceous matter. 8. The coagulating matter of the ſtomach, &c. Theſe are *retained* and employed in the body.

§ 10. *Of the Inſenſible Perſpiration.*

The matter of the inſenſible perſpiration is ſeparated from the ſurface of the lungs, and from the ſkin by evaporation. The quantity evaporated depends upon the quantity of ſuperfluous water in the blood-veſſels, the heat of the air, the quantity of air applied, and the contraction or relaxation of the veſſels, from which the evaporation takes place.

When the body is in its natural ſtate, that part of the inſenſible perſpiration, which is capable of condenſation, conſiſts of water, with a very ſmall proportion of a mucilaginous matter and eſſential oil, and ſometimes perhaps volatile alkali, and gas.

There is no reaſon to ſuppoſe, that any matter flies off that cannot be condenſed, excepting gas, from any experiment hitherto made; but it is rather probable that there is not.

Should any other ſubſtance, capable of emitting vapour in the heat of the human body, get into the blood-veſſels, or be formed on the ſurface of the ſkin, lungs, or in any of the paſſages of the air in breathing, it may be mixed with the inſenſible perſpiration.

Some of theſe ſubſtances may be putrid vapour, variolous, morbillous, and other infectious matters, alcohol, and other volatile extraneous ſubſtances, &c.

The matters thrown off by inſenſible perſpiration may be evacuated by the other excretions.

The health is not in proportion to the quantity of inſenſible perſpiration.

§ 11. *Of the Urine.*

The urine, in the common ſtate of the body, is a tranſparent browniſh fluid, which, upon cooling, has a mucilaginous matter ſeparated, capable of being redilſolved in heat, which we call the ſeparating mucilage.

In health, this ſeparating mucilage is generally in ſuch quantity as to remain ſuſpended in the urine after its ſeparation, forming what has been called the cloud.

It is ſometimes totally abſent in health, but much more frequently in diſeaſes; ſometimes it is in quantity ſufficient to carry the cloud to the bottom, and form a mucous ſediment; and ſometimes it falls down in a flaky powder, and forms what has been called a lateritious ſediment, which is commonly of a brick colour, and now and then white.

The lateritious ſediment often takes place on the going off of acute diſeaſes; but it alſo happens in health, and while diſeaſes ſubſiſt in their full force, particularly when they affect the urinary paſſages, or parts near them.

Sometimes the ſeparating mucilage is ſeparated in a powder, remains ſuſpended in the urine, and renders it turbid: and after this ſeparation, if the urine be filtrated from it, it is tranſparent, conſiſting of water which contains a mucilage, and ſalts.

1ſt, A *mucilage*, ſimilar to that formed by the firſt ſtage of putrefaction; which is of a browniſh colour, and gives the greateſt part of the colour to the urine. Its quantity varies conſiderably; but the proportion of it in the urine is always ſmall. If the water be evaporated from it, it will redilſolve, and it may be diffuſed through any quantity of water in any heat. It is not coagulable.

2dly, The *ſalts* of the urine are common ſalt, common ſal ammoniac, phoſphoric ammoniac, vitriolic ſelenites, and muriatic ſelenites.

Common ſalt is contained in the urine, in conſequence of its being uſed in the food, or drink; and it is, in ſome degree, in proportion to the quantity uſed. The other ſalts are contained in the urine, independent of any ſaline ſubſtance taken into the body, except perhaps the vitriolic ſelenites.

The quantity of ſelenitic ſalts is commonly very ſmall; but ſometimes the urine is ſaturated with vitriolic ſelenites, which ſeparates, and cryſtallizes, upon the urine's ſtanding to cool. The proportion of the ſalts varies conſiderably, but is always ſo ſmall as to form a diluted ſolution; and this ſolution is generally ſufficiently concentrated to ſtimulate a very irritable part, but not always.

The dilution depends on the quantity of ſuperfluous water in the blood-veſſels, and on the quantity evacuated by the kidneys: ſo that, when the ſecretion is large, the ſolution is generally diluted; when ſmall, more concentrated.

Watery fluids may paſs through the blood-veſſels, and by the kidneys, hardly carrying off any thing with them, eſpecially if large quantities be drunk at a time, and the external veſſels be contracted.

Sometimes calcareous earth is found in the urine, ſuſpended by mechanical mixture, or at leaſt not combined with an acid.

Any extraneous ſubſtance, ſoluble in water, that may get into the blood-veſſels, may be evacuated along with the urine; ſuch as acids, alkalies, neutral and other ſaline ſubſtances; infuſion of rhubarb, and other mucilaginous vegetable juices; bile, pus, and other fluids formed in the body.

If the kidneys be relaxed, or ſtimulated; chyle, ſerum, coagulable lymph, and even the red part of the blood may be thrown out. The red part may alſo be broken down by putrefaction, and paſs off by the kidneys of a very dark colour, diſturbing the tranſparency, and ſometimes forming a ſediment.

If the heart and arteries act more ſtrongly, or frequently, than they do in their natural ſtate, a quantity of expreſſed oil comes away with the urine, and forms a film on the ſurface, or a ring round the veſſel into which it is received.

The urine always contains a portion of the eſſential oil of the urinary paſſages, and ſometimes a portion of their mucus.

§ 12. *Of the Senſible Perſpiration.*

As far as we are capable of judging of the nature of this, from the very ſmall quantity that can be collected, it contains nearly the ſame ſubſtances as the urine; only that, inſtead of the eſſential oil of the urinary paſſages, it is mixed with the

ſebaceous matter of the ſkin, which gives it a degree of whiteneſs, and a ſmell different from that of the urine.

§ 13. *Of the Milk.*

Milk is ſecreted naturally in the breaſts of women, for the nouriſhment of their young, ſometimes during pregnancy, and always after child-birth. There are ſaid to have been inſtances of its being ſecreted at other times, and from other parts of the body. It is a whitiſh fluid, which ſeparates into two parts, upon being left at reſt in a moderate degree of heat: the upper part conſiſts principally of expreſſed oil, with a mixture of the other part, and is whiter and more opaque, and is called the cream. The under part conſiſts of a ſolution of coagulable matter and ſugar, in water; with a ſmall mixture of expreſſed oil, and is called the ſkim milk.

The *expreſſed oil* is fluid in the heat of the human body, but ſolid in the heat of the atmoſphere. It is only mechanically mixed with the other part. It is tinged with, and receives a flavour from, the eſſential oil of the food and of the body. It is found not only in different proportions in the milk of different women, but alſo in the milk of the ſame woman at different times, and even in that which iſſues from the different excretory ducts of the glands of the ſame breaſt.

The coagulable matter only differs from the coagulable matter of the ſerum, in its coagulability, and its proportion to the water. It is not coagulable by a leſs heat than that of boiling water, and by that only, if the water be evaporated from it. It may be coagulated by acids, alcohol, ſeveral metallic and aluminous ſalts, and vegetable juices; but it requires that they ſhould be applied to it in a greater degree of concentration than the ſerum does, in order to its coagulation.

Heat aſſiſts the coagulating power of theſe ſubſtances; and it is readily coagulable by the coagulating juices of the ſtomach, and coagulates in the ſtomach of a living animal, whether any acid be contained in it or not.

The ſugar contained in the milk does not differ in its properties from that of the ſugar-cane, but its proportion is always ſmall; and when a woman makes uſe of vegetable food, it ſeems to be in greater proportion than when ſhe uſes animal. The milk of a bitch, uſing animal food alone, contains ſugar.

If milk be kept for ſome time expoſed to the air, and in the heat of the atmoſphere, or of the human body, the ſugar ferments, and is converted into vinegar, which coagulates the coagulable matter. The ſame change may take place in the breaſt, if it ſtagnate there for ſome time, or if the woman be ſuddenly affected with any of the paſſions of the mind that are attended with anxiety.

If blood be taken from the arm after a full meal, the ſerum is often mixed with a ſubſtance which gives it a degree of whiteneſs and opacity like milk.

The milk is ſecreted after a full meal in larger proportion than after a woman has faſted for ſome time. In the latter caſe, the proportion of the expreſſed oil, coagulable matter, and ſugar, likewiſe diminiſhes, and the milk contains, beſides theſe, the neutral ſalts of the blood, and acquires a bitterneſs from the ſebaceous matter of the glands of the nipples.

In ſome women the milk always contains the ſalts of the blood, or the ſebaceous matter of the nipples; and this not only gives it a bitter taſte, but alſo, ſometimes a yelloviſh colour, and a thicker appearance.

The milk may contain any ſubſtance which is thrown into the ſtomach, ſimply diſſolved in water, and abſorbed by the lacteals, without going through the digeſtive fermentations, and being converted into chyle.

§ 14. *Of the Mucus.*

The ſurfaces of the membranes expoſed to any extraneous matter, ſuch as the ſkin and internal membrane of the mouth, noſe, lungs, œſophagus, ſtomach, inteſtines, urinary paſſages, &c. are covered with mucus.

It is a fluid of an adheſive viſcidity approaching to a ſolid, and of greater viſcidity in one part of the body than in another. It is a compound of a mucilage and water. It is more or leſs viſcid, according to the quantity of water with which it is combined. It is of different degrees of viſcidity in different parts of the body. It will not combine with more water than what is already contained in it: neither can its viſcidity be altered by digeſting it with water, unleſs it begin to putrefy; nor can the more viſcid mucus of one part be converted into the leſs viſcid of another.

If the water be evaporated from it by a gentle heat, the mucilage remains ſolid; if this be immerſed in water, it will abſorb that quantity which evaporated from it, but no more, and it will regain its former fluidity and viſcidity.

It, for the moſt part, contains either no neutral ſalts, or ſo ſmall a proportion as cannot eaſily be rendered ſenſible to experiment. It is colourleſs, inſipid, inodorous, and incapable of ſtimulating.

It combines with concentrated vitriolic, nitrous, and muriatic acids, with concentrated ſolutions of ſome metallic ſalts, and alſo with concentrated or diluted ſolutions of cauſtic alkalies, and cauſtic calcareous earth, forming compounds ſoluble in, and diffuſible through, water.

Acids, and ſome metallic ſalts diſſolved in water and concentrated, but not to that degree as to diſſolve it, alcohol and aluminous ſalts coagulate it. It is alſo coagulable by the heat of boiling water, but not by a leſs degree of heat.

The mucus defends the membranes from being ſo much ſtimulated by any application as they would be, if they were not covered with it.

If the ſecretion be ſuddenly increaſed, the matter ſecreted is often a thin watery fluid, containing the ſalts of the blood, and in conſequence of them capable of ſtimulating; and the membranes are not defended from external applications.

If a greater ſecretion ſhould continue than what naturally takes place, the mucus retains the ſalts, but often acquires a viſcidity, and becomes incapable of being diffuſed through water: its colour, alſo, often grows white, greeniſh, or yellow; and now and then it acquires a ſmell; eſpecially if the mucous glands or membrane be inflamed.

§ 15. *Of the Saliva.*

The ſaliva is ſecreted by ſeveral glands opening into the mouth; and the principal part of it is thrown down into the ſtomach, to anſwer ſome purpoſe in the digeſtion of the food.

It is a fluid of an adheſive viſcidity, with difficulty diffuſible through water. It conſiſts of water, a mucilage ſimilar to that of the mucus, and the ſalts of the blood, but not in ſo large a proportion as they are contained in the ſerum. It contains a larger proportion of water than the mucus.

In its other properties it is ſimilar to the mucus, in as far as they have been inveſtigated.

§ 16. *Of the Pancreatic Juice.*

This ſecretion appears to be ſimilar to the ſaliva, except that it is leſs viſcid, and contains a larger proportion of the ſalts of the blood.

The ſaliva and pancreatic juice are probably watery menſtrua for the ſolution of the food in the ſtomach and inteſtines, their viſcidity preventing them from being abſorbed before they produce that effect.

They have been ſaid to act as ferments during the digeſtion; but as the fermentations of the ſtomach have never been made

to take place out of it, we cannot judge of this by any experiment hitherto communicated to the public.

§ 17. *Of the Bile.*

The blood from which the bile is formed has probably gone through one circulation, without being expoſed to the air in the lungs, or mixed with the fluids brought by the lymphatics from the different parts of the body.

The blood, from which the bile is formed, paſſes through the veſſels of the abdominal viſcera, before it arrives at the liver; but it does not take up any ſubſtance from them, or, at leaſt, not in ſuch a quantity as to be ſenſible to any experiment yet made public; but, on the contrary, it appears perfectly ſimilar in all ſenſible qualities to the blood returning by the veins from the other parts of the body.

There is no appearance of bile in the vena portarum of a living animal.

When bile in the jaundice is contained in the blood-veſſels, it is ſecreted by all the ſecretory organs, and it is evidently contained in all the ſecretions.

The bile is formed from the blood in the ſecretory veſſels of the liver. It runs along the hepatic ducts into the ductus communis choledochus, and from thence partly into the duodenum, and partly into the gall-bladder. It continues for ſome time in the gall-bladder, and becomes more perfect in its properties there; from thence it returns into the ductus communis choledochus, and paſſes into the duodenum.

The bile is a fluid of an oleaginous viſcidity, conſiſting of a ſolution of a ſolid matter in water. If the water be not evaporated from it, no alteration is produced in it by any heat between 32 and 112 degrees of Fahrenheit's thermometer.

The bile in its natural ſtate is diffuſible through any proportion of water: and if the water be evaporated from the ſolid part by a heat not exceeding 112 degrees of Fahrenheit's thermometer, it is then alſo ſoluble in, and diffuſible through, any quantity of water.

The ſolid matter of the bile melts if it be heated, and is decompoſed if the heat be increaſed. If it be diſtilled by itſelf, it yields a larger proportion of empyreumatic oil, than any of the other fluids, except the expreſſed oil, and perhaps the red part of the blood. It is of a yellow colour, and a ſweetiſh bitter taſte.

When it is not combined with more water than it generally is in the gall-bladder, it does not putrefy more readily than the blood; but if it be diluted with water, or watery fluids, it putrefies more readily.

Acids, and ſome of their compounds, decompoſe it, and precipitate from it a reſinous matter. The acidity of the acid is loſt by its combination with the other part; but if more acid be employed than what is neceſſary for the decompoſition, the acidity of the ſuperfluous quantity remains. The matter precipitated has the peculiar ſmell of the animal.

It is ſolid in the heat of the atmoſphere, melts in a moderate degree of heat, and burns very readily. It is not ſoluble in water. It is partly ſoluble in alcohol.

If the paſſage of the bile into the duodenum be ſtopt, acidities are apt to take place in the inteſtinal canal, the periſtaltic motion does not go on properly, the fæces loſe their peculiar colour and ſmell, and often acquire a more putrid fœtor, and the digeſtion is hurt, but not entirely prevented.

The properties of the other ſecreted fluids have not been ſufficiently inveſtigated by experiments, for us to be able to give any ſatisfactory account of them.

Chap. II. Chemical Properties *of the* Animal Solids.

THE animal ſolids are a compound of a mucilage and water. They are naturally flexible; but, if the water be evaporated from them by a gentle heat, they become friable. The water, chemically combined, cannot be ſeparated from them by expreſſion.

Expoſed to about a red heat, they are decompoſed; and if they be diſtilled by themſelves, volatile alkali, empyreumatic oil, water, and calcareous earth, are formed. When free from eſſential oil, blood, and the ſalts of the fluids, they are colourleſs, inſipid, and inodorous.

They differ in their flexibility and elaſticity. Fibres and membranes are readily flexible, not capable of being broken by bending, and have a leſs degree of elaſticity. Cartilage is leſs flexible, capable in general of being broken by bending, and more elaſtic. Cartilage often ſupplies the place of bone in young animals.

Heat, dilute acids, neutral ſalts, alcohol, metallic and aluminous ſalts, aſtringent juices of vegetables, and ſeveral other ſubſtances, coagulate them, i. e. ſeparate part of the water chemically combined, and of conſequence contract them, diminiſh their flexibility, and harden them. Subſtances coagulating the animal ſolids are called aſtringents.

If they be expoſed to a freezing cold, the water freezes; and, upon thawing, their texture is found to be altered.

Concentrated vitriolic, nitrous, and muriatic acids, cauſtic alkalies, even in a diluted ſolution, quick lime, and ſeveral of the metallic ſalts, combine with them into a ſubſtance diffuſible through, or ſoluble in, water; and deſtroy their texture at the ſame time.

They are capable of putrefaction in the ſame manner as the animal fluids.

Chap. III. General Structure *of the* Human Body.

§ 1. *Of the Blood Veſſels.*

THERE are cavities and tubes in the body, viz. the heart and blood-veſſels, in which the red part of the blood, the coagulable lymph, and part of the ſerum and ſuperfluous water, are uſually contained. They conſiſt of the heart, arteries, capillaries, and veins.

The heart conſiſts eſſentially of two cavities, there being two hearts, properly ſpeaking, joined together in the human body, ſerving for two circulations of the blood: one through every part of the body, and one through the lungs.

The left ſide of the heart ſerves for the general circulation, and conſiſts of two cavities, the auricle and the ventricle.

The auricle is a cavity, which opens into the pulmonary veins at one end, and into the ventricle at the other. There is a valve placed at the opening into the ventricle, which prevents any fluid from paſſing from the ventricle into the auricle. The auricle is in part covered with muſcular fibres.

The ventricle is a cavity ſurrounded with muſcular fibres, having one opening into the auricle, and another into a pipe called the aorta or great artery.

At the opening into the aorta there are valves, which prevent any fluid from paſſing from the aorta into the ventricle.

The aorta is a tube which begins at the heart, and, dividing into a great number of branches, goes to every part of the body. It does not divide at once, but branches out as it paſſes along. When it has arrived at any part, and divided into very ſmall branches; theſe open into one another, ſo as to have a free communication every way; from theſe ariſe a ſmaller ſet of tubes, which alſo communicate in the ſame manner; and from them again ariſe a larger ſet, which have like-

wiſe a free communication. The firſt ſet have been called capillary, or anaſtomoſing arteries; the ſecond have not gotten a name; the third have been called capillary veins; but I term all of them capillary veſſels.

From the third ſet ariſe tubes, which terminate in the heart, joining together as they go on towards it, and forming principally two large tubes, which open into the right auricle. Theſe are called veins, and they are ſubject to frequent compreſſion, from the action of the muſcles, and have valves which open towards the heart.

Each artery, capillary, and vein, is nearly cylindrical, but ſomewhat irregular in its diameter.

No red muſcular fibres appear on the arteries, capillaries, or veins in the human body.

Theſe veſſels are all of them elaſtic, and capable of being diſtended, ſo as to contain a larger quantity of fluid than what is neceſſary to render them cylindrical.

Their elaſticity is not ſufficient to overcome the weight of their ſides, and keep them cylindrical, if they be not filled with a fluid, excepting in that part of the aorta neareſt the heart.

When an animal is dead, and no chemical or mechanical change has taken place in the veſſels, the elaſticity is the ſame as when the animal was alive.

When an animal is dead, and the veſſels act by their elaſticity alone, they are incapable of contracting to half the ſize they are of at their utmoſt diſtenſion, ſuppoſing them to continue cylindrical.

When an animal is alive, the blood-veſſels are always cylindrical, excepting when they are compreſſed by a conſiderable external force. They are always full of blood.

When an animal is alive, the veins, capillaries, and ſmall arteries are ſometimes contracted to leſs than half the ſize they are of at other times, which cannot happen from their elaſticity; therefore the veins, capillaries, and ſmall arteries, in a living animal, have a contractile power, independent of their elaſticity, by which they adapt themſelves to the blood, and continue cylindrical. This power is ſimilar to the muſcular power.

When the veſſels contain more blood, they become longer, or their diameter is enlarged, or both; and *e contrario*, when they contain leſs blood, they become ſhorter, or their diameter diminiſhes, or both. The contractile power of the veſſels is capable of diminiſhing either their length or diameter.

When an animal dies, the arteries and veins loſe their cylindrical form, and are flattened, and the capillaries contain leſs blood, ſo that the blood ſufficient to fill the veſſels when the animal was alive, is not capable of filling them after he is dead; therefore

The arteries, veins, and capillaries of a living animal are commonly contracted to a greater degree than they can be by their elaſticity.

The elaſticity is commonly endeavouring to diſtend them, but is always overpowered by the contractile power depending on life, which adapts the ſize of the veſſels to the quantity of blood contained in them.

If the veſſels be emptied to ſuch a degree that they cannot adapt themſelves to the blood, and continue cylindrical, the animal dies. The moſt eſſential effort of the living power is to adapt the veſſels to the blood.

§ 2. *Of the Circulation.*

The blood paſſes from the left auricle of the heart into the left ventricle, from the left ventricle into the aorta, and from thence, by the ſmaller arteries, to the capillaries in every part of the body; from theſe it returns by the veins to the right auricle of the heart. The blood, for the moſt part, moves in one uniform direction in each artery, viz. from the heart towards the capillaries: it alſo moves in one uniform direction in each vein, viz. from the capillaries towards the heart; but although it moves in general from the arteries through the capillaries into the veins, yet its direction in any one capillary may be, and often is, altered and reverſed.

Both the general velocity with which the blood moves through the whole ſyſtem, and the proportional velocity of its motion in particular veſſels, are conſtantly varying.

§ 3. *Of the Powers producing the Circulation.*

The force with which the blood moves in the veins, and the muſcular contraction of the auricle which takes place during the relaxation of the ventricle, propels the blood into the ventricle.

When a certain quantity of blood is propelled into the ventricle, its muſcular fibres contract, being probably ſtimulated thereto by the blood.

This contraction of the muſcular fibres of the left ventricle diminiſhes or obliterates it, and propels the whole, or part of the blood contained in it, into the aorta; the valve placed at the opening of the auricle into the ventricle, preventing its return into the auricle.

When the ventricle has emptied itſelf into the aorta, it relaxes, and receives a freſh quantity of blood from the auricle; the blood being prevented from returning from the aorta by the valves placed at its opening into the heart.

The action of the heart tends to produce an equal and uniform circulation in every part of the body. Yet the circulation doth not depend on the action of the heart alone.

The circulation is not equal and uniform through the whole body; but, the ſame quantity of blood flowing from the heart, a greater proportion of it ſometimes circulates through one part, ſometimes through another.

If the heart be the ſole power propelling the blood forward, the circulation can only be increaſed in any one part by an increaſe in the ſize of the veſſels, or a removal of ſome obſtruction to the circulation there, or a diminution of the ſize of the veſſels, or obſtruction to the circulation in the reſt of the body; and *e contrario*, the circulation can only be diminiſhed in one part by a diminution of the ſize of the veſſels, or obſtruction to the circulation there, or an increaſe of the ſize of the veſſels, or a removal of ſome obſtruction to the circulation in the other parts of the body: but it will appear, from what follows, that without any of theſe things happening, the circulation in a part may be diminiſhed or increaſed, and therefore that the heart is not the ſole propelling power.

The principal cauſes producing an alteration of the ſize of the veſſels, or an obſtruction to the circulation, are, 1. An increaſe or diminution in the diſpoſition to contraction in the capillary veſſels, or in the external preſſure. 2. The meeting of the ſtreams of blood in the anaſtomoſing veſſels. 3. The attraction of the blood to the ſides of the veſſels.

The diſpoſition to contraction in the capillaries of a particular part, or the external preſſure, may be increaſed, ſo as actually to produce a diminution of the ſize of the veſſels of that part, (notwithſtanding the action of the heart,) and by conſequence a diminution of the circulation of the blood in that part.

As the obſtruction ariſing from the meeting of the ſtreams of blood in the anaſtomoſing veſſels depends on, and increaſes with, the velocity with which it moves, it tends to render the circulation in a part equal, by preventing an increaſe or diminution of it.

As the blood is thoroughly mixed in the left ventricle of the heart, and is diſtributed from thence to the different parts, no alteration in its attraction to the ſides of the veſſels from viſcidity, can produce an increaſe or diminution of the circulation in a particular part, unleſs we ſuppoſe it to become more viſcid, in its paſſage through the arteries of that part, which is too quick to allow of ſuch alteration.

It has been ſuppoſed, that a viſcidity in the fluids, or an increaſe of the ſize of their particles, often happened, and produced an obſtruction to the circulation; but this opinion has not been proved, or rendered probable, by any experiment hitherto made public: on the contrary, the red globules appear to be always nearly of the ſame ſize, except when they are broken down by putrefaction: the ſerum and coagulable lymph ſeldom or never appear more viſcid than when in their common ſtate; and, if they were, their viſcidity would affect the ſyſtem equally.

The diſpoſition to contraction in the capillary veſſels, or the external preſſure, may be ſo much diminiſhed, as that, the action of the heart continuing the ſame, the ſize of the veſſels of a part may be increaſed, ſo as actually to occaſion a greater circulation of blood in that part.

If the heart be the ſole cauſe of the circulation, the only material alteration that could take place in the proportion of the circulation in the different parts, muſt depend on an increaſe or diminution of the diſpoſition to contraction in the veſſels, or on an alteration in the external preſſure.

But the circulation may be increaſed in a particular part, the motion of the heart continuing the ſame, by cauſes which do not diminiſh the diſpoſition to contraction of the veſſels of that part, or increaſe the diſpoſition to contraction in the veſſels in the other parts of the body, or produce any effect on the external preſſure; for inſtance, by the application of an infuſion of cantharides. Therefore the heart is not the ſole power which propels the fluids through the part in which the circulation is thus increaſed.

The cauſes capable of increaſing the circulation in a part, are generally ſuch as tend to excite muſcular motion, and are called ſtimuli. Some part of the body brought into action by theſe, is capable of increaſing the circulation independent of the action of the heart. This force muſt reſide in the arteries or capillaries.

The arteries are endowed with a muſcular motion, by which they may increaſe the circulation in a particular part, or aſſiſt the heart in the general circulation of the blood.

The arteries at each contraction of the heart are diſtended; at each relaxation they contract.

This alternate contraction and dilatation might depend on their elaſticity. If their contractions and dilatations depended on their elaſticity, their ſize at their utmoſt contraction in the living body ſhould be equal to that produced by a fluid injected into them, with a force capable of overcoming the reſiſtance the blood meets with in the capillary veſſels, which, in the human body, is probably equal to about eight feet perpendicular height of water.

But their ſize, even at their utmoſt ſtate of dilatation, is leſs than that produced by a fluid injected into them, with a force equal to one foot perpendicular height of water, when the animal is dead. Therefore their contractions and dilatations do not depend on their elaſticity. Or the argument may be taken in this manner; the veſſels, when of the largeſt ſize in the living body, are leſs than they are in the dead body; but as the elaſticity remains perfect in the dead body, they could never be contracted by it in the living.

If the arteries contracted and dilated by their elaſticity, no additional force could be applied from their contraction and dilatation; ſince the heart would loſe more force in diſtending the arteries, than they would re-apply to the blood in contracting.

If the arteries, upon being diſtended by the blood thrown into them by the heart, are excited to a muſcular contraction, and when they have performed this contraction relax, and, like the ventricle of the heart, receive the blood eaſily into them, and, when they are again diſtended, are excited to a ſecond contraction, they may apply an additional force to that of the heart, ſo as to promote the circulation through the whole body.

If ſuch contractions and dilatations be greater in any particular part, they will promote the circulation in that part; in as much as, when they are relaxed to a greater degree, they will ſuffer the blood to paſs through them more readily into the capillaries; and, when they contract, they will empty themſelves more thoroughly into the capillaries.

The arteries have a muſcular contraction and dilatation, ſimilar to that of the ventricles of the heart, by which they apply an additional power to that of the heart, ſo as to promote the general circulation through the whole body, and often to increaſe the proportional circulation in a particular part.

As the capillaries do not contract or dilate alternately, and as the direction of the blood in any one of them is quite undetermined, this additional force cannot depend on their action.

The motion of the blood is regulated by the action of the heart and arteries, and the contraction of the capillary veſſels; and theſe are meaſured by the pulſe.

§ 4. *Of the Pulſe.*

The indications of the pulſe are of great importance in medicine; for by that we can judge of the ſtate of the circulating ſyſtem, the phenomena of diſeaſes, the patient's ſtrength or weakneſs, &c.

It indicates,	by	It is called
1. The ſtrength of the contraction of the heart,	Strength,	Strong.
	Weakneſs,	Weak.
2. The quantity of blood thrown out at each contraction,	Fulneſs,	Full.
	Smallneſs,	Small.
3. The number of contractions,	Frequency,	Frequent.
	Slowneſs,	Slow.
4. The regularity of its action as to ſtrength, quantity or frequency,	Regularity,	Regular.
	Irregularity,	Irregular.
	Intermiſſion,	Intermittent.
5. The ſtrength of the action of the arteries,	Hardneſs,	Hard.
	Softneſs,	Soft.
	Redoubling,	Redoubling.
	Trembling,	Trembling.
6. The irritability of the veſſels,	Quickneſs,	Quick.
	Regularity,	Regular.
	Slowneſs,	Slow.
7. The medium diameter of the arteries,	Dilatation,	Great.
	Contraction,	Small.
8. The quantity of blood in the veſſels,	Oppreſſion,	Oppreſſed.
	Smallneſs,	Empty.
9. The contraction of the capillaries,	Obſtruction,	Obſtructed.
	Freedom,	Free.

This table needs no explanation; yet it is in fact no eaſy matter, in many caſes to make the proper diſtinctions. In attempting to decide on the ſtate of the pulſe, it is of importance too, to know the uſual pulſations of the patient when in health; as theſe differ materially in different ſubjects.

§ 5. *Of the Structure of the Lungs.*

There is one set of vessels in the lungs, which contain air, and another which contain blood.

Air vessels.—These consist of a pipe, called the trachea; one end of which opens into the throat, and communicates with the atmosphere by the nostrils and mouth; the other divides into branches which go to every part of the lungs, and whose ends open into small cavities or cells.

The air in the lungs is generally in motion; for either that which is at present contained in the cells, is passing through the trachea into the atmosphere, or a fresh parcel is passing from the external atmosphere, through the trachea, into the cells.

The whole of this compound motion is called respiration: when the air is passing in, it is called inspiration; when it is thrown out, expiration.

When the thorax is enlarged by the action of one set of its muscles, the pressure of the external atmosphere forces the air into the lungs; the other set of muscles, which contract the thorax when put in action, force the air out of the lungs into the atmosphere. But the pressure of the atmosphere on the surface of the body counterbalancing its pressure on the surface of the lungs, neither the muscles of inspiration, nor those of expiration, are assisted or counteracted by it.

If the air continues at rest in the lungs for many minutes, or if a man continues to respire the same air, or if he breathes air that hath served for the inflammation of fuel, or pure fixable air, or any other vapour excepting respirable air, he dies.

Some vapours kill immediately if taken into the lungs, independent of their being unfit for respiration.

§ 6. *Of the Blood-Vessels of the Lungs.*

The blood vessels of the lungs consist of two sets, viz. the *pulmonary*, and the *bronchial*.

1. *Pulmonary vessels.*—The right side of the heart is similar to the left, excepting that both the auricle and the ventricle have fewer muscular fibres, and that the auricle receives blood from the venæ cavæ, and the ventricle throws it into the pulmonary artery.

The pulmonary artery begins at the right ventricle of the heart, and goes from thence to every part of the lungs, in the same manner that the aorta goes to every part of the body.

When the pulmonary artery hath divided into very small branches, these do not open into one another, and form anastomosing vessels like the small branches of the aorta; but they join again, and form veins, which, uniting together, go to the left auricle of the heart commonly in four trunks.

In its course through the pulmonary vessels the blood passes from the right auricle into the right ventricle, from the right ventricle into the pulmonary artery, from the pulmonary artery into the pulmonary veins, and from the pulmonary veins into the left auricle.

The powers propelling the blood through the lungs are these:—The right auricle contracting, propels part of the blood contained in it into the right ventricle, and is assisted by the force with which the blood moves in the veins.

The muscular fibres of the right ventricle being stimulated to contract when it is full, propel part or the whole of the blood contained in it into the pulmonary artery, the blood being prevented from returning into the auricle by the valve placed at the opening of the auricle into the ventricle.

After the ventricle has contracted, it relaxes, and receives the blood from the auricle, it being prevented from returning from the pulmonary artery by the valves placed at the opening of the pulmonary artery into the ventricle.

The blood is thrown by the right ventricle through the pulmonary artery and veins into the left auricle.

Perhaps the pulmonary artery hath a muscular power similar to the muscular power of the other arteries, by which it promotes the circulation of the blood through the lungs.

The blood meets with the same obstructions in its passage through the lungs, that it does in its passage through the other parts of the body, excepting that, there being no anastomosing vessels, there is no obstruction from the streams of the blood meeting in them, and opposing each other's motion.

The blood meets with some additional obstructions in its passage through the pulmonary vessels, besides those it meets with in the other parts of the body, viz. 1st. The motion of the lungs in respiration, as there are no valves in the vessels, tends to retard the circulation, although the reverse hath been asserted. 2dly, If a sufficient quantity of respirable air be not received into, and thrown out of the lungs, the motion of the blood in the pulmonary vessels is considerably retarded. *Quere*, Does not the life depend on a portion of respirable air, taken into the blood from the lungs, and constantly carried to every part of the body?

2. *Bronchial vessels.*—An artery arises from the aorta, and spreads itself through the lungs, terminating in anastomosing capillary vessels, which open into veins, in the same manner as the other branches of the aorta in other parts of the body.

The blood circulates in these vessels in the same manner as in the other vessels, arising from the aorta in other parts of the body.

Quere. Is not therefore the air only capable of being taken into the blood, by the pulmonary vessels, spread on the cells of the lungs, so as to support the life in the lungs themselves, as well as in the other parts of the body?

§ 7. *Of the Extravasation and Absorption of the Lymph.*

During the blood's circulation, part of the superfluous water and serum is continually passing through the sides of the vessels, particularly the capillaries, into the cellular membrane, and all the cavities of the body, so as to keep their surfaces moist. The fluids commonly extravasated have been called the *lymph*.

It has been supposed that they passed through tubes appended to the sides of the blood-vessels; but such vessels have never been demonstrated, nor is there any reason for supposing that they exist, excepting in the glands.

It is uncertain whether the lymph passes through the accidental pores in the sides of the vessels, or by cylindrical organised holes; but it is most probable that it passes through organised holes, as the secretion is regular and constant. The pores or vessels it passes through are called *exhalants*.

The lymph is absorbed by the lymphatics, which are tubes nearly cylindrical, divided by valves, so as to give the resemblance of joints. These arise from the cellular membrane, and cavities, and the greatest part of them go to the thoracic duct.

The valves allow the lymph to pass from the cavities to the thoracic duct, but prevent its passing from the thoracic duct to the cavities.

The lymphatics, in passing from the cavities to the thoracic duct, go through the lymphatic glands; the structure and use of which are not as yet ascertained.

The thoracic duct is a tube, which begins near the diaphragm, and commonly terminates in the left subclavian vein. At its opening into the left subclavian vein, there is a valve which allows the lymph to pass from it into the vein, but prevents the running of the blood from the vein into the thoracic duct.

Some of the lymphatics terminate in veins, which are ſimilar in their ſtructure to thoſe which terminate in the thoracic duct.

§ 8. *Of the Powers producing the Extravaſation and Abſorption of the Lymph*

THE contractile power of the blood-veſſels ſqueezes the lymph into the cellular membrane and cavities.

The quantity thrown out is in proportion to the force of the circulation, the fluidity of the ſubſtances contained in the blood-veſſels, or the quantity of the more fluid ſubſtances, and the degree of contraction of the capillaries and exhalants.

The joint of a lymphatic opening into a cavity, endeavours to fill itſelf from that cavity by its action as a capillary tube, the valves preventing the return of the lymph from the other part of the lymphatic. In like manner, a lymphatic may fill itſelf entirely from the cavity in which it terminates; but its action as a capillary tube will not tend, in the ſmalleſt degree, to propel the lymph into the veins.

It is moſt probable, that the joint of the lymphatic, next to the cavity, having abſorbed a ſufficient quantity of lymph to fill it, is ſtimulated to contract and propel the fluid into the next joint, and ſo on to the thoracic duct, or vein in which it terminates; and having emptied itſelf, and being relaxed, it fills itſelf again from the cavity, and ſo continues to act: for there is apparently no other power in the body capable of producing a regular flow of the lymph through the lymphatics into the blood-veſſels.

For in a living animal, where the veins are contracting, and preſſing upon the blood, if one end of a capillary tube terminate in a vein, and the other in a cavity; and if there be no action in that tube, excepting that which ariſes from its being a capillary one, or from the motion of the blood in the vein; if there be any motion in that tube after it is full, it will always be from the vein into the cavity, and never from the cavity into the vein, let the tube be of any ſize or ſhape whatever.

Further; the alternate preſſure of the lymphatics, ariſing from the alternate contractions and relaxations of the blood-veſſels, or muſcles, is not ſufficiently powerful, univerſal, or equal, to produce a regular flow of the lymph through the lymphatics into the blood-veſſels.

Neither does the cellular membrane and cavities force the lymph into the lymphatics, and through them into the veins.

The extravaſation of fluids from the blood-veſſels into the cellular membrane and cavities, and their reabſorption, generally take place in the above manner.

Sometimes the coagulable lymph is thrown out by the exhalants; and then it moſt commonly coagulates.

If it coagulate, it cannot be taken up by the lymphatics, till it be redilſolved, which happens in many caſes; and it is then abſorbed much ſooner than it can be rendered ſoluble in water, by putrefaction when out of the body. At other times it continues in the cavity for many years.

The red part of the blood is alſo ſometimes thrown out by the exhalants. In this caſe, its particles are broken down probably by the firſt ſtage of putrefaction, and it is afterwards reabſorbed. The ſame things may happen, if the red particles and coagulable lymph be extravaſated in conſequence of the rupture of a blood-veſſel.

In particular parts, as in the corpora cavernoſa penis, the extravaſation and abſorption are probably performed in a different manner, and by different veſſels.

All abſorbent veſſels muſt have a power of propelling the fluids into the blood-veſſels, ſufficient to overcome the force of their contraction, by which they endeavour to propel the blood out of any opening.

§ 9. *Of the Properties depending on the Life.*

INANIMATE matter is endowed with properties which are peculiar to, and diſtinguiſh its different ſpecies from one another, and theſe are called chemical.

Figure, motion, and other accidental circumſtances, may give to any ſpecies of matter indiſcriminately other properties, and theſe are called mechanical.

Animated matter of the ſame ſpecies may have new or different chemical properties, or loſe ſome of thoſe it had when inanimate, in conſequence of life, and which are immediately altered when it is deprived of it. In animated bodies, there are alſo powers of action, and laws of motion, different from thoſe mechanical ones found in inanimate matter; and there are alſo other properties, which have no reſemblance of chemical or mechanical. All theſe we call the properties depending on life.

§ 10. *Of the Heat of the Body.*

THE bodies of quadrupeds have a diſpoſition to maintain the ſame degree of heat nearly, and the heat of the ſame ſpecies is generally the ſame, eſpecially in mankind, who are included in the claſs of quadrupeds by natural hiſtorians.

The common heat of the human body in health, is 98 degrees of Fahrenheit's thermometer.

The heat is the ſame throughout the whole body, excepting that a cold ſubſtance applied to the ſkin diminiſhes its heat: and the heat of the blood, flowing from an opened vein in a limb that is expoſed to a cold atmoſphere, is reduced two or three degrees.

Otherwiſe the heat continues the ſame, whether that of the atmoſphere, or other ſurrounding bodies, be greater or leſs than ninety-eight degrees, unleſs when it produces a diſeaſe, the conſequence of which is an increaſe or diminution of the heat of the body.

The body is capable of reſiſting different degrees of external heat or cold, according to the habit it has acquired. There are inſtances of its bearing 20 degrees below 0 of Fahrenheit's thermometer, with very moderate clothing, and 115 above, without alteration. The heat may be increaſed or diminiſhed by alterations in the body itſelf, eſpecially in diſeaſes. It has ſeldom been obſerved to be leſs than ninety-four, or more than a hundred and ten degrees of Fahrenheit's thermometer.

An increaſed action of the living power in any part, or in the whole body, increaſes the heat; and *e contrario*, a diminution of the action of the living power diminiſhes the heat, either in the quantity produced in a given time, or the degree. It is known that the bodies of living animals have a power of ſometimes heating a larger, ſometimes a leſs quantity of ſurrounding matter, although they continue themſelves of the ſame degree.

Fluids rubbing againſt ſolids, or very ſmall particles of a ſolid immerſed in a fluid rubbing againſt one another, or againſt a ſolid, produce no ſenſible heat; therefore, neither the friction of the blood againſt the veſſels, nor the friction of the red particles againſt one another, or againſt the veſſels, produces, maintains, or regulates the heat of the body.

It has not been proved, by any experiment hitherto made public, that the fermentations producing or deſtroying the fluids generate heat: and if it were, theſe fermentations do not go on ſo regularly, univerſally, or conſtantly, as to produce, maintain, or regulate the heat of the body.

The heat is not at all in proportion to the evaporation, as a double quantity evaporated by the inſenſible perſpiration makes no alteration in the heat.

The power which produces, maintains, and regulates the heat of the human body in health, produces heat when the ſurrounding ſubſtances are heated to a leſs degree than 98 of Fahrenheit's thermometer, and cold when they are heated to a greater degree.

§ 11. *Of the Nervous Syſtem.*

THE brain is a ſoft maſs, internally of a white colour, externally of a greyiſh or aſh colour. It is furniſhed with blood-veſſels in the ſame manner as the other parts, excepting that larger arteries anaſtomoſe, and the ſmaller veins enter more ſuddenly into a large trunk, whoſe ſides are of a firmer texture. In the more perfect or complicated animals it is contained in the cavity of the ſkull. In man it is in a larger proportion to the whole body, than in any other quadruped, or any bird or fiſh hitherto known.

From the white part maſſes of fibres ariſe, which go to every part of the body. Theſe are called nerves. One large maſs paſſes down through the cavity of the ſpine, and is called the ſpinal marrow. A little of the cineritious part is contained in the middle of this, and alſo in the optic nerves.

The brain, ſpinal marrow, and nerves, are covered with membranes of a very firm texture.

The nerves proceed from the brain in trunks, which branch out as they paſs to the different parts of the body. Upon examining the trunks with a microſcope, they appear to conſiſt of very ſmall fibres, which in the branching are only ſeparated from one another. In their paſſage the branches ſometimes join again, forming roundiſh maſſes call ganglions, and ſometimes a kind of net work, from whence they proceed to the different parts. When they divide into very ſmall branches, they have been ſuppoſed to become ſofter, and ſeem to go to every the ſmalleſt part.

CHAP. IV. *Of the* SENSIBILITY, MOBILITY, *and* IRRITABILITY *of the* BODY.

THE *ſenſibility* is a property of the body, by which applications to it excite ſenſations in the mind. *Mobility* is an original power of motion, by which certain parts of the body are capable of moving themſelves without any external motion impreſt. The *irritability* is a property of the body, by which applications to particular parts excite a motion in the moveable parts, independent of the motion impreſt.

1. *Senſibility.* The ſenſibility depends on a part's being connected with the brain by the nerves; for, if the nerves going to any part be cut through, the ſenſibility is loſt. If the nerves going to any part be moderately compreſt, the ſenſibility is diminiſhed; and if the nerves be compreſt ſtrongly, the ſenſibility is loſt. If the preſſure be ſoon removed, the ſenſibility recurs. If the preſſure be continued for a long time before it is removed, the ſenſibility returns more ſlowly, or not at all.

Preſſure on the brain may diminiſh the ſenſibility of the whole body. If a ſmall branch of a nerve be cut through, ſo as to take off the ſenſibility of a part of the ſkin, it may be reſtored in time. The ſenſibility may be impaired, or loſt, without any ſenſible preſſure on the nerve, or alteration of its ſtructure.

When there is no wound in the body, the ſenſations generally appear to be in the place where the application exciting them is made. But to this law there are many exceptions.

If an extremity be cut off, an application made to the ſtump may produce ſenſations, which appear to be in the part amputated.

A ſenſation may be excited apparently in a part by an affection of the nerve going to it, the body being whole. An application made to one part, may excite a ſenſation in another, when there is no apparent communication between the nerves going to them.

Every part of the body is capable of ſenſation in a ſound or morbid ſtate. The bones and cartilages do not appear to be ſenſible in a ſound ſtate, whatever application be made to them; but in a morbid one they may become ſenſible. All the other parts of the body appear to be ſenſible in a ſound ſtate; for the diſtenſion of a part conſiderably beyond its preſent diſpoſition to contract, either by its muſcular power or elaſticity, is capable of exciting ſenſations in every other part of the body.

There are applications which are capable of exciting ſenſations in one part, that produce no ſuch effect in another.

Some of the ſenſible parts are only capable of ſenſation from diſtenſion in a ſound ſtate, ſuch as the membranes. One part may be ſenſible to an application to which another is not, and the ſecond part may be ſenſible to another application to which the firſt is not; as the effluvia of muſk do not affect the eyes, although they affect the noſtrils; and the rays of light affect the eyes, but not the noſtrils. Some parts of the body are only capable of the ſenſation of pain; others are capable of various ſenſations, of which pain is always one.

Some applications are capable of exciting pain only; others may excite various ſenſations. Every ſenſation, excited in a very great degree, is painful, and ſeveral are alſo painful from being very weak.

Thoſe parts of the body which are capable of a variety of ſenſations are generally called the organs of the ſenſes. Theſe are, the ſkin, the mouth, the noſtrils, the eyes, the ears: the ſtomach is capable of ſeveral ſenſations beſides pain, but not of ſo great a variety as the organs of the ſenſes. Some other parts of the body are alſo capable of ſome ſenſations not painful.

All the ſenſible parts may have their ſenſibility increaſed or diminiſhed.

2. *Mobility* and *irritability.* Parts capable of original motion are called the moving parts. In many parts capable of original motion there are red fibres called muſcular fibres; but in ſome of the parts capable of original motion no ſuch fibres have hitherto been demonſtrated.

All the parts of the body are not capable of original motion. The muſcles, blood-veſſels, lymphatics, ſecretories of the glands, and ſkin, are capable of original motion.

The moving parts are capable of contracting beyond that degree of contraction which would ariſe from their elaſticity.

All the actions of the body, and all the power which it exerts, depend upon the contraction of the moving parts. *Quere*, May not the contraction or coming nearer one another of the particles of a moving part be called the attraction of life?

When a muſcular fibre, or any other moving part, continues in action for a conſiderable time, it does not in general exert one continued contraction, but a number of alternate contractions and relaxations. The relaxations, when the body is ſtrong, or the whole ſtrength is not exerted, are often hardly diſtinguiſhable; but when the habit is weak, or the whole force exerted, they become very apparent. A contraction may however probably continue for a very long time, without any intermediate relaxation; as a ſpaſm.

When any motion takes place in conſequence of a relaxation, it is from the elaſticity or weight of the part, or from ſome external power.

The original motions are produced by volition, ideas of the mind, or certain external applications called ſtimuli.

There muſt be the ſame intercourſe, which is neceſſary for ſenſation, between the moving part and the brain, by means of the nerves, to render volition capable of exciting a motion in it.

Many of the moveable parts are incapable of being put in motion by the will. The will indeed may acquire a power over a moving part, which it could not affect originally.

An idea of the mind may excite a motion independent of, and contrary to, the will, provided the part be connected with the brain by the nerves.

The motions excited by the will are called *voluntary* motions: thoſe excited by ideas or ſtimuli, independent of, or contrary to, the will, are called *involuntary* or ſpontaneous. All the parts of the human body capable of voluntary motions have red muſcular fibres.

The will and ideas are both capable of producing contractions and relaxations in the moving parts.

If the communication between the brain and a moving irritable part be cut off, by cutting through the nerve, a motion may be ſtill excited in it by a ſtimulus: hence ſtimuli may excite motion without affecting the brain; and therefore all the motions excited by them are not begun in the brain, and carried along the nerves to the moving part.

If a nerve be cut through, ſo as to leave a portion of it adhering to a moving part, a ſtimulus applied to the part of the nerve adhering may excite a motion in the moving part. Hence the action of a nerve upon a part may excite a motion in it; and the motions excited by the nerves do not all ariſe in the brain.

If the communication between the brain and a moving part by the nerves continue, a ſtimulus applied to the brain may excite a contraction of the moving part.

When a ſtimulus produces a contraction in a moving fibre, the force of that contraction is often far greater than the force with which the ſtimulus was applied. Therefore, when a ſtimulus excites a motion, it is not in conſequence of a communication of the power employed in applying that ſtimulus: nay, the motion may be the very reverſe of that which would have been produced by the exertion of that power.

When a ſtimulus, applied to a nerve, produces a contraction in a moving fibre, it is a queſtion whether the motion is excited in the nerve, and communicated to the fibre, or produced immediately in the fibre, without any motions being excited in the nerve: for in this laſt there is often no apparent motion excited.

It has been conjectured by ſome, that the motion was communicated by a fluid flowing through the nerves as tubes; by others, that it was communicated by vibrations; and by others, that it ariſes from an elaſtic vapour ſurrounding the nerves; but none of theſe conjectures are founded on experiment, neither are any of them any ways capable of accounting for the appearances.

As the influence of a ſtimulus on a moving fibre is not occaſioned by any mechanical communication of motion, may not a ſtimulus, applied to a nerve, exert its influence on a contractile fibre, without any mechanical communication, by any motion running along the nerve?

If the brain be not diſeaſed, and two parts of the body communicate with it by the nerves, as for ſenſation, an application made to one of theſe parts may excite a contraction or relaxation in the other, although none of the ſubſtance applied be carried from the one to the other, and although no ſenſation be excited by the ſtimulus. Hence a medicine, applied to one part of the body, may produce an effect upon another, although none of that medicine be carried to the part on which that effect is produced.

The effect of an application upon a part at a diſtance from that where it is made, may be the ſame which it would have produced if applied to that part, or it may be the reverſe, or totally unconnected with it. *Quere*, May not the application in this caſe influence the diſtant part, without any communication from a mechanical motion running along the nerves of the one part to the brain, and from the brain by the nerves to the other part? Or, in other words, May not the influence be ſimilar to that which exiſts between the earth and ſun, or any other ſubſtances which act on one another, without any apparent connection by matter?

An application to one part may produce a motion in another, although it would have had no effect if it had been made to the part itſelf.

A ſtimulus applied to a part incapable of original motion may excite a motion in a moving part at a diſtance.

If the communication between the brain and any part of the body, by means of the nerves, be cut off, application made to that part will not affect the other parts, nor will application to the other parts produce motions in that; unleſs the nerves be cut off from a muſcle whoſe fibres have been accuſtomed to contract at one and the ſame time, ſuch as the heart. In that caſe, if you ſtimulate one of theſe fibres, the whole are brought into immediate contraction; thoſe not ſtimulated contract, to all appearance, as ſoon as the one to which the ſtimulus is applied.

As in this caſe the communication between the fibres by the nerves is cut off, and as, after cutting through the nerves of a ſmall part of the body, the ſenſation may in time be reſtored, is there not a communication of living influence between the parts that are in contact, independent of the nerves?

The motions produced by the application of ſtimuli to moving and irritable parts are apparently the ſame, whether the part be connected with the brain by the nerves or not; excepting that the motions excited become more languid, after the moving part has been ſeparated ſome time from the brain, and at laſt the power of motion in it is entirely loſt in quadrupeds.

The ſame things are true of the motions excited by the application of ſtimuli to the nerves going to a moving part. Hence, it is probable, that the motions, excited by the application of ſtimuli to a moving and irritable part, or to the nerve going to a moving part, do not ariſe in the brain, but immediately in the part; the brain in this caſe only keeping up the life of the part, and rendering it capable of motion.

The parts on which ſtimuli are capable of acting, ſo as to produce motion, are called the *irritable* parts. All the parts of the body are irritable in a ſound ſtate, excepting the bones, cartilages, and tendons: and all the parts of the body may become irritable in a morbid ſtate.

Stimuli may produce motion in a diſtant part, when applied to a part incapable of original motion; or, in other words, all the irritable parts are not moving parts.

An application that produces relaxation, or diminiſhes contraction, is called a *ſedative*. A ſubſtance may act on one part as a ſtimulant, on another as a ſedative: and a ſubſtance may act on one part as a ſtimulant or ſedative, and have a leſs effect, or none at all, when applied to another, although otherwiſe equally irritable. Such ſtimuli are called ſpecific.

There are ſome parts upon which ſtimuli in general produce greater effects than they do upon others. A greater number of ſubſtances act alſo upon theſe parts. The membranes, ligaments, and blood-veſſels, excepting the heart, are incapable of being affected by any other ſtimulus but diſtenſion.

Some of the applications capable of affecting the moving parts, tend to deſtroy the fibres by mechanical or chemical effects; ſome of them have no particular mechanical or chemical power of action.

The irritability and mobility of a part may be increaſed, diminiſhed, or entirely loſt.

Chap. V. *Of* Custom *and* Habit, *as affecting the* Human Body.

CUSTOM is the frequent repetition of any application to the body, capable of affecting the ſenſible or irritable parts; or it is the repetition of any action or motion of the body. Habit is the effect of ſuch repetition.

An application, producing a ſenſation, may have its power increaſed or diminiſhed by cuſtom. If the mind pays particular attention to any impreſſion, its force and diſtinctneſs is increaſed. Hence ariſes the improvement of the eye, ear, &c. in diſtinguiſhing objects in painting, tones in muſic, &c. If the impreſſions are very ſtrong, ſo as to excite great attention,

their force is increaſed. If the impreſſions are not attended to, their force is diminiſhed. Hence, after living for ſome time near any thing producing a great noiſe, the noiſe is ſcarcely heard.

The power of the will, in producing motion, may be increaſed by cuſtom, and diminiſhed by diſuſe. The will, in frequently producing a motion, may not only have its power increaſed, but it is alſo capable of producing that motion with greater accuracy, and by frequent attempts may acquire a power over a moving part, upon which it has naturally little or no influence.

A motion may ariſe from a volition in conſequence of cuſtom, which was not naturally connected with it; as a man in turning in a lathe does not will the motion of his hand, but that of the end of the chiſel. *Quere*, Can a man produce two diſtinct motions by his will at once; or, when two diſtinct motions are produced, does the will produce them ſucceſſively? the impreſſion ariſing from one volition remaining till the mind renews it, after having produced the other, in the ſame manner as the impreſſion of a flame making a circular motion, remains on the eye, ſo as to give an idea of a complete circle.

The power of producing two diſtinct motions, apparently at the ſame time, is greatly increaſed by cuſtom

From the above circumſtances the facility of execution acquired by cuſtom ariſes.

The power of an idea in exciting motion, may be increaſed or diminiſhed by cuſtom. An idea ſtrongly impreſt on the mind, is for the moſt part more powerful in exciting a motion, than one weakly impreſt. The power of an application in impreſſing an idea, may be increaſed or diminiſhed by cuſtom, as is above deſcribed, and of conſequence the power of an idea in exciting motion.

Suppoſing the impreſſion on the mind the ſame, if an idea has frequently produced a motion, its power is increaſed. On the contrary, if an idea has been often excited, and if the motion depending upon it has by any means been prevented, its power is diminiſhed or loſt.

The action of an application producing, diminiſhing, or altering the mode of contraction of a moving part, and which at the ſame time has no effect on the mind, may be increaſed or diminiſhed by cuſtom.

If it be often applied, ſo as always to produce its effect, its power, or the certainty of its action, is for the moſt part increaſed.

An application of an equal apparent force does not always produce the ſame effect. If the ſame quantity of ipecacuanha be twice exhibited at the interval of ſeveral days, it may vomit at the firſt exhibition, and not at the ſecond; or it may produce vomiting at the ſecond exhibition, and not at the firſt.

In applying medicines, which do not act as ſimple ſtimuli, their particular effect cannot be increaſed by increaſing the doſe, they being converted into ſimple ſtimuli. Thus ſmall doſes of ſaccharum ſaturni produce coſtiveneſs, but a very large doſe frequently purges. There is a maximum in the doſe of all medicines, ſo that if they be exhibited in greater quantity their effects are loſt inſtead of being increaſed.

An application frequently repeated, ſo as to produce its proper effect, often becomes more conſtant and uniform in its action, although it may become neceſſary that it ſhould be applied in a greater degree.

If an evacuating medicine be repeatedly exhibited, it generally requires a larger doſe at the ſecond, and ſome of the ſubſequent exhibitions, to produce the ſame effect as the firſt; but if theſe produce the effect, the power of the medicine is afterwards increaſed.

The more violent the effect of any application, the more is its power increaſed by repetition. If an application be made in ſo ſmall a degree as not to produce any effect, or if its effects are by any means counteracted, its power is diminiſhed or loſt. The repeated application of ſome medicines in any circumſtance diminiſhes their powers.

All the natural powers of action in the body are increaſed by frequent exertion. If two or more fibres have been accuſtomed to contract together, either by the action of the will, by an idea, or by ſtimuli; or if the contraction in one of them be produced by the will, while the other is brought into action at the ſame time by a ſtimulus, the producing of a contraction in the one by an application to it alone, will produce a contraction in the other. If they be fibres of the ſame muſcle, and acted upon by a ſtimulus, this will happen after the communication with the brain by the nerves is cut off.

If, after this habit is acquired, one of theſe fibres is made to contract frequently, while the other is prevented from contracting, the habit will be loſt or deſtroyed.

If any motion, or ſtate of the body, be repeated at a particular period of time, it will often return at that period, although no other cauſe be applied but the habit acquired.

A habit may be deſtroyed by counteracting and preventing its effects. Two habits may be ſo connected, that preventing the one from taking place, may prevent the effects of the other. Cuſtom has alſo a powerful influence on the mind.

Chap. VI. *Of* Exercise, Rest, *and* Sleep.

WHEN a moving part is brought into action by the will, an idea or ſtimulus, that action ſometimes ceaſes upon removing the cauſe, ſometimes it continues after the cauſe is removed. This laſt frequently happens in the production of diſeaſes.

When it is neceſſary for the continuation of an action, that its cauſe ſhould be continually or repeatedly applied, the original power ſeems gradually to be exhauſted, ſo that the motions for the moſt part become gradually weaker, and at laſt are not to be produced, as in the caſe of exerciſe.

There are ſome actions which are neceſſary for life, that are continued by the application of ſtimuli, and nevertheleſs do not apparently exhauſt the original power; ſuch as the action of the heart, the periſtaltic motion of the inteſtines, &c.

If theſe actions are increaſed beyond their common pitch, or beyond what can be allowed by the preſent ſtrength of the ſyſtem, they alſo exhauſt the original power. Thus, a great exertion of the faculties of the mind alſo, exhauſts its powers. Reſt however reſtores both to the body and mind their powers of action.

In perfect ſleep, both the body and mind are at reſt, excepting in thoſe particulars where an exertion is neceſſary to life. Theſe exertions are in the alternate contractions of the heart and arteries, the motion of the muſcles in reſpiration, the tone of the muſcular fibres, blood-veſſels, and other moving parts, the action of the lymphatics and ſecretory and excretory ducts of glands, the periſtaltic motion of the inteſtines, &c.

The common exertions of the body and mind, when a man is awake, exhauſt to ſuch a degree, as to require that reſt which is found in ſleep, to allow the original power to recruit itſelf.

In ſleep the mind is often brought into action, ſometimes from affections of its own, ſometimes from affections of the body. The body alſo often exerts other powers beſides thoſe neceſſary for life. In theſe caſes the original power is leſs recruited, and that in proportion to the exertion.

Although the original power may be ſo far exhauſted as to require to be recruited by ſleep, that ſtate may nevertheleſs be prevented by any thing exciting great attention of the mind, by applications to the body producing uneaſineſs or pain, or by an increaſed action of any of its parts, or by any action or contraction which continues after its cauſe is removed.

The ſame cauſes may render ſleep leſs perfect, although not ſufficient to prevent it altogether.

Although reſt is not complete at the beginning of ſleep, it has a tendency to become ſo during this ſtate of the body. In particular, all actions and contractions remaining after their cauſe has been removed, are apt to go off.

During ſleep the original power appears to be ſo much accumulated, as to give a diſpoſition to action, both to the mind and body, from the ſlighteſt cauſe, and this ſtate of the ſyſtem goes off of courſe.

At the beginning of ſleep, the reſt is generally leſs perfect; it becomes gradually more ſo for a certain time afterwards. When the original power is recruited, the mind begins to be put in action, and at laſt the whole ſyſtem, at which time ſleep goes off.

A continued or ſtrong action of one part of the body may not only exhauſt the original power in that part, but alſo in all the others.

A great exertion of powers of the body may exhauſt the powers of the mind; and *e contrario*, a great exertion of the powers of the mind may exhauſt thoſe of the body.

A frequent exertion of the original power in one part of the body tends to ſtrengthen that part, but to weaken the others.

An exertion of the original power increaſes the loſs of fluids, and renders a greater quantity of food neceſſary. Hence animals that require a conſiderable quantity of nouriſhment when awake, may ſleep for ſeveral months without any being taken in.

A loſs of fluids generally increaſes the powers of digeſtion, excepting when they are diſordered by diſeaſe.

A moderate exertion of the powers of the body, in proportion to the preſent ſtrength, powers of digeſtion, food, and ſleep, tends to ſtrengthen the whole body.

A violent or continued exertion of the original power, either in the mind or body, if it be not recruited by food and ſleep, may weaken to that degree as to kill.

A repeated exertion of the powers of the mind tends to ſtrengthen its faculties, but at the ſame time to weaken the original power in the body.

Unleſs the body be endowed with a certain degree of ſtrength, the mind cannot exert itſelf powerfully.

Exerciſe of the powers of the body tends to weaken the mind, except ſo far as is neceſſary to give the body the proper ſtrength.

But a moderate exerciſe of the body and mind together tends to ſtrengthen the whole ſyſtem, ſo that by cuſtom the original power in the whole may be increaſed.

Man differs from all other animals in this, viz. all other animals have their faculties naturally as perfect, without any improvement, as they can be, for their own uſe: but in man the natural faculties are but juſt ſufficient for his exiſtence, and that only in a ſmall part of the earth. It is therefore left to himſelf to procure faculties, both of the body and mind, by proper exerciſe, by which he can excel all other animals in every power, inhabit the whole earth, and improve the powers of other animals for his own uſe.

PRACTICE OF MEDICINE; OR, AN ACCOUNT OF THE PRINCIPAL DISEASES TO WHICH THE HUMAN BODY IS SUBJECTED.

WE have already defined medicine to be the art of preventing, curing, and alleviating, thoſe diſeaſes to which mankind are ſubjected. While theſe affections, however, are in number almoſt infinite, each in its progreſs is ſubjected to almoſt endleſs varieties from differences in climate, conſtitution, treatment, and a variety of other particulars.—Hence we may readily explain both the difficulty of diſtinguiſhing morbid affections from each other in actual practice, and the diverſity of names which have been affixed to them in the writings of ancient phyſicians. It may readily be ſuppoſed, that in this as well as other ſubjects, there has been a gradual improvement from the progreſſive labours of induſtrious and ingenious men. And although much yet remains to be done in the proper arrangement and diſtinction of diſeaſes, or what has been called *methodical noſology*, yet there cannot be a doubt, that during the courſe of the preſent century this ſubject has received very great improvements. For theſe, we are in the firſt place highly indebted to the labours of Franciſcus Boiſſier de Sauvages, an eminent profeſſor of medicine at Montpelier, who, following out an idea ſuggeſted by the ſagacious Dr. Sydenham of England, firſt ſucceſsfully attempted to arrange diſeaſes, as botaniſts had done plants, into claſſes, orders, genera, and ſpecies. Since the publication of the *Noſologia Methodica* of Sauvages, this ſubject has been ſucceſsfully cultivated by ſeveral ingenious men, particularly by Sir Charles Linnæus of Upſal, to whoſe genius for arrangement every branch of natural hiſtory, but botany in particular, has been ſo highly indebted; by Rudolphus Auguſtus Vogel, an eminent profeſſor at Gottingen; and by John Baptiſt Sagar, a diſtinguiſhed phyſician at Iglaw in Moravia: But of all the ſyſtems of arrangements yet preſented to the medical world, that publiſhed by the late illuſtrious Dr. William Cullen of Edinburgh may juſtly be conſidered as the beſt. In treating, therefore, of the principal diſeaſes to which the human body is ſubjected, we ſhall follow his plan, endeavouring to deliver the beſt eſtabliſhed obſervations reſpecting the hiſtory, theory, and practice of each. And in treating of particular genera of diſeaſe, although we follow the arrangement of Dr. Cullen, yet for the ſatisfaction of the reader, we ſhall point out the claſſes to which the ſame affection is referred by the other eminent writers whom we have mentioned. And on this account, it may not be improper briefly to enumerate the general claſſes to which each of them has referred the affections of the human body.

The claſſes of Sauvages are,

1. Vitia.
2. Febres.
3. Phlegmaſiæ.
4. Spaſmi.
5. Anhelationes.
6. Debilitates.
7. Dolores.
8. Veſaniæ.
9. Fluxus.
10. Cachexiæ.

The claſſes of Linnæus are,

1. Exanthematici.
2. Critici.
3. Phlogiſtici.
4. Doloroſi.
5. Mentales.
6. Quietales.
7. Motorii.
8. Suppreſſorii.
9. Evacuatorii.
10. Deformes.
11. Vitia.

The claſſes of Vogel are,

1. Febres.
2. Profluvia.
3. Epiſcheſes.
4. Dolores.
5. Spaſmi.
6. Adynamiæ.
7. Hyperæſtheſes.
8. Cachexiæ.
9. Paranoiæ.
10. Vitia.
11. Deformitates.

The claſſes of Sagar are,

1. Vitia.
2. Plagæ.

3. Cachexiæ.
4. Dolores.
5. Fluxus.
6. Suppreſſiones.
7. Spaſmi.
8. Anhelationes.
9. Debilitates.
10. Exanthemata.
11. Phlegmaſiæ.
12. Febres.
13. Veſaniæ.

After this ſhort view of different claſſifications, we ſhall next preſent to our readers a more particular account of the arrangement of Dr. Cullen; which, although it can by no means be repreſented as free from errors or imperfections, is yet in many reſpects the beſt that has hitherto been publiſhed.

CULLEN'S *Arrangement.*

CLASS I. PYREXIÆ. A frequent pulſe coming on after an horror; conſiderable heat; many of the functions injured; the ſtrength of the limbs eſpecially diminiſhed.

ORDER I. Febres. Pyrexia without any primary local affection, following languor, laſſitude, and other ſymptoms of debility.

Sect. I. *Intermittentes.* Fevers ariſing from the miaſma of marſhes; with an apyrexia, or at leaſt a very evident remiſſion; but the diſeaſe returns conſtantly, and for the moſt part with a horror or trembling. There is only one paroxyſm in a day.

Genus I. Tertiana. Similar paroxyſms at an interval of about 48 hours, coming on moſt commonly at mid-day. A tertian hath either;

I. An apyrexia interpoſed;

1. Varying the duration of the paroxyſms.

A. The tertian whoſe paroxyſms are not extended beyond 12 hours.

B. The tertian with paroxyſms extended beyond 12 hours.

2. Varying in the return of the paroxyſms.

C. The tertian returning every day with unequal paroxyſms alternately ſimilar to one another.

D. The tertian returning every third day with two paroxyſms on the ſame day.

E. The tertian returning every day, with two paroxyſms on every third day, and only one on the intermediate ones.

F. The tertian returning every day with a notable remiſſion interpoſed between the odd and the even days, but a leſs remarkable one between the even and the odd one.

3. Varying in its ſymptoms.

G. The tertian accompanied with a diſpoſition to ſleep.

H. Accompanied with ſpaſms and convulſive motions.

I. Accompanied with an efflorescence on the ſkin.

K. With phlegmaſia.

4. Varying in being complicated with other diſeaſes.

5. Varying as to its origin.

II. With the interpoſition only of a remiſſion between the paroxyſms.

Genus II. Quartana. Similar paroxyſms, with an interval of about 72 hours, coming on in the afternoon.

I. With the interpoſition of an apyrexia.

1. Varying in the type.

A. The quartan with ſingle paroxyſms, returning every fourth day, none on the other days.

B. With two paroxyſms every fourth day, and none on the other days.

C. With three paroxyſms every fourth day, and none on the intermediate days.

D. Of the four days having only the third free from fever, with ſimilar paroxyſms every fourth day.

E. The quartan coming on every day, with ſimilar paroxyſms every fourth day.

2. Varying in its ſymptoms.

3. Varying in being complicated with other diſeaſes.

II. With a remiſſion only between the paroxyſms.

Genus III. Quotidiana. Similar paroxyſms with an interval of about 24 hours, coming on in the morning.

I. With the interpoſition of an apyrexia.

1. Varies in being ſolitary.

A. Univerſal.

B. Partial.

2. Complicated with other diſeaſes.

II. With a remiſſion only between the paroxyſms.

Sect. II. *Continuæ.* Fevers without any intermiſſion, and not occaſioned by marſh miaſmata; attended with exacerbations and remiſſions, though not very remarkable.

Genus IV. Synocha. Great heat; a frequent, ſtrong, and hard pulſe; high-coloured urine; the functions of the ſenſorium a little diſturbed.

Genus V. Typhus. A contagious diſeaſe; the heat not greatly above the natural; the pulſe ſmall, weak, and for the moſt part frequent; the urine little changed; the functions of the ſenſorium very much diſturbed, and the ſtrength greatly diminiſhed.

The ſpecies are,

I. Typhus *petechialis.* Typhus for the moſt part with petechiæ.

Varying in degree. 1. Mild Typhus. 2. Malignant typhus.

II. Typhus *icterodes.* Typhus with a yellowneſs of the ſkin.

Genus VI. Synochus. A contagious diſeaſe. A fever compoſed of a ſynocha and typhus; in the beginning a ſynocha, but towards the end a typhus.

ORDER II. Phlegmaſiæ. A ſynocha fever, with inflammation or topical pain, the internal function of the part being at the ſame time injured; the blood covered with ſize.

Genus VII. Phlogoſis. Pyrexia; redneſs, heat, and painful tenſion, of ſome external part.

The ſpecies are,

I. Phlogoſis *(phlegmone)* of a vivid red colour; a ſwelling well defined, for the moſt part elevated to a point, and frequently degenerating into an abſceſs, with a beating or throbbing pain.

The variations are, 1. In the form. 2. In the ſituation.

II. Phlogoſis (*erythema*) of a reddiſh colour, vaniſhing by preſſure; of an unequal and creeping circumference, with ſcarce any ſwelling; ending in the ſcaling off the cuticle, in phlyctenæ, or blitters.

The variations are, 1. In the degree of violence. 2. In the remote cauſe. 3. In being complicated with other diſeaſes.

The conſequences of a phlogoſis are, an impoſthume, gangrene, ſphacelus.

Genus VIII. Ophthalmia. A redneſs and pain of the eye, with an inability to bear the light; for the moſt part with an effuſion of tears.

The ſpecies and varieties of the ophthalmia are,

I. Idiopathic.

1. Ophthalmia (*membranarum*) in the tunica adnata, and the membranes lying under it, or the coats of the eye.

A. Varying in the degree of the external inflammation.

B. In the internal coats affected.

2. Ophthalmia (*tarſi*) of the eye-lids, with ſwelling, eroſion, and glutinous exſudation.

II. Symptomatic.

1. From a diſeaſe of the eye itſelf.

2. From diſeaſes of other parts, or of the whole body.

Genus IX. Phrenitis. Violent pyrexia; pain of the head; redneſs of the face and eyes; inability to endure the light or any noiſe; watchfulneſs; a fierce delirium, or typhomania.

I. Idiopathic.

II. Symptomatic.

Genus X. Cynanche. Pyrexia ſometimes inclining to a

typhus; difficulty of ſwallowing and breathing; with a ſenſation of narrowneſs in the fauces.

The ſpecies are,

I. Cynanche (*tonſillaris*) affecting the mucous membrane of the fauces, but eſpecially the tonſils, with redneſs and ſwelling, accompanied with a ſynocha.

II. Cynanche (*maligna*) affecting the tonſils and mucous membrane of the fauces with ſwelling, redneſs, and mucous cruſts of a whitiſh or aſh-colour, creeping, and covering ulcers; with a typhous fever and exanthemata.

III. Cynanche (*trachealis*) attended with difficult reſpiration, noiſy and hoarſe inſpiration, loud cough, without any apparent tumour in the fauces, ſomewhat difficult deglutition, and a ſynocha.

IV. Cynanche (*pharingæa*) attended with redneſs in the bottom of the fauces, very difficult and painful deglutition, reſpiration ſufficiently free, and a ſynocha.

V. Cynanche (*parotidæa*) with great ſwelling of the parotids and maxillary glands appearing on the outſide: the reſpiration and deglutition but little injured; a ſynocha, for the moſt part mild.

Diſeaſes of this genus are ſymptomatic, either from external or internal cauſes.

Genus XI. Pneumonia. Pyrexia, with a pain in ſome part of the thorax, difficult reſpiration, and cough. The ſpecies are,

I. Peripneumony, with a pulſe not always hard, but ſometimes ſoft; an obtuſe pain of the breaſt; the reſpiration always difficult; ſometimes the patient cannot breathe unleſs in an upright poſture; the face ſwelled, and of a livid colour; the cough for the moſt part moiſt, frequently bloody.

1. Simple idiopathic peripneumonies.

Varying in degree.

2. Idiopathic peripneumonies complicated with fever.

3. Symptomatic peripneumonies.

II. Pleuriſy, with a hard pulſe; for the moſt part attended with a pungent pain of one ſide, augmented chiefly during the time of inſpiration; an uneaſineſs when lying on the ſide; a moſt painful cough, dry in the beginning of the diſeaſe, afterwards moiſt, and frequently bloody.

1. Simple idiopathic pleuriſies.

2. Pleuriſies, complicated (1.) With fever. (2.) With catarrh.

3. Symptomatic pleuriſies.

4. Falſe pleuriſies.

The conſequences of pleuriſy are a vomica or empyema.

Genus XIII. Carditis. Pyrexia; pain about the heart; difficulty of breathing; cough; unequal pulſe; palpitation of the heart, and fainting.

I. Idiopathic.

II. Symptomatic.

Genus XIV. Peritonitis. Pyrexia; pain of the belly, exaſperated by an upright poſture, without the proper ſigns of other abdominal phlegmaſiæ. If the diagnoſtics of the following diſeaſes are given, they may be reckoned as ſo many ſpecies of this genus.

I. Peritonitis (*propria*) ſituated in the peritonæum, properly ſo called, ſurrounding the inſide of the abdomen.

II. Peritonitis (*omentalis*) in the peritonæum extended through the omentum.

III. Peritonitis (*meſenterica*) in the peritonæum ſpread through the meſentery.

Genus XV. Gaſtritis. Pyrexia inclining to a typhus; anxiety; pain and heat of the epigaſtrium, augmented when any thing is taken into the ſtomach; an inclination to vomit, and an immediate rejection of every thing ſwallowed; an hickup.

I. Idiopathic.

1. From internal cauſes.

A. Gaſtritis (*phlegmonodæa*) attended with acute pain and violent pyrexia.

2. From external cauſes.

B. Gaſtritis (*eryſipelatoſa*), with a leſs violent fever and pain; an eryſipelatous redneſs appearing on the fauces.

II. Symptomatic.

Genus XVI. Enteritis. Pyrexia of a typhous nature; pungent pain of the belly, ſtretching and twisting round the navel; vomiting; the belly obſtinately bound.

I. Idiopathic.

1. Enteritis (*phlegmonodæa*) with acute pain, violent fever, vomiting, and conſtipation of the belly.

2. Enteritis (*eryſipelatoſa*) with leſs acute fever and pain, without vomiting; but accompanied with a diarrhœa.

II. Symptomatic.

Genus XVII. Hepatitis. Pyrexia; tenſion and pain of the right hypochondrium; ſometimes pungent like that of a pleuriſy, but more frequently obtuſe; a pain reaching to the clavicle and top of the right ſhoulder; a difficulty of lying on the left ſide; dyſpnœa; dry cough, vomiting, and hickup.

Genus XVIII. Splenitis. Pyrexia; tenſion, heat, and ſwelling of the left hypochondrium, the pain increaſing by preſſure; without the ſigns of nephritis.

Genus XIX. Nephritis. Pyrexia; pain in the region of the kidney, often following the courſe of the ureter; frequent making of water, either thin and colourleſs, or very red; vomiting; ſtupor of the thigh; with a retraction or pain of the teſticle of the ſame ſide. The ſpecies are,

I. Idiopathic. Spontaneous.

II. Symptomatic.

Genus XX. Cyſtitis. Pyrexia; pain and ſwelling of the hypogaſtrium; frequent and painful making of water, or iſchuria; and teneſmus. The ſpecies are,

I. Thoſe ariſing from internal cauſes.

II. Thoſe from external cauſes.

Genus XXI. Hyſteritis. Pyrexia; heat, tenſion, ſwelling, and pain of the hypogaſtrium; the os uteri painful when touched; vomiting.

Genus XXII. Rheumatiſmus. A diſeaſe ariſing from an external and frequently very evident cauſe pyrexia; pain about the joints, frequently purſuing the courſe of the muſcles; inteſting the knees and other large joints rather than thoſe of the feet or hands; increaſed by external heat.

The ſpecies are either idiopathic or ſymptomatic. The former varies in ſituation.

A. In the muſcles of the loins.

B. In the muſcles of the coxendix.

C. In the muſcles of the breaſt.

Genus XXIII. Odontalgia; a rheumatiſm of the jaws from a caries of the teeth.

Genus XXIV. Podagra. An hereditary diſeaſe, ariſing without any evident external cauſe, but for the moſt part preceded by an unuſual affection of the ſtomach; pyrexia; pain of a joint for the moſt part of the great toe of the foot, at leaſt infeſting chiefly the wriſts and ankles; returning by intervals; and often alternated with affections of the ſtomach and other internal parts.

I. Podagra (*regularis*) with a pretty violent inflammation of the joints remaining for ſome days, and by degrees going off with ſwelling, itching, and deſquamation of the affected part.

II. Podagra (*atonica*) with an atony of the ſtomach, or ſome other internal part; and either without the uſual inflammation of the joints, or only with ſlight and wandering pains; and frequently alternated with dyſpepſia, or other ſymptoms of atony.

III. Podagra (*retrograda*) with the inflammation of the joints ſuddenly receding, and an atony of the ſtomach and other parts immediately following.

IV. Podagra (*aberrans*) with the inflammation of an inter-

nal part either preceding or not, and ſuddenly receding; with an inflammation of the joints.

Genus XXV. Arthropuoſis. Deep, obtuſe, and long-continued pains of the joints or muſcular parts, frequently following contuſions; with either no ſwelling, or a moderate and diffuſed one; no phlogoſis; pyrexia, at firſt gentle, afterwards hectic, and at length an impoſtume.

Order III. Exanthemata. Contagious diſeaſes; affecting a perſon only once in their life; beginning with fever; after a certain time appear phlogoſes, for the moſt part ſmall and in conſiderable number, and diſperſed over the ſkin.

Genus XXVI. Eryſipelas. A ſynocha of two or three days, for the moſt part attended with drowſineſs, often with a delirium. In ſome part of the ſkin, moſt frequently the face, appears a phlogoſis *erythema*. (G. VII. Sp. 2.) The ſpecies are,

I. Eryſipelas *(veſiculoſum)* with erythema, redneſs creeping, occupying a large ſpace, and in ſome parts ending in large bliſters.

II. Eryſipelas *(phlyctænodes)* with an erythema formed of a number of papulæ, chiefly occupying the trunk of the body, ending in phlyctenæ or ſmall bliſters.

The diſeaſe is alſo ſymptomatic.

Genus XXVII. Peſtis. An exceedingly contagious typhus, with the higheſt debility. On an uncertain day of the diſeaſe buboes and carbuncles break forth. It is various in degree, but the ſpecies are uncertain.

Genus XXVIII. Variola; a contagious ſynocha, with vomiting, and pain on preſſing the epigaſtrium. On the third day begins, and on the fifth is finiſhed, the eruption of inflammatory puſtules, which ſuppurate in the ſpace of eight days, and at laſt go off in cruſts; frequently leaving depreſſed cicatrices or pockpits in the ſkin. The ſpecies are,

I. Variola *(diſcreta)* with few, diſtinct, turgid puſtules, having circular baſes; the fever ceaſing immediately after the eruption.

II. Variola *(confluens)* with numerous, confluent, irregularly ſhaped puſtules, flaccid, and little elevated; the fever remaining after the eruption.

Genus XXIX. Varicella. Synocha; papulæ breaking out after a ſhort fever, ſimilar to thoſe of the ſmall-pox, but hardly ever coming to ſuppuration; after a few days going off in ſmall ſcales, but never leaving any mark.

Genus XXX. Rubeola. A contagious ſynocha, with ſneezing, epiphora, and dry hoarſe cough. On the fourth day, or a little later, break forth ſmall, cluſtered, and ſcarce elevated papulæ; after three days going off in very ſmall branny ſcales.

I. Rubeola *(vulgaris)* with very ſmall confluent, corymboſe papulæ, ſcarce riſing above the ſkin.

Varying,

1. In the ſymptoms being more ſevere, and the courſe of the diſeaſe leſs regular.

2. In being accompanied with a quinſey.

3. With a putrid diatheſis.

II. Rubeola *(variolodes)* with diſtinct papulæ, raiſed above the ſkin.

Genus XXXI. Miliaria. Synochus with anxiety, frequent ſighing, fœtid ſweat, and points on the ſkin. On an uncertain day of the diſeaſe, break out red, ſmall, diſtinct papulæ, ſpread over the whole body as well as the face; the apices of which, after one or two days, become very ſmall white puſtules, remaining for a ſhort time.

Genus XXXII. Scarlatina. A contagious ſynocha. On the fourth day of the diſeaſe the face ſwells a little; at the ſame time an univerſal redneſs occupies the ſkin in large ſpots, at length running together; after three days going off in branny ſcales; frequently ſucceeded by an anaſarca. The ſpecies are,

I. Scarlatina *(ſimplex)*, not accompanied with cynanche.

II. Scarlatina *(cynanchica)*, with an ulcerous cynanche.

Genus XXXIII. Urticaria. An amphemerina fever. On the ſecond day of the diſeaſe, red ſpots reſembling the ſtinging of nettles, almoſt vaniſhing during the day, but returning in the evening with the fever, and after a few days going off altogether in very ſmall ſcales.

Genus XXXIV. Pemphigus. A contagious typhus. On the firſt, ſecond, or third day of the diſeaſe, bliſters break out in ſeveral parts of the body, of the bigneſs of a bean, remaining for many days, and at laſt pouring out a thin ichor.

Genus XXXV. Aphtha. Synochus; the tongue ſomewhat ſwelled and of a livid colour, as well as the fauces; eſchars firſt appearing in the fauces, but at length occupying the whole internal part of the mouth, of a white colour, ſometimes diſtinct, often running together; quickly growing again when taken off; and remaining for an uncertain time.

The ſpecies are, 1. Idiopathic. 2. Symptomatic.

Order IV. Hæmorrhagiæ. Pyrexia, with a profuſion of blood, without any external violence: the blood drawn from a vein hath the ſame appearance as in phlegmaſiæ.

Genus XXXVI. Epiſtaxis. Pain or weight of the head, redneſs of the face; a profuſion of blood from the noſe.

I. Idiopathic.

Varying according to the time of life.

1. Epiſtaxis of young people, with ſymptoms of an arterious plethora.

2. Epiſtaxis of old people, with ſymptoms of a venous plethora.

II. Symptomatic.

1. From internal cauſes.

2. From external cauſes.

Genus XXXVII. Hæmoptyſis. Redneſs of the cheeks; a ſenſation of uneaſineſs, or pain, and ſometimes of heat in the breaſt; difficulty of breathing; tickling of the fauces; either a ſevere or leſs violent cough, bringing up florid and frequently frothy blood.

The idiopathic ſpecies are,

1. Hæmoptyſis *(plethorica)*, without any external violence, and without being preceded by any cough or ſuppreſſion of any cuſtomary evacuation.

2. Hæmoptyſis *(violenta)*, from external violence applied.

3. Hæmoptyſis *(phthiſica)*, after a long continued cough, with a leanneſs and debility.

4. Hæmoptyſis *(calculoſa)*, in which ſome calculous molecules, for the moſt part of a calcareous nature, are thrown up.

5. Hæmoptyſis *(vicaria)*, after the ſuppreſſion of a cuſtomary evacuation.

Beſides theſe, there are a number of ſymptomatic ſpecies mentioned by different authors. The conſequence of an hæmoptyſis is, a

Phthiſis. A waſting and debility of the body, with a cough, hectic fever, and for the moſt part a purulent expectoration. The ſpecies are,

I. An incipient phthiſis, without any expectoration of pus.

II. A confirmed phthiſis, with an expectoration of pus.

Both ſpecies vary, 1. As to their remote cauſe. 2. As to the origin of the purulent matter.

Genus XXXVIII. Hæmorrhois. Weight and pain of the head; vertigo; pain of the loins; pain of the anus; livid painful tubercles, from which for the moſt part blood flows out; which ſometimes alſo drops out of the anus, without any apparent tumor. The ſpecies are,

1. Hæmorrhois *(tumens)*, external from mariſcæ.

Varying.

A. Bloody.

B. Mucous.

2. Hæmorrhois *(procidens)*, external from a *procidentia ani*.

3. Hæmorrhois (*fluens*), internal, without any fwelling, or *procidentia ani*.

4. Hæmorrhois (*cæca*), with pain and fwelling of the anus, without any profufion of blood.

Genus XXXIX. Menorrhagia. Pains of the back, belly, and loins, like thofe of child-birth; an unufually copious flux of the menfes or blood from the vagina. The fpecies are,

1. Menorrhagia (*rubra*), bloody in women neither with child nor in child-birth.

2. Menorrhagia (*abortus*), bloody in women with child.

3. Menorrhagia (*lochialis*), bloody in women after delivery.

4. Menorrhagia (*vitiorum*), bloody from fome local difeafe.

5. Menorrhagia (*alba*), ferous, without any local difeafe, in women not with child.

6. Menorrhagia (*Nabothi*), ferous in women with child.

Order V. Profluvia. Pyrexia, with an increafed fecretion, naturally not bloody.

Genus XL. Catarrhus. Pyrexia frequently contagious; an increafed excretion of mucus, at leaft efforts to excrete it.

The fpecies are for the moft part fymptomatic.

1. From cold.

2. From contagion.

Genus XLI. Dyfenteria. Contagious pyrexia; frequent mucous or bloody ftools, while the alvine fæces are for the moft part retained; gripes; teneſmus.

Varying:

1. Accompanied with worms.

2. With the excretion of fmall fleſhy or febaceous bodies.

3. With an intermittent fever.

4. Without blood.

5. With miliary fever.

CLASS II. Neuroses. An injury of the fenfe and motion, without an idiopathic pyrexia or any local affection.

Order I. Comata. A diminution of voluntary motion, with fleep, or a deprivation of the fenfes.

Genus XLII. Apoplexia. Almoft all voluntary motion diminifhed, with fleep more or lefs profound; the motion of the heart and arteries remaining.

The idiophatic fpecies are,

1. Apoplexia (*fanguinea*), with fymptoms of univerfal plethora, efpecially of the head.

2. Apoplexia (*ferofa*), with a leucophlegmatia over the whole body, efpecially in old people.

3. Apoplexia (*hydrocephalica*), coming on by degrees; affecting infants, or thofe below the age of puberty, firft with laffitude, a flight fever and pain of the head, then with flownefs of the pulfe, dilatation of the pupil of the eye, and drowfinefs.

4. Apoplexia (*atrabiliaria*), taking place in thofe of a melancholic conftitution.

5. Apoplexia (*traumatica*) from fome external injury mechanically applied to the head.

6. Apoplexia (*venenata*), from powerful fedatives taken internally or applied externally.

7. Apoplexia (*mentalis*), from a paffion of the mind.

8. Apoplexia (*cataleptica*), the mufcles remaining contractile, by external motion of the limbs.

9. Apoplexia (*fuffocata*), from fome external fuffocating power.

The apoplexia is frequently fymptomatic,

1. Of an intermitting fever. 2. Continued fever. 3. Phlegmafia. 4. Exanthema. 5. Hyfteria. 6. Epilepfy. 7. Podagra. 8. Worms. 9. Ifchuria. 10. Scurvy.

Genus XLIII. Paralyfis. Only fome of the voluntary motions diminifhed, frequently with fleep.

The idiopathic fpecies are,

1. Paralyfis (*partialis*) of fome particular mufcles only.

2. Paralyfis (*hemiplegica*) of one fide of the body.

Varying according to the conftitution of the body.

a. Hemiplegia in a plethoric habit.

b. In a leucophlegmatic habit.

3. Paralyfis (*paraplegica*) of one half of the body taken tranfverfely.

4. Paralyfis (*venenata*) from fedative powers applied either internally or externally.

A fymptom either of an Aſthenia or Palfy is,

Tremor; an alternate motion of a limb by frequent ſtrokes and intervals.

The fpecies are, 1. Aſthenic. 2. Paralytic. 3. Convulfive.

Order II. Adynamiæ. A diminution of the involuntary motions, whether vital or natural.

Genus XLIV. Syncope; a diminution, or even a total ſtoppage, of the motion of the heart for a little.

I. Idiopathic.

1. Syncope (*cardiaca*), returning frequently without any manifeſt cauſe, with violent palpitations of the heart during the intervals.—From a fault of the heart or neighbouring veſſels.

2. Syncope (*occaſionalis*) ariſing from ſome evident cauſe.—From an affection of the whole ſyſtem.

II. Symptomatic; or ſymptoms of diſeaſes either of the whole ſyſtem, or of other parts beſides the heart.

Genus XLV. Dyſpepſia. Anorexia, nauſea, vomiting, inflation, belching, rumination, cardialgia, gaſtrodynia, more or fewer of thoſe ſymptoms at leaſt concurring; for the moſt part with a conſtipation of the belly, and without any other diſeaſe either of the ſtomach itſelf or of other parts.

I. Idiopathic.

II. Symptomatic.

1. From a diſeaſe of the ſtomach itſelf.

2. From a diſeaſe of other parts, or of the whole body.

Genus XLVI. Hypochondriaſis. Dyſpepſia, with languor, ſadneſs and fear without any adequate cauſes, in a melancholy temperament.

Genus XLVII. Chloroſis. Dyſpepſia, or a deſire of ſomething not uſed as food; a pale or diſcoloured complexion; the veins not well filled; a ſoft tumor of the whole body; aſthenia; palpitation; ſuppreſſion of the menſes.

Order III. Spaſmi. Irregular motions of the muſcles or muſcular fibres.

Sect. I. *In the animal functions.*

Genus XLVIII. Tetanus;—a ſpaſtic rigidity of almoſt the whole body.

Varying according to the remote cauſe, as it ariſes either from ſomething internal, from cold, or from a wound. It varies likewiſe, from whatever cauſe it may ariſe, according to the part of the body affected.

Genus XLIX. Triſmus. A ſpaſtic rigidity of the lower jaw.—The ſpecies are,

1. Triſmus (*naſcentium*), ſeizing infants under two months old.

2. Triſmus (*traumaticus*), ſeizing people of all ages either from a wound or cold.

Genus L. Convulſio.—An irregular clonic contraction of the muſcles without ſleep.

I. Idiopathic.

II. Symptomatic.

Genus LI. Chorea, attacking thoſe who have not yet arrived at puberty, moſt commonly within the 10th or 14th year, with convulſive motions for the moſt part of one ſide in attempting the voluntary motion of the hands and arms, reſembling the geſticulations of mountebanks; in walking, rather dragging one of their feet after them than lifting it.

Genus LII. Raphania. A ſpaſtic contraction of the joints, with a convulſive agitation, and moſt violent periodical pain.

Genus LIII. Epilepſia. A convulſion of the muſcles, with ſleep.

The idiopathic ſpecies are,

1. Epilepſia (*cerebralis*), ſuddenly attacking without any manifeſt cauſe, without any ſenſe of uneaſineſs preceding, excepting perhaps a ſlight vertigo or ſcotomia.

2. Epilepſia (*ſympathica*), without any manifeſt cauſe, but preceded by the ſenſation of a kind of air riſing from a certain part of the body towards the head.

3. Epilepſia (*occaſionalis*), ariſing from a manifeſt irritation, and ceaſing on the removal of that irritation.

Varying according to the difference of the irritating matter. And thus it may ariſe,

From injuries of the head; pain; worms; poiſon; from the repulſion of the itch; or an effuſion of any other acrid humour; from crudities in the ſtomach; from paſſions of the mind; from an immoderate hemorrhagy; or from debility.

Sect. II. *In the vital functions.*

In the action of the heart.

Genus LIV. Palpitatio. A violent and irregular motion of the heart.

In the action of the lungs.

Genus LV. Aſthma. A difficulty of breathing returning by intervals, with a ſenſe of ſtraitneſs in the breaſt, and a noiſy reſpiration with hiſſing. In the beginning of the paroxyſm there is either no cough at all, or coughing is difficult; but towards the end the cough becomes free, frequently with a copious ſpitting of mucus.—The idiopathic ſpecies are,

1. Aſthma (*ſpontaneum*), without any manifeſt cauſe or other concomitant diſeaſe.

2. Aſthma (*exanthematicum*), from the repulſion of the itch or other acrid effuſion.

3. Aſthma (*plethoricum*), from the ſuppreſſion of ſome cuſtomary ſanguineous evacuation, or from a ſpontaneous plethora.

Genus LVI. Dyſpnœa. A continual difficulty of breathing, without any ſenſe of ſtraitneſs, but rather of fullneſs and infarction in the breaſt; a frequent cough throughout the whole courſe of the diſeaſe.

The idiopathic ſpecies are,

1. Dyſpnœa (*catarrhalis*), with a frequent cough, bringing up plenty of viſcid mucus.

2. Dyſpnœa (*ſicca*), with a cough for the moſt part dry.

3. Dyſpnœa (*aërea*), increaſed by the leaſt change of weather.

4. Dyſpnœa (*terrea*), bringing up with the cough an earthy calculous matter.

5. Dyſpnœa (*aquoſa*), with ſcanty urine and œdematous feet; without any fluctuation in the breaſt, or other ſigns of an hydrothorax.

6. Dyſpnœa (*pinguedinoſa*), in very fat people.

7. Dyſpnœa (*thoracica*), from an injury done to the parts ſurrounding the thorax, or from ſome bad conformation of them.

8. Dyſpnœa (*extrinſica*), from evident external cauſes.

The ſymptomatic ſpecies of diſpnœa are ſymptoms,

1. Of diſeaſes of the heart or large veſſels.

2. Of a ſwelling in the abdomen.

3. Of various diſeaſes.

Genus LVII. Pertuſſis. A contagious diſeaſe; convulſive ſtrangulating cough reiterated with noiſy inſpiration; frequent vomiting.

Sect. III. *In the natural functions.*

Genus LVIII. Pyroſis. A burning pain in the epigaſtrium, with plenty of aqueous humour, for the moſt part inſipid, but ſometimes acrid, belched up.

Genus LIX. Colica. Pain of the belly, eſpecially twiſting round the navel; vomiting; a conſtipation.

The idiopathic ſpecies are,

1. Colica (*ſpaſmodica*), with retraction of the navel, and ſpaſms of the abdominal muſcles.

Varying, by reaſon of ſome ſymptoms ſuperadded. Hence,

a, Colica, with vomiting of excrements, or of matters injected by the anus.

b, Colica, with inflammation ſupervening.

2. Colica (*pictonum*), preceded by a ſenſe of weight or uneaſineſs in the belly, eſpecially about the navel; then comes on the colic pain, at firſt ſlight and interrupted, chiefly augmented after meals: at length more ſevere and almoſt continual, with pains of the arms and back, at laſt ending in a palſy.

Varying according to the nature of the remote cauſe; and hence,

a, From metallic poiſon.

b, From acids taken inwardly.

c, From cold.

d, From a contuſion of the back.

3. Colica (*ſtercorea*), in people ſubject to coſtiveneſs.

4. Colica (*accidentalis*), from acrid matter taken inwardly.

5. Colica (*meconialis*), in new-born children, from a retention of the meconium.

6. Colic (*calleſa*), with a ſenſation of ſtricture in ſome part of the inteſtines, and frequently of a collection of flatus with ſome pain before the conſtricted part; which flatus alſo paſſing through the part where the ſtricture is felt, gradually vaniſhes; the belly ſlow, and at laſt paſſing only a few liquid fæces.

7. Colica (*calculoſa*), with a fixed hardneſs in ſome part of the abdomen, and calculi ſometimes paſſing by the anus.

Genus LX. Cholera. A vomiting of bilious matter, and likewiſe a frequent excretion of the ſame by ſtool; anxiety; gripes; ſpaſms in the calves of the legs.

I. Idiopathic.

1. Cholera (*ſpontanea*), ariſing in a warm ſeaſon, without any manifeſt cauſe.

2. Cholera (*accidentalis*), from acrid matters taken inwardly.

II. Symptomatic.

Genus LXI. Diarrhœa. Frequent ſtools; the diſeaſe not infectious; no primary pyrexia.

I. Idiopathic.

1. Diarrhœa (*crapuloſa*), in which the excrements are voided in greater quantity than naturally.

2. Diarrhœa (*bilioſa*), in which yellow fæces are voided in great quantity.

3. Diarrhœa (*mucoſa*), in which either from acrid ſubſtances taken inwardly, or from cold, eſpecially applied to the feet, a great quantity of mucus is voided.

4. Diarrhœa (*cœliaca*), in which a milky humour of the nature of chyle is paſſed.

5. Diarrhœa (*lienteria*), in which the aliments are diſcharged with little alteration ſoon after eating.

6. Diarrhœa (*hepatirrhœa*), in which a bloody ſerous matter is diſcharged without pain.

II. Symptomatic.

Genus LXII. Diabetes. A chronical profuſion of urine, for the moſt part preternatural, and in immoderate quantity.

I. Idiopathic.

1. Diabetes (*mellitus*), with urine of the ſmell, colour, and taſte of honey.

2. Diabetes (*inſipidus*), with limpid, but not ſweet urine.

II. Symptomatic.

Genus LXIII. Hyſteria. Rumbling of the bowels; a ſenſation as of a globe turning itſelf in the belly, aſcending to the ſtomach and fauces, and there threatening ſuffocation; ſleep;

convulſions; a great quantity of limpid urine; the mind involuntarily fickle and mutable.

The following are by Sauvages reckoned diſtinct idiopathic ſpecies; but, by Dr. Cullen, only varieties of the ſame ſpecies.

A, From a retention of the menſes.

B, From a menorrhagia cruenta.

C, From a menorrhagia ſeroſa, or fluor albus.

D, From an obſtruction of the viſcera.

E, From a fault of the ſtomach.

F, From too great ſalacity.

Genus LXIV. Hydrophobia. A diſlike and horror at any kind of drink, as occaſioning a convulſion of the pharynx; induced, for the moſt part, by the bite of a mad animal. The ſpecies are,

I. Hydrophobia *(rabioſa)*, with a deſire of biting the byſtanders, occaſioned by the bite of a mad animal.

II. Hydrophobia *(ſimplex)*, without madneſs, or any deſire of biting.

Order IV. Veſaniæ. Diſorders of the judgment, without any pyrexia or coma.

Genus LXV. Amentia; an imbecility of judgment, by which people either do not perceive, or do not remember, the relations of things. The ſpecies are,

I. Amentia *(congenita)*, continuing from a perſon's birth.

II. Amentia *(ſenilis)*, from the diminution of the perceptions and memory through extreme old age.

III. Amentia *(acquiſita)*, occurring in people formerly of a ſound mind, from evident external cauſes.

Genus LXVI. Melancholia; a partial madneſs, without dyſpepſia.

Varying according to the different ſubjects concerning which the perſon raves; and thus it is,

1. With an imagination in the patient concerning his body being in a dangerous condition, from ſlight cauſes; or that his affairs are in a deſperate ſtate.

2. With an imagination concerning a proſperous ſtate of affairs.

3. With violent love, without ſatyriaſis or nymphomania.

4. With a ſuperſtitious fear of a future ſtate.

5. With an averſion from motion and all the offices of life.

6. With reſtleſſneſs, and an impatience of any ſituation whatever.

7. With a wearineſs of life.

8. With a deception concerning the nature of the patient's ſpecies.

Dr. Cullen thinks that there is no ſuch diſeaſe as that called *dæmonomania*, and that the diſeaſes mentioned by Sauvages under that title are either,

1. Species of melancholy or mania; or

2. Of ſome diſeaſe by the ſpectators falſely aſcribed to the influence of an evil ſpirit; or

3. Of a diſeaſe entirely feigned; or,

4. Of a diſeaſe partly true and partly feigned.

Genus LXVII. Mania; univerſal madneſs.

1. Mania *(mentalis)*, ariſing entirely from paſſions of the mind.

2. Mania *(corporea)*, from an evident diſeaſe of the body.

Varying according to the different diſeaſe of the body.

3. Mania *(obſcura)*, without any paſſion of mind or evident diſeaſe of the body preceding.

The ſymptomatic ſpecies of mania are,

1. Paraphroſyne from poiſons.

2. Paraphroſyne from paſſion.

3. Paraphroſyne febrilis.

Genus LXVIII. Oneirodynia. A violent and troubleſome imagination in time of ſleep.

1. Oneirodynia *(activa)*, exciting to walking and various motions.

2. Oneirodynia *(gravans)*, from a ſenſe of ſome weight incumbent, and preſſing on the breaſt eſpecially.

CLASS III. Cachexiæ; a depraved habit of the whole or greateſt part of the body, without primary pyrexia or neuroſis.

Order I. Marcores. A waſting of the whole body.

Genus LXIX. Tabes. Leanneſs, aſthenia, hectic pyrexia. The ſpecies are,

1. Tabes *(purulenta)*, from an external or internal ulcer, or from a vomica.

Varying in its ſituation: hence,

2. Tabes *(ſcrophuloſa)*, in ſcrophulous conſtitutions.

3. Tabes *(venenata)*, from poiſon taken inwardly.

Genus LXX. Atrophia. Leanneſs and aſthenia, without hectic pyrexia. The ſpecies are,

1. Atrophia *(inanitorum)*, from too great evacuation.

2. Atrophia *(famelicorum)*, from a deficiency of nouriſhment.

3. Atrophia *(cacochymica)*, from corrupted nouriſhment.

4. Atrophia *(debilium)*, from the function of nutrition being depraved, without any extraordinary evacuation or cacochymia having preceded.

Order II. Intumeſcentiæ. An external tumor of the whole or greateſt part of the body.

Sect. I. *Adipoſæ.*

Genus LXXI. Polyſarcia; a troubleſome ſwelling of the body from fat.

Sect. II. *Flatuoſæ.*

Genus LXII. Pneumatoſis. A tenſe elaſtic ſwelling of the body, crackling under the hand. The ſpecies are,

1. Pneumatoſis *(ſpontanea)*, without any manifeſt cauſe.

2. Pneumatoſis *(traumatica)*, from a wound in the breaſt.

3. Pneumatoſis *(venenata)*, from poiſon injected or applied.

4 Pneumatoſis *(hyſterica)*, with hyſteria.

Genus LXXIII. Tympanites. A tenſe, elaſtic, ſonorous ſwelling of the abdomen; coſtiveneſs; a decay of the other parts. The ſpecies are,

1. Tympanites *(inteſtinalis)*, with a tumour of the abdomen frequently unequal, and with a frequent evacuation of air relieving the tenſion and pain.

2. Tympanites *(abdominalis)*, with a more evident noiſe, a more equable tumor, and a leſs frequent emiſſion of flatus, which alſo gives leſs relief.

Genus LXXIV. Phyſometra. A ſlight elaſtic ſwelling in the epigaſtrium, having the figure and ſituation of the uterus.

Sect. III. *Aquoſæ* or *Hydropes.*

Genus LXXV. Anaſarca. A ſoft, inelaſtic ſwelling of the whole body, or ſome part of it. The ſpecies are,

1. Anaſarca *(ſeroſa)*, from a retention of ſerum on account of the ſuppreſſion of the uſual evacuations, or from an increaſe of the ſerum on account of too great a quantity of water taken inwardly.

2. Anaſarca *(oppilata)*, from a compreſſion of the veins.

3. Anaſarca *(exanthematica)*, ariſing after exanthemata, eſpecially after the eryſipelas.

4. Anaſarca *(anæmia)*, from the thinneſs of the blood produced by hemorrhagy.

5. Anaſarca *(debilium)*, in weak people after long diſeaſes, or from other cauſes.

Genus LXXVI. Hydrocephalus. A ſoft inelaſtic ſwelling of the head, with the ſutures of the cranium opened.

Genus LXXVII. Hydrorachitis. A ſoft, ſlender tumor above the vertebræ of the loins; the vertebræ gaping from each other.

Genus LXXVIII. Hydrothorax. Dyſpnœa; paleneſs of the face; œdematous ſwellings of the feet; ſcanty urine; lying down difficult; a ſudden and ſpontaneous waking out of ſleep, with palpitation; water fluctuating in the breaſt.

Genus LXXIX. Aſcites. A tenſe, ſcarce elaſtic, but fluctuating ſwelling of the abdomen. The ſpecies are,

1. Aſcites *(abdominalis)*, with an equal ſwelling of the whole abdomen, and with a fluctuation ſufficiently evident.

Varying according to the cauſe.

A, From an obſtruction of the viſcera.

B, From debility.

C, From a thinneſs of the blood.

2. Aſcites *(ſaccatus)*, with a ſwelling of the abdomen, in the beginning at leaſt, partial, and with a leſs evident fluctuation.

Genus LXXX. Hydrometra. A ſwelling of the hypogaſtrium in women, gradually increaſing, keeping the ſhape of the uterus, yielding to preſſure, and fluctuating; without iſchuria or pregnancy.

Genus LXXXI. Hydrocele. A ſwelling of the ſcrotum, not painful; increaſing by degrees, ſoft, fluctuating, and pellucid.

Sect. IV. *Solidæ*.

Genus LXXXII. Phyſconia. A ſwelling chiefly occupying a certain part of the abdomen, gradually increaſing, and neither ſonorous nor fluctuating. The ſpecies are,

Phyſconia hepatica.
Phyſconia ſplenica.
Phyſconia renalis.
Phyſconia uterina.
Phyſconia ab ovario.
Phyſconia meſenterica.
Phyſconia inteſtinalis.
Phyſconia omentalis.
Phyſconia polyſplachna.
Phyſconia viſceralis.
Phyſconia externa lupialis.
Phyſconia externa ſcirrhodea.
Phyſconia externa hydatidoſa.
Phyſconia ab adipe ſubcutaneo.
Phyſconia ab excreſcentia.

Genus LXXXIII. Rachitis. A large head, ſwelling moſt in the forepart, the ribs depreſſed; abdomen ſwelled, with a decay of the other parts.

Varying,

1. Simple, without any other diſeaſe.
2. Joined with other diſeaſes.

Order III. Impetigines. Cachexies chiefly deforming the ſkin and external parts of the body.

Genus LXXXIV. Scrophula. Swellings of the conglobate glands, eſpecially in the neck; ſwelling of the upper lip and ſupport of the noſe; the face florid, ſkin thin, abdomen ſwelled. The ſpecies are,

1. Scrophula *(vulgaris)*, ſimple, external, and permanent.
2. Scrophula *(meſenterica)*, ſimple, internal, with paleneſs of the face, want of appetite, ſwelling of the abdomen, and unuſual fetor of the excrements.
3. Scrophula *(fugax)*, moſt ſimple, appearing only about the neck; for the moſt part proceeding from the reſorption of the matter of ulcers in the head.
4. Scrophula *(Americana)*, joined with the yaws.

Genus LXXXV. Syphilis. A contagious diſeaſe, after impure venery, and a diſorder of the genitals; ulcers of the tonſils; of the ſkin, eſpecially about the margin of the hair; corymboſe papulæ, ending in cruſts and cruſty ulcers; pains of the bones; exoſtoſes.

Genus LXXXVI. Scorbutus. In cold countries, attacking after putreſcent diet, eſpecially ſuch as is ſalt and of the animal-kind, where no ſupply of freſh vegetables is to be had; aſthenia; ſtomacace; ſpots of different colours on the ſkin, for the moſt part livid, and appearing chiefly among the roots of the hair.

Varying in degree.

a, Scorbutus incipiens.
b, Scorbutus creſcens.
c, Scorbutus inveteratus.

Varying alſo in ſymptoms.

d, Scorbutus lividus.
e, Scorbutus petechialis.
f, Scorbutus pallidus.
g, Scorbutus ruber.
h, Scorbutus calidus.

Genus LXXXVII. Elephantiaſis. A contagious diſeaſe; thick, wrinkled, rough, unctuous ſkin, deſtitute of hairs, anæſtheſia in the extremities, the face deformed with pimples, the voice hoarſe and naſal.

Genus LXXXVIII. Lepra. The ſkin rough, with white, branny, and chopped eſchars, ſometimes moiſt beneath, with itching.

Genus LXXXIX. Frambœſia. Swellings reſembling fungi, or the fruit of the mulberry or raſpberry, growing on various parts of the ſkin.

Genus XC. Trichoma. A contagious diſeaſe; the hairs thicker than uſual, and twiſted into inextricable knots and cords.

Genus XCI. Icterus. Yellowneſs of the ſkin and eyes; white fæces; urine of a dark red, tinging what is put into it of a clay-colour.

The idiopathic ſpecies are,

1. Icterus *(calculoſus)*, with acute pain in the epigaſtric region, increaſing after meals; biliary concretions voided by ſtool.
2. Icterus *(ſpaſmodicus)*, without pain, after ſpaſmodic diſeaſes and paſſions of the mind.
3. Icterus *(hepaticus)*, without pain, after diſeaſes of the liver.
4. Icterus *(gravidarum)*, ariſing during the time of pregnancy, and going off after delivery.
5. Icterus *(infantum)*, coming on in infants a few days after birth.

CLASS IV. Locales. An affection of ſome part, but not of the whole body.

Order I. Dyſtheſiæ. The ſenſes depraved or deſtroyed, from a diſeaſe of the external organs.

Genus XCII. Caligo. The ſight impaired or totally deſtroyed, on account of ſome opaque ſubſtance interpoſed between the objects and the retina, inherent in the eye itſelf or the eye-lids. The ſpecies are,

1. Caligo (*lentis*), occaſioned by an opaque ſpot behind the pupil.
2. Caligo (*corneæ*), from an opacity of the cornea.
3. Caligo *(pupillæ)*, from an obſtruction of the pupil.

Varying according to the different cauſes from which it proceeds.

4. Caligo (*humorum*), from a diſeaſe or defect of the aqueous humour.

Varying according to the different ſtate of the humour.

5. Caligo *(palpebrarum)*, from a diſeaſe inherent in the eye-lids.

Varying according to the nature of the diſeaſe in the eye-lids.

Genus XCIII. Amauroſis. The ſight diminiſhed, or totally aboliſhed, without any evident diſeaſe of the eye; the pupil for the moſt part remaining dilated and immoveable. The ſpecies are,

1. Amauroſis (*compreſſionis*), after the cauſes and attended with the ſymptoms of congeſtion in the brain.

Varying according to the nature of the remote cauſe.

2. Amauroſis (*atonica*), after the cauſes and accompanied with ſymptoms of debility.

3. Amauroſis (*ſpaſmodica*), after the cauſes and with the ſigns of ſpaſm.

4. Amauroſis (*venenata*), from poiſon taken into the body or applied outwardly to it.

Genus XCIV. Dyſopia. A depravation of the ſight, ſo that objects cannot be diſtinctly perceived, except at a certain diſtance, and in a certain ſituation. The ſpecies are,

1. Dyſopia (*tenebrarum*), in which objects are not ſeen unleſs they be placed in a ſtrong light.

2. Dyſopia (*luminis*), in which objects are not diſtinctly ſeen unleſs by a weak light.

3. Dyſopia (*diſſitorum*), in which diſtant objects are not perceived.

4. Dyſopia (*proximorum*), in which the neareſt objects are not perceived.

5. Dyſopia (*lateralis*), in which objects are not perceived unleſs placed in an oblique poſture.

Genus XCV. Pſeudoblepſis. When the ſight is diſeaſed in ſuch a manner that the perſon imagines he ſees things which really do not exiſt, or ſees things which do exiſt after ſome other manner than they really are. The ſpecies are,

1. Pſeudoblepſis (*imaginaria*), in which the perſon imagines he ſees things which really do not exiſt.

Varying according to the nature of the imagination.

2. Pſeudoblepſis (*mutans*), in which objects really exiſting appear ſomehow changed.

Varying according to the change perceived in the objects, and according to the remote cauſe.

Genus XCVI. Dyſecœa. A diminution or total abolition of the ſenſe of hearing. The ſpecies are,

1. Dyſecœa (*organica*), from a diſeaſe in the organs tranſmitting ſounds to the internal ear.

Varying according to the nature of the diſeaſe and of the part affected.

2. Dyſecœa (*atonica*), without any evident diſeaſe of the organs tranſmitting the ſounds.

Varying according to the nature of the cauſe.

Genus XCVII. Paracuſis. A depravation of the hearing. The ſpecies are,

1. Paracuſis (*imperfecta*), in which though ſounds coming from external objects are heard, yet it is neither diſtinctly nor in the uſual manner.

Varying,

a, With a dulneſs of hearing.

b, With a hearing too acute and ſenſible.

c, When a ſingle external ſound is doubled by ſome internal cauſes.

d, When the ſounds which a perſon deſires to hear are not perceived, unleſs ſome other violent ſound is raiſed at the ſame time.

2. Paracuſis (*imaginaria*), in which ſounds not exiſting externally are excited from internal cauſes.

Varying according to the nature of the ſound perceived, and according to the nature of the remote cauſe.

Genus XCVIII. Anoſmia. A diminution or abolition of the ſenſe of ſmell. The ſpecies are,

1. Anoſmia (*organica*), from a diſeaſe in the membrane lining the internal parts of the noſtrils.

Varying according to the nature of the diſeaſe.

2. Anoſmia (*atonica*), without any evident diſeaſe of the membrane of the noſe.

Genus XCIX. Agheuſtia. A diminution or abolition of the ſenſe of taſte.

1. Agheuſtia (*organica*), from a diſeaſe in the membrane of the tongue, keeping off from the nerves thoſe ſubſtances which ought to produce taſte.

2. Agheuſtia (*atonica*), without any evident diſeaſe of the tongue.

Genus C. Anæſtheſia. A diminution or abolition of the ſenſe of feeling. The ſpecies from Sauvages, adopted by Dr. Cullen, are,

1. Anæſtheſia a ſpina biſida.
2. Anæſtheſia plethorica.
3. Anæſtheſia naſcentium.
4. Anæſtheſia melancholica.

Order II. Dyſorexia. Error or defect in appetite.

Sect. I. Appetitus erronei.

Genus CI. Bulimia. A deſire for food in greater quantities than can be digeſted.

The idiopathic ſpecies are,

1. Bulimia (*helluonum*), an unuſual appetite for food, without any diſeaſe of the ſtomach.

2. Bulimia (*ſyncopalis*), a frequent deſire of meat, on account of a ſenſation of hunger threatening ſyncope.

3. Bulimia (*emetica*), an appetite for a great quantity of meat, which is thrown up immediately after it is taken.

Genus CII. Polydipſia. An appetite for an unuſual quantity of drink.

The polydipſia is almoſt always ſymptomatic, and varies only according to the nature of the diſeaſe which accompanies it.

Genus CIII. Pica. A deſire of ſwallowing ſubſtances not uſed as food.

Genus CIV. Satyriaſis. An unbounded deſire of venery in men. The ſpecies are,

1. Satyriaſis (*juvenilis*), an unbounded deſire of venery, the body at the ſame time being little diſordered.

2. Satyriaſis (*furens*), a vehement deſire of venery, with a great diſorder of the body at the ſame time.

Genus CV. Nymphomania. An unbounded deſire of venery in women.

Varying in degree.

Genus CVI. Noſtalgia. A violent deſire in thoſe who are abſent from their country of reviſiting it.

1. Noſtalgia (*ſimplex*), without any other diſeaſe.

2. Noſtalgia (*complicata*), accompanied with other diſeaſes.

Sect. II. Appetitus deficientes.

Genus CVII. Anorexia. Want of appetite for food. Always ſymptomatic.

1. Anorexia (*humoralis*), from ſome humour loading the ſtomach.

2. Anorexia (*atonica*), from the tone of the fibres of the ſtomach being loſt.

Genus CVIII. Adipſia. A want of thirſt. Always a ſymptom of ſome diſeaſe affecting the ſenſorium commune.

Genus CIX. Anaphrodiſia. Want of deſire for, or impotence to, venery.

The true ſpecies are,

1. Anaphrodiſia paralytica.
2. Anaphrodiſia gonorrhoica.

The falſe ones are,

1. Anaphrodiſia a mariſeis.
2. Anaphrodiſia ab urethræ vitio.

Order III. Dyſcineſiæ. An impediment, or depravation of motion from a diſorder of the organs.

Genus CX. Aphonia. A total ſuppreſſion of voice without coma or ſyncope. The ſpecies are,

1. Aphonia *(gutturalis)*, from the fauces or glottis being ſwelled.

2. Aphonia *(trachealis)*, from a compreſſion of the trachea.

3. Aphonia *(atonica)*, from the nerves of the larynx being cut.

Genus CXI. Mutitas. A want of power to pronounce words. The ſpecies are,

1. Mutitas *(organica)*, from the tongue being cut out or deſtroyed.

2. Mutitas *(atonica)*, from the injuries done to the nerves of the tongue.

3. Mutitas *(ſurdorum)*, from people being born deaf, or the hearing being deſtroyed during childhood.

Genus CXII. Paraphonia. A depraved ſound of the voice. The ſpecies are,

1. Paraphonia *(puberum)*, in which, about the time of puberty, the voice, from being acute and ſweet, becomes more grave and harſh.

2. Paraphonia *(rauca)*, in which, by reaſon of the dryneſs or flaccid tumor of the fauces, the voice becomes rough and hoarſe.

2. Paraphonia *(reſonans)*, in which, by reaſon of an obſtruction in the noſtrils, the voice becomes hoarſe, with a ſound hiſſing through the noſtrils.

4. Paraphonia *(palatina)*, in which, on account of a defect or diviſion of the uvula, for the moſt part with an hare lip, the voice becomes obſcure, hoarſe, and unpleaſant.

5. Paraphonia *(clangens)*, in which the voice is changed to one acute, ſhrill, and ſmall.

6. Paraphonia *(comatoſa)*, in which, from a relaxation of the velum palati and glottis, a ſound is produced during inſpiration.

Genus CXIII. Pſelliſmus. A defect in the articulation of words. The ſpecies are,

1. Pſelliſmus (*hæſitans*), in which the words, eſpecially the firſt ones of a diſcourſe, are not eaſily pronounced, and not without a frequent repetition of the firſt ſyllable.

2. Pſelliſmus *(ringens)*, in which the ſound of the letter R is always aſpirated, and, as it were, doubled.

3. Pſelliſmus (*lallans*), in which the ſound of the letter L becomes more liquid, or is pronounced inſtead of R.

4. Pſelliſmus *(emolliens)*, in which the hard letters are changed into the ſofter ones, and thus the letter S is much uſed.

5. Pſelliſmus *(balbutiens)*, in which, by reaſon of the tongue being large, or ſwelled, the labial letters are better heard, and often pronounced inſtead of others.

6. Pſelliſmus *(acheilos)*, in which the labial letters cannot be pronounced at all, or with difficulty.

7. Pſelliſmus *(logoſtomatum)*, in which, on account of the diviſion of the palate, the guttural letters are leſs perfectly pronounced.

Genus CXIV. Strabiſmus. The optic axes of the eyes not converging. The ſpecies are,

1. Strabiſmus *(habitualis)*, from a bad cuſtom of uſing only one eye.

2. Strabiſmus *(commodus)*, from the greater debility or mobility of one eye above the other; ſo that both eyes cannot be conveniently uſed.

3. Strabiſmus *(neceſſarius)*, from a change in the ſituation or ſhape of the parts of the eye.

Genus CXV. Contractura. A long-continued and rigid contraction of one or more limbs. The ſpecies are,

1. Contractura *(primaria)*, from the muſcles becoming contracted and rigid.

a, From the muſcles becoming rigid by inflammation.

b, From muſcles becoming rigid by ſpaſm.

c, From muſcles contracted by reaſon of their antagoniſts having become paralytic.

d, From muſcles contracted by an irritating acrimony.

2. Contractura *(articularis)*, from ſtiff joints.

Order IV. Apocenoſes. A flux either of blood or ſome other humour flowing more plentifully than uſual, without pyrexia, or an increaſed impulſe of fluids.

Genus CXVI. Profuſio. A flux of blood.

Genus CXVII. Ephidroſis. A preternatural evacuation of ſweat.

Symptomatic ephidroſes vary according to the nature of the diſeaſes which they accompany, the different nature of the ſweat itſelf, and ſometimes the different parts of the body which ſweat moſt.

Genus CXVIII. Epiphora. A flux of the lachrymal humour.

Genus CXIX. Ptyaliſmus. A flux of ſaliva.

Genus CXX. Enureſis. An involuntary flux of urine without pain. The ſpecies are,

1. Enureſis *(atonica)*, after diſeaſes injuring the ſphincter of the bladder.

2. Enureſis (*irritata*), from a compreſſion or irritation of the bladder.

Genus CXXI. Gonorrhœa. A preternatural flux of humour from the urethra in men, with or without a deſire of venery. The ſpecies are,

1. Gonorrhœa *(pura)*, in which, without any impure venery having preceded, a humour reſembling pus, without dyſuria or propenſity to venery, flows from the urethra.

2. Gonorrhœa *(impura)*, in which, after impure venery, an humour like pus flows from the urethra with dyſuria. The conſequence of this is,

3. Gonorrhœa *(mucoſa)*, in which, after an impure gonorrhœa, a mucous humour flows from the urethra with little or no dyſuria.

4. Gonorrhœa *(laxorum)*, in which an humour for the moſt part pellucid, without any erection of the penis, but with a propenſity to venery, flows from the urethra while the perſon is awake.

5. Gonorrhœa *(dormientium)*, in which the ſeminal liquor is thrown out, with erection and deſire of venery, in thoſe who are aſleep and have laſcivious dreams.

Order V. Epiſcheſes. Suppreſſions of evacuations.

Genus CXXII. Obſtipatio. The ſtools either ſuppreſſed, or ſlower than uſual. The ſpecies are,

1. Obſtipatio *(debilium)*, in lax, weak, and for the moſt part dyſpeptic perſons.

2. Obſtipatio *(rigidorum)*, in people whoſe fibres are rigid, and frequently of an hypochondriac diſpoſition.

3. Obſtipatio *(obſtructorum)*, with ſymptoms of the colica 1ſt, 2d, 4th, and 7th, abovementioned.

Genus CXXIII. Iſchuria. An abſolute ſuppreſſion of urine. The ſpecies are,

1. Iſchuria *(renalis)*, coming after a diſeaſe of the kidneys, with pain, or troubleſome ſenſe of weight in the region of the kidneys, and without any ſwelling of the hypogaſtrium, or deſire of making water.

2. Iſchuria *(ureterica)*, coming after a diſeaſe of the kidneys, with a ſenſe of pain or uneaſineſs in ſome part of the ureter, and without any tumor of the hypogaſtrium, or deſire of making water.

3. Iſchuria *(veſicalis)*, with a ſwelling of the hypogaſtrium, pain at the neck of the bladder, and a frequent ſtimulus to make water.

4. Iſchuria *(urethralis)*, with a ſwelling of the hypogaſtrium, frequent ſtimulus to make water, and pain in ſome part of the urethra.

All theſe ſpecies are ſubdivided into many varieties, according to their different cauſes.

Genus CXXIV. Dyſuria. A painful, and ſomehow impeded emiſſion of urine. The ſpecies are,

1. Dyſuria *(ardens)*, with heat of water, without any manifeſt diſorder of the bladder.

2. Dyſuria *(ſpaſmodica)*, from a ſpaſm communicated from the other parts to the bladder.

3. Dyſuria *(compreſſionis)*, from the neighbouring parts preſſing upon the bladder.

4. Dyſuria *(phlogiſtica)*, from an inflammation of the neighbouring parts.

5. Dyſuria *(irritata)*, with ſigns of a ſtone in the bladder.

6. Dyſuria *(mucoſa)*, with a copious excretion of mucus.

Genus CXXV. Dyſpermatiſmus. A flow, impeded, and inſufficient miſſion of ſemen in the venereal act. The ſpecies are,

1. Dyſpermatiſmus *(urethralis)*, from diſeaſes of the urethra.

2. Dyſpermatiſmus *(nodoſus)*, from knots on the cavernous bodies.

3. Dyſpermatiſmus *(præputialis)*, from too narrow an orifice of the prepuce.

4 Dyſpermatiſmus *(mucoſus)*, from mucus infarcting the urethra.

5. Dyſpermatiſmus *(hypertonicus)*, from too ſtrong an erection of the penis.

6. Dyſpermatiſmus *(epilepticus)*, from a ſpaſmodic epilepſy happening during the time of coition.

7. Dyſpermatiſmus *(apractodes)*, from an imbecility of the parts of generation.

8. Dyſpermatiſmus *(refluus)*, in which there is no emiſſion of ſemen, becauſe it returns from the urethra into the bladder.

Genus CXXVI. Amenorrhœa. The menſes either flowing more ſparingly than uſual, or not at all, at their uſual time, without pregnancy. The ſpecies are,

1. Amenorrhœa *(emanſionis)*, in thoſe arrived at puberty, in whom, after the uſual time, the menſes have not yet made their appearance, and many different morbid affections have taken place.

2. Amenorrhœa *(ſuppreſſionis)*, in adults, in whom the menſes which had already begun to flow are ſuppreſſed.

3. Amenorrhœa *(difficilis)*, in which the menſes flow ſparingly, and with difficulty.

Order VI. Tumores. An increaſed magnitude of any part without phlogoſis.

Genus CXXVII. Aneuriſma. A ſoft tumor, with pulſation, above an artery.

Genus CXXVIII. Varix. A ſoft tumor, without pulſation, above a vein.

Genus CXXIX. Ecchymoma. A diffuſed, and ſcarce eminent, livid tumor.

Genus CXXX. Scirrhus. An hard tumor of ſome part, generally of a gland, without pain, and difficultly brought to ſuppuration.

Genus CXXXI. Cancer. A painful tumor of a ſcirrhous nature, and degenerating into an ill-conditioned ulcer.

Genus CXXXII. Bubo. A ſuppurating tumor of a conglobate gland.

Genus CXXXIII. Sarcoma. A ſoft ſwelling, without pain.

Genus CXXXIV. Verruca. A harder ſcabrous ſwelling.

Genus CXXXV. Clavus. A hard, lamellated thickneſs of the ſkin.

Genus CXXXVI. Lupia. A moveable, ſoft tumour below the ſkin, without pain.

Genus CXXXVII. Ganglion. An harder moveable ſwelling, adhering to a tendon.

Genus CXXXVIII. Hydatis. A cuticular veſicle filled with aqueous humour.

Genus CXXXIX. Hydarthrus. A moſt painful ſwelling of the joints, chiefly of the knee, at firſt ſcarce elevated, of the ſame colour with the ſkin, diminiſhing the mobility.

Genus CXL. Exoſtoſis. A hard tumor adhering to a bone.

Order VII. Ectopiæ. Tumors occaſioned by the removal of ſome part out of its proper ſituation.

Genus CXLI. Hernia. An ectopia of a ſoft part as yet covered with the ſkin and other integuments.

Genus CXLII. Prolapſus: A bare ectopia of ſome ſoft part.

Genus CXLIII. Luxatio. The removal of a bone from its place in the joints.

Order VIII. Dialyſes. A ſolution of continuity; manifeſt to the ſight or touch.

Genus CXLIV. Vulnus. A recent and bloody ſolution of the unity of ſome ſoft part by the motion of ſome hard body.

Genus CXLV. Ulcus. A purulent or ichorous ſolution of a ſoft part.

Genus CXLVI. Herpes. A great number of phlyctenæ or ſmall ulcers, gathering in cluſters, creeping, and obſtinate.

Genus CXLVII. Tinea. Small ulcers among the roots of the hair of the head, pouring out a humour which changes to a white friable ſcurf.

Genus CXLVIII. Pſora. Itchy puſtules and little ulcers of an infectious nature, chiefly infeſting the hands.

Genus CXLIX. Fractura. Bones broken into large fragments.

Genus CL. Caries. An exulceration of a bone.

Having thus preſented to our readers Dr. Cullen's general ſyſtematic view of all the diſeaſes to which the human body is ſubjected, we come next to give a particular account of the more important affections. In the execution of this part of our taſk, however, we ſhall reſume our extracts from Dr G. Fordyce, and add to them accounts of the treatment of various chronic affections from other writers.

Chap. I. *Of the* Symptoms, Distinctions, Prognostics, *and* Treatment *of* Fevers.

THE periods of fevers begin with the following ſymptoms: (*a*) Languor, wearineſs, weakneſs, inſenſibility of the extremities. Blindneſs and inſenſibility in the other organs of ſenſation, cold and trembling, pain in the back. (*b*) Horripilatio; the ſkin pale, dry, and of a duſky colour; a dry, foul tongue, and thirſt; tranſparent urine; coſtiveneſs; and ſuppreſſion of other ſecretions; paleneſs and dryneſs in ulcers; a ſmall obſtructed pulſe, ſometimes intermitting; pain in the limbs, joints, and forehead; *delirium*. (*c*) Anxiety; oppreſſion and ſwelling about the *præcordia*; frequency of the pulſe; quick and laborious reſpiration, ſometimes with a cough; rigor, and horror; thirſt, flatulencies, loſs of appetite, *nauſea*, and vomiting.

According to the violence of theſe ſymptoms at any time of the diſeaſe, the fever is violent; and when they are entirely carried off it is cured.

Theſe are produced by, 1. Certain paſſions of the mind ſuddenly excited, the principal of which are fear, grief, and anxiety. 2. Cold. 3. Putrid, infectious, variolous, morbillous, and other eruptive matter, acting upon the irritable parts. 4. Retention of certain ſubſtances in the *primæ viæ*, as indigeſtible food in the ſtomach, *fæces* in the inteſtines. 5. Changing of cuſtoms or climates to which the body has been habi-

tuated; at leaſt aſſiſting the other cauſes. 6. Unknown cauſes.

Theſe cauſes, except variolous and morbillous, and ſometimes other matter, produce fever immediately, without any previous alteration. And when matter does not produce fever immediately, it does not enter the blood-veſſels, but lodges in ſome part of the body for ſome time, and, as ſoon as it enters the blood-veſſels, and touches the heart, the fever immediately comes on.

Any two of them acting together are more powerful in exciting the diſeaſe than one ſingly; and they act more certainly on irritable habits.

When a fever is once produced, it is totally independent of its cauſe, and for the moſt part goes on in the ſame manner, whether it be removed or continued.

Unleſs when the ſymptoms of the firſt ſtage deſtroy the patient, they are followed by *rigor* and *horror*; heat riſing from the præcordia, and diffuſed from thence over the body irregularly, unequally, and with flushing; a ſtrong, full, obſtructed pulſe; or a very frequent, ſmall one; pain in the head and joints; *ſtupor* and *delirium*; univerſal ſoreneſs; redneſs ariſing in different parts irregularly; the urine high-coloured, but perfectly tranſparent; ſweating in the head and breaſt, or over the whole body; partial ſecretions.

The ſymptoms of the firſt ſtage are gradually relieved. At laſt the pulſe becomes free; all the ſecretory organs are relaxed; hence the ſkin grows ſoft and moiſt, and returns to its natural colour; the tongue likewiſe is ſoft and moiſt, the belly is open, and the urine in greater quantity; if tranſparent when diſcharged, after a little time it becomes turbid and opaque, and at laſt depoſits a copious ſediment: the ſecretions are often greatly increaſed; there ariſes a copious and univerſal ſweat, or a purging, or great flow of urine.

The frequency of the pulſe, and all the other ſymptoms of the firſt and ſecond ſtage gradually ſubſiding, the patient recovers his health, but is conſiderably weakened.

Or there ariſes an inflammation or hæmorrhage in ſome part of the body, the ſymptoms of the firſt ſtage ſuddenly diſappearing, or being greatly diminiſhed.

During the whole period the blood continues the ſame in all its ſenſible qualities. It is in all the different ſtates in which it is ever found in the body at any time; ſometimes throwing up the coagulable lymph, and coagulating firmly; ſometimes having its natural appearance, and ſometimes coagulating looſely. Fever therefore is not connected with any ſtate of the blood.

Fevers are, 1. The *ephemera ſimplex*, conſiſting of one period only; and, 2. *Recurrent fevers*, conſiſting of more than one period; no ſingle one laſting more than 24 hours, or till the following evening.

Recurrent fevers are, 1. The *intermittent*, in which the ſymptoms of one period go off entirely before a ſecond ariſes, or there are only left a ſlight pain in the back, a foul tongue, ſome contraction and paleneſs on part of the ſkin, with languor; or ſome other ſlight ſymptoms of the firſt ſtage. 2. The *remittent*, in which the patient is greatly relieved; but the pulſe continues frequent, and ſeveral other ſymptoms are not carried off before the ſecond period begins. 3. The *continued*, in which one period begins before the former is conſiderably abated.

Fevers recur in conſequence of, 1. Freſh occaſional cauſes. 2. A habit acquired. 3. Symptoms of the firſt ſtage continuing after the criſis. 4. The natural evening paroxyſm of fever. 5. The action of types.

In *intermittent fevers*, the diſeaſe is more apt to recur at the end of 48 hours from the beginning of the former period, than at any other interval: ſuch are called *tertians*: next to this it is more apt to recur at 24 hours, when they are called *quotidians*; or at 72 hours, when they are called *quartans*; but there are inſtances of their recurring at all other intervals.

Theſe types extend their influence to an hour or two ſooner or later; and *quotidians* are frequently converted into *tertians*, and *tertians* into *quartans*.

The ſymptoms indicating ſtrong action of the veſſels, often happen in quotidians; the ſymptoms of the firſt ſtage are violent in tertians; and thoſe indicating weakneſs are frequently found in quartans. But ſymptoms of ſtrength and weakneſs occur in all the types.

In fevers recurring at the end of 24 hours, when every ſecond period is more violent, they are called *double tertians*; when every third, they are called *triple quartans*.

In *continued fevers* the exacerbations happen commonly every day in the evening, and are equable at the beginning, but gradually increaſing; and this commonly through the firſt week: in the middle every other one is more violent: and this continues often through the ſecond week: and at the end every third, when they likewiſe gradually decreaſe and go off in the third week for the moſt part, unleſs when they are irregular.

Fevers are much more apt to be governed by types in warm climates; in cold ones there are frequently no marks of them, and therefore no critical days.

In continued fevers at the beginning, for the moſt part, the veſſels act ſtrongly; at the end weakly.

In all fevers, the more violent the attack at any particular period, the greater chance there is of the paroxyſm's running through its ſtages, and producing a perfect criſis.

In continued fevers left to themſelves, more violent exacerbations oftener happen in the fourth, fifth, ſeventh, ninth, eleventh, thirteenth, fourteenth, ſeventeenth, and twenty-firſt days, than on any others; and theſe therefore have been called critical days.

If the tertian type ſhould begin on the ſixth day, the critical days will be altered: for, in the beginning, continued fevers commonly obſerve the quotidian type; in the ſecond week the tertian, and afterwards the quartan.

The danger is greateſt on the critical days; the paroxyſms alſo ſometimes go through all their ſtages on theſe days, and a perfect freedom from the diſorder is produced, (in which caſe, for moſt part, it does not recur); or the diſeaſe, without any remarkable criſis, goes off by the exacerbations becoming gradually leſs and leſs, and being followed by imperfect critical ſymptoms.

For moſt part, if a criſis ſhould not terminate a continued fever, it increaſes during the firſt week, ariſes to its greateſt violence in the ſecond, and gradually wears itſelf out in the third, or ſometimes in the fourth. Intermittents go through the ſame kind of progreſs, but in a longer time.

The danger ariſes from the violence of the ſymptoms of the firſt ſtage, and the *delirium* produced from thence; or from too ſtrong an action of the veſſels, or irregularity in the diſeaſe; or from great weakneſs and irritability.

The firſt is indicated by the diſeaſe's being preceded by long continued languor, wearineſs, and weakneſs: its being attended by great proſtration of ſtrength: ſymptoms of putrid blood appearing in its courſe, as a black fur upon the tongue; petechiæ, hæmorrhage, putrid ſecretions, as putrid fæces and fœtid breath, frothy or thick and black urine. The ſkin's being rough, dry, and unequal; ulcers becoming perfectly dry; the pulſe being much obſtructed; the tongue and mouth's being dry, the tongue covered with a dry rough fur, and the thirſt unextinguiſhable; the urine's being pale, perfectly tranſparent, and in ſmall quantities; the nails, fingers, and feet remaining

cold and pale; the nose sharp, temples and eyes hollow; skin of the forehead contracted; ears cold, and face universally pale, or of a dusky colour. When the breast is particularly affected, it is shown by the pulse being very frequent, irregular, or intermittent; the breathings being short, quick, and laborious, the patient moving his nostrils; the *præcordia* tense, swelled, and hard; the anxiety and restlessness great. When the mind is much or particularly affected, there is delirium, either with contraction or fulness of the vessels of the brain; the first is shown by the eyes being sunk and stupid, without redness or flushing of the face; the second by the eyes being blood-shot, the face flushed, or the cheeks red; both begin with watchfulness, or restless and unrefreshing sleep, the patient waking somewhat delirious; the imagination afterwards continues hurried; the patient picking the hairs off the bed-clothes, and hunting flies; the thirst going suddenly off; violent delirium, or a total insensibility, or convulsions appearing.

The second is indicated by a hard, full, strong pulse; a great redness; a quick respiration; a dry white tongue; great pain in the head and joints; sweating about the head and breast, or all over the body; red swelled eyes; *stupor, delirium*; convulsions.

The third is indicated by partial, or universal, or cold colliquative sweating; purging; tears; great secretion of urine; or any partial secretion, the others not taking place at the same time; urine with a mucous cloud or sediment; any part of the system being affected with symptoms of the first stage, in a greater proportion than the other parts; the types varying, the paroxysms or exacerbation sometimes diminishing for two or three periods, afterwards becoming more severe. A small, quick, trembling pulse; the patient lying seemingly stupid without much uneasiness; or on his back with the legs and arms extended, slipping out at the foot of the bed; fainting when in an erect posture, or upon any evacuation; *delirium*; *subsultus tendinum*; the *fæces* and urine evacuated without knowledge of the patient; the pulse lost in the arm.

When the symptoms of the first stage come on with great violence, the disease is oftener an *ephemera simplex* or *intermittent*, than a continued fever.

When the symptoms (*a*) of the first stage attack the patient more violently in proportion to (*b*) (*c*), the disease is apter to be continued, and *e contrario*.

When the tertian type is evident on the first days of a continued, it is generally changed into an intermittent.

The more perfect the crisis, the less danger of a relapse, and *e contrario*. Continued fevers, whose types are changed by evacuations, are less apt to be cured by a crisis; and have more imperfect crises than those running through their natural periods.

Fevers which in the beginning are neither attended with strong symptoms of the first stage, nor those indicating great strength or weakness, generally continue long.

Fevers that are continued, and have the symptoms of the first stage violent, are the *plague, malignant fevers*.

Continued fevers, in which the symptoms of the first stage are slight at the beginning, if attended with symptoms of strong action of the vessels, are *inflammatory fevers*; if otherwise, *irregular, low, nervous fevers*.

Indications of Cure *in* Fevers.

I. Indication. All applications increasing the disease, rendering the hot fit irregular, or disturbing the natural periods, are to be avoided.

(*A*) The food is to be easy of solution and fermentation; not flatulent, nor producing an adhesive solution; agreeable to the stomach; and not in too great quantity.

Proper substances for food are, (*a*) Decoction of rice, barley, oats, &c. (*b*) Barley, oats, rice, &c. shelled, and afterwards boiled; or fermented, baked into bread, and afterwards toasted. Fruits which are not acescent or flatulent; recent or dried; roasted, baked, or boiled. (*c*) Milk; broths made of pullets, lean mutton, and beef. (*d*) Pullets about nine months old, roasted or boiled. (*e*) Whitings, flounders, &c.; these fishes however are seldom to be used in continued fevers. (*f*) Mutton, venison, hares, rabbits, &c. which are only to be used in intermittents when the intermissions are long and perfect.

(*B*) The *primæ viæ* are to be cleared of any offending matter by gentle emetics and laxatives, or clysters, according to the strength of the patient. (*a*) Proper laxatives are, sal glauberi verus, tartar vitriolatum, tartar solubile, polychrestum rupellense, sulphur, radix rhei, manna, cassia, tartar, fructus tamarindorum. (*b*) Laxatives used in clysters are, decoctum commune pro clysmate, sal commune, sal glauberi, oleum lini, saccharum rubrum, electuarium lenitivum.

(*C*) External heat and cold are to be avoided, as are likewise sudden changes from the one to the other, and air unfit for respiration. The patient is to be confined to his bed, where unnecessary exertion is avoided, and the heat is equable over the whole body. The bedchamber is to be large, and heated when necessary by fuel, burning in an open fire place; or cooled by sprinkling the floor with infusions, or distilled waters of some of the aromatic herbs, such as thymus, rosmarinus, lavendula, rosarum flores; and the bed is not to be exposed to currents of air.

(*D*) Sleep may be procured by (*a*) attention to an uniform murmuring noise, as that of falling water, or reading in a low voice. (*b*) Antispasmodics and sedatives, as oleum dulce, oleum æthereum, in spiritu vini soluta et aqua commixta. (*c*) Opium, which is seldom useful, frequently prejudicial.

(*E*) Passions of the mind attended with anxiety are to be avoided.

II. Indication. Accidents arising from too strong action of the vessels or plethora are prevented, (*A*) by bleeding, according to the strength of the patient, and violence of the symptoms of the first stage. (*B*) By using such food as affords little nourishment. [Vid. Ind. 1st. (*A*) (*a*)]. (*C*) By sedatives given internally, such as acidum vitriolicum, muriaticum, limonum, tamarindorum, berberis, mororum. (*D*) By laxatives, so as to procure two or three stools. [Vid. Ind. 1st. (*B*) (*a*)].

III. Indication. Care is to be taken not to waste the powers of the body unnecessarily, by evacuations or otherwise, through the course of the disease; and the strength is to be supported when the symptoms of weakness come on.

Hæmorrhages, with symptoms of putrefaction, are to be stopped by cortex peruvianus, flores rosarum rubrarum, acidum vitriolicum. (*A*) Stimulants and antispasmodics are to be given according to the weakness, such as sack, mountain, port, claret. (*B*) By food of as great nourishment as can be digested without disordering the system through the whole disease. (*C*) By strengthening remedies, as cortex peruvianus, flores chamæmeli, præparationes ferri, &c. These are particularly applicable in intermittents, and sometimes in continued fevers, if there be laxity in the secretory vessels.

It hath been the practice, with this view, to give the spices, and other similar stimulants; but as they generally quicken the pulse, and greatly increase all the symptoms of irritability, I think they ought to be laid aside: blisters, upon the same account, are not useful for this purpose.

IV. Indication. Irritability arising towards the end is to be taken off. (*A*) By acids. [Vid. Ind. II. (*C*)]. (*B*) By cortex peruvianus, if there are remarkable remissions, or a ge-

neral freedom in the ſecretory organs. (*C*) By opium, given ſo as to act conſtantly, but gently.

V. Indication. The ſymptoms of the firſt ſtage are to be taken off or diminiſhed. (*A*) By giving internally medicines to relax the ſmall veſſels throughout the ſyſtem by their action on the ſtomach, ſuch as nitrum commune, ammoniacum commune, all the other neutral ſalts, radix ipecacuanhæ, præparationes antimonii, aqua frigida. By applying warm water in fomentation, eſpecially to the legs and thighs. (*B*) By external applications producing inflammation, ſuch as cantharides, ſemina ſinapi. By applying leeches to the temples in caſe of delirium, from fulneſs of the veſſels of the brain.

The gentle ſtimulants, commonly called *diaphoretics*, as contrayerva, &c. have been uſed internally by many practitioners for this purpoſe; but their action is extremely doubtful.

VI. Indication. The diſeaſe is to be prevented from recurring. (*A*) By taking off ſymptoms of the firſt ſtage remaining after the criſis, and facilitating the re-production of the diſeaſe. [Vid. Ind. V. (*A*)].

(*B*) By counteracting the cold fit before and at the time of the acceſſion. (*a*) [Vid. Ind. V. (*A*)]. (*b*) By the application of ſtimulants and antiſpaſmodics: (1) externally, as allium, ſinapi, aromata; (2) internally, as the aromata, alkali volatile, opium, moſchus, camphora.

(*C*) By medicines preventing any application from affecting the ſyſtem ſo powerfully as it would do naturally, (i. e. diminiſhing irritability,) ſuch as cortex peruvianus, vitriolum et muria ferri, vitriolum cupri, alumen, cortex fraxini.

§ 1. *Of the Plague.*

The plague is always produced by putrid or infectious vapour applied to the body, ſometimes acting as the ſole cauſe, ſometimes in conjunction with others, and more or leſs powerfully according to the irritability.

Of all *continued fevers* this attacks the patient with the moſt ſevere ſymptoms of the firſt ſtage: theſe too increaſe in it the faſteſt at every exacerbation, and produce the ſymptoms of weakneſs the quickeſt, particularly thoſe of putrid blood. In cold climates the ſymptoms of ſtrong action of the veſſels ſometimes appear at the beginning with great violence.

For moſt part, the ſymptoms of the firſt ſtage ariſe to ſo great a height as to kill the patient before the end of the firſt week.

The putrid vapour in the air may perhaps be deſtroyed by impregnating it with acids; as, by burning great quantities of wood, or detaching great quantities of concentrated muriatic acid from ſea-ſalt by the vitriolic, and evaporating it.

Fear, grief, and anxiety, indigeſtible and flatulent food, coſtiveneſs, cold, and the other cauſes of fever, are to be avoided as much as poſſible.

Medicines deſtroying the irritability of the body may be exhibited (as a glaſs of wine) when any-one is unavoidably expoſed to the infection in circumſtances where it would act more powerfully. The bark may be uſed as a preſervative, in the following, or a ſimilar form:

(No. 1.) ℞ Vin. Rubr. Luſit. ℔ ij.
Cort. Peruv. } a a ℥ ij.
—— Cinnam. }
Digere per horas xlviij calore 100 grad. Therm. Fahren. et col. Capt. Coch. iiij ter indies.

The fever is to be put a ſtop to, if poſſible, by the moſt powerful means of taking off the ſymptoms of the firſt ſtage.

(No. 2.) ℞ Pulv. Ipecac. gr. vi ad xij.
Antim. Tart. gr. i. Ft. Pul. Emet.
Vel, Ft. cum Syr. Scilit. q. ſ. Bolus. Emet.
Vel, ℞ Tinct. Ipecac. ℥ ſß ad ℥j.
Tart. Emet. gr. j. Ft. Hauſt. Emet.
Cap. veſp. hora ix ſuperbib. Infuſ. Cham. vel Card. Benedict. nequaquam tamen ultra modum urgeatur vomitus; in lecto etiam detineatur æger.

After the operation of the emetic, the patient is to be laid in cloth of cotton, or flannel, his head bound round, and when warm the following draught is to be given:

(No. 3.) ℞ Aq. Menth. vulg. vel Cinnam. Ten. vel Alexit. ſimpl. ℥j ſß.
Tinct. Opii, gtt. x ad xxv. vel
Syr. Diacod. ℥jſß ad ℥vi.
Aq. Menth. Spir. vel
Nuc. Moſch. vel
Cinnam. Spir. ℥ij.
Syr. Moror. ℥ij.

If a ſweat can be raiſed by theſe means, it is to be kept up by relaxing medicines.

(No. 4.) ℞ Antim. Tart. gr. ¼ ad gr. j.—Sacch. Alb. gr. x. M. Ft. Pulv. Capt. quartâ vel ſextâ quâque horâ cum Hauſt. ſequent.
℞ Aq. Menth. vulg. ℥iſß.—Nuc. Moſch. ℥ij—Syr. Moror. ℥ij.——M. Ft. Hauſt.

If the vomiting ſhould continue, it might perhaps be adviſeable to add a few drops of laudanum to the draught.

The patient is to drink copiouſly of any warm watery fluid at the ſame time.

If by theſe means the fever ſhould be carried off, the following medicine may be made uſe of to prevent a relapſe.

(No. 5.) ℞ Pulv. Cort. Peruv. Subt. ℥ ſß. ad ℥j. Ft. Pulvis;
Vel, Cum Syr. Croc. q. ſ. Ft. Bolus.
Vel, ℞ Aq. Alexit. ℥i ſß.
Pulv. Cort. Peruv. ℥ ſß. ad ℥j.
Syr. e Cort. aur. } a a ℥ij.
Aq. Cort. aur. Spir. }
Ft. Hauſt. Omne horâ ſumendus.

If the ſymptoms indicating ſtrong action of the veſſels ſhould be very violent, it may be neceſſary to take away a little blood. No ſolid food is to be uſed.

From the deſcriptions given, and methods of cure applied by the different authors who have treated of the plague in cold climates, the above ſeems to be the moſt promiſing means of ſaving patients, who would otherwiſe certainly be deſtroyed.

An inflammation of a lymphatic gland, ſometimes ariſes at the beginning, and diminiſhes or entirely carries off the fever. This inflammation is never to be taken off, but always brought to ſuppuration.

Inflammations alſo ariſe in this diſeaſe which tend ſtrongly to gangrene.

Multitudes of patients appear to have been loſt for want of neceſſary attendance, on account of the danger.

§ 2. *Of the Violent, Putrid, or Jail Fever.*

This ſpecies of fever generally proceeds from the ſame cauſes that produce the plague, only not applied in ſo great a degree. It attacks the patient with violent ſymptoms of the firſt ſtage; particularly with thoſe marked *(a)*. The cold often returns alternately with the heat, for the firſt 24 hours; the ſymptoms indicating ſtrong action of the veſſels ſometimes appear, but ſeldom to any great degree; the fever increaſes greatly every evening, ſo that *delirium*, either from fulneſs or with contraction of the veſſels of the brain, affection of the breaſt, or hæmorrhage from putrefaction, often come on about the beginning of the ſecond week, and with the other ſymptoms of the firſt ſtage kill the patient: otherwiſe each exacerbation becomes leſs towards the end of the ſecond week and afterwards; the *delirium*, eſpecially when it ariſes from relaxa-

tion of the veſſels of the brain, is converted into a *ſtupor*. The criſis happens from the beginning of the ſecond to the end of the third week; or the diſeaſe gradually leaves the patient with very imperfect critical ſymptoms. From the middle of the ſecond week, and ſometimes ſooner, the ſymptoms indicating putrid blood begin to appear, eſpecially if bleeding and ſtimulants have been uſed, and ſometimes ariſe to ſuch a height as to prove fatal.

From the violence of the diſeaſe the patient is often ſo much weakened as to be cut off in the third week. Sometimes, although ſeldom, an inflammation ariſes at the beginning, alleviating, but ſeldom entirely terminating the diſeaſe.

When putrid or infectious vapour is applied, it ſometimes produces at firſt only ſome of the ſymptoms of the firſt ſtage, which continue ſeveral days; at laſt a ſtrong attack comes on at once, followed by a hot fit, and the fever proceeds as above.

The air is frequently to be changed in places where it is liable to putrefy, and the putrid matter that has been generated is to be deſtroyed by acids converted into vapour.

As in the *Plague*.

If ſome few ſymptoms only ariſe from putrid or infectious vapour, they are readily carried off by the emetic (No. 2.) and draught (No. 3.), or by (No. 4.). They ought never to be neglected, although ever ſo ſlight.

No blood ſhould be taken away, unleſs the ſymptoms indicating ſtrong action of the veſſels be ſevere, or the patient be very plethoric, and even then with caution; and the bleeding hardly ever requires to be repeated.

We are to endeavour to leſſen the fever at the beginning by the emetic (No. 2.), and the ſtomach is to be ſettled by (No. 3), but profuſe ſweating is not to be attempted.

If the fever continues, in the evenings following that in which the emetic was given, until the fifth day,

(No. 6.) ℞ Sacch. Alb. gr. xx.—Antim. Tart. gr. ſ. ad gr. j. Divid. in Pulv. ij. Cap. unum hora viij. alterum hora xj. veſp. cum Hauſt. (No. 4.)

Or it is better to exhibit the medicine in the following manner.

(No. 6*.) ℞ Antim. Tart. gr. xxxx. Solve bulliendo ex Aq. Pur. ℥ij. Solutioni fere bullienti adde Vin. Alb. dulcis ℥vj. Sumat gtt. xxv et ſupra, quartâ, quintâ, vel ſextâ quâque horâ; nauſea non tamen excitanda.

At the beginning, through the whole periods, gentle ſedatives may be uſed, as

(No. 7.) ℞ Aq. Menth. vel Cinnam. Ten. vel Alex. ℥iſ. Succ. Limon. vel Mororum, vel Acid. Vitr. vel Mur. q. f. ad gratam acedin. Syr. Violar. ℥j. Ft. Hauſt. quartâ quâque horâ ſumend.

If the belly be not ſufficiently open, to one of the draughts may be added,

(No. 8.) ℞ Infuſ. Sen. ℥j ſ.—Sal. Glauber. ver. ℥ij. ad ℥iij. vel Tart. Vit. ℥ ſ. ad ℥j. vel Tart. Solub. ℥i. ad ℥ij. Træ. Senn. ℥ij. Man. ℥j.

Small doſes of neutral ſalts have been exhibited at this time of the diſeaſe, but, for the moſt part, without any ſenſible advantage.

Delirium, from fulneſs of the veſſels of the brain, is to be taken off by applying leeches to the temples.

If the ſymptoms of the firſt ſtage ſhould increaſe with great violence in the ſecond week, particularly delirium, bliſters are often applied to the head and back with advantage; but bliſtering the patient from head to foot from this time to the end of the diſeaſe exhauſts his ſtrength, quickens the pulſe, produces petechiæ, renders the ſyſtem extremely irritable, and ſometimes produces *ſubſultus tendinum*, and convulſions.

If the head be more affected than the reſt of the ſyſtem, the bliſter ſhould be applied to it; if the breaſt, it ſhould be applied there.

Acids may be continued, provided the patient be not much affected with flatulency.

The belly is to be kept open, if neceſſary, by clyſters, from this time to the end of the diſeaſe.

(No. 9.) ℞ Decoc. commun. pro Clyſm. ℥viij. ad ℥xiv. Elect. Lenitiv. ℥vj. ad ℥j ſ. vel Sal. Glaub. ver. ℥ ſ. ad ℥j. Ol. Lini ℥j ſ. M. Ft. Enem. pro re nata veſp. injic.

The greater the weakneſs, the leſs of the purgative is to be employed.

As the ſymptoms indicating weakneſs appear, the ſtrength is to be ſupported. Bibat Æger Vin. ℥ ſ. ad ℥j bis ad ſex ties indies.

The ſimple ſtimulants are, we apprehend, to be avoided, although it has been much the practice to employ them as well as camphor and other antiſpaſmodics, and by men of ſuch eminence that it requires more than my experience to reject them entirely.

If in the latter part of the diſeaſe, with great weakneſs, there be conſiderable remiſſion without ſtupor; or if there be general relaxation of the ſecretories,

(No. 11.) ℞ Aq. Menth. Vulg. ℥j ſ.—Pulv. Cort. Peruv. gr. xv. ad ℥ ſ.—Syr. e Cort. Aur. ℥ij. Aq. Menth. Piper. ℥j. M. F. Hauſt.
Vel Loco Pulv. Cort. Peruv. decoct. ſequent. ℥ ſ. ad ℥j

(No. 12.) ℞ Cort. Peruv. ſubt. Pulv. ℥j. Aq. Font. ℔ i. Coquantur ſimul per decem minut. prim. vaſe clauſo: Capt. quartâ vel ſextâ quâque horâ.

If the ſymptoms of weakneſs be conſiderable, it will be improper to uſe (No. 6*.), or continue it to this time of the diſeaſe.

The food, at the beginning of the diſeaſe, is to be of thoſe articles marked *(a) (b)*; and when the ſymptoms of weakneſs appear, thoſe marked *(c)* may be added; and native vegetable acid, if the patient be not affected with much flatulency.

§ 3. *Of the Inflammatory Fever.*

THIS is produced in ſtrong habits by all the cauſes of *Fever*; frequently by cold, but ſeldom by putrid or infectious vapour.

The ſymptoms of the firſt ſtage are ſlight, particularly thoſe marked *(a)*; but they are followed by a violent hot fit, in which all the ſymptoms indicating ſtrength appear in a great degree, the whole fever being often entirely terminated by topical inflammation or hæmorrhage, leaving only general inflammation; or in a few periods the patient is deſtroyed by the ſtrong action of the veſſels immediately affecting the brain, or injuring it to ſuch a degree as it cannot recover; ſo that the patient dies in the ſubſequent part of the diſeaſe; or depriving him entirely of ſleep, and in conſequence of that, cauſing delirium, violent convulſions, and death. If none of theſe things happen, in the ſecond week the ſtrength diminiſhes, the fever goes off with a perfect criſis; or imperfect critical ſymptoms appear after each exacerbation, theſe becoming gradually leſs. The white cruſt covering the tongue, in falling off, ſometimes leaves little exulcerations behind.

Its prevention is effected by avoiding the cauſes of fever.

In attempting the cure, the action of the arteries is to be diminiſhed by theſe means.

Ft. V. S. ad ℥viij. vel ℥xvj. bis, ter, quaterve repet. pro re nata.

(No. 13.) ℞ Aq; Alexit. ℥j ß.
Sal. nitr. ℈j. ad ℈ij. vel Sal. Alk. V. Fix. Succ. Limon. ſatur. ℈j vel Spt. Minder. ℥ ß.
Syrup. Limon. ℥ij. M. Ft. Hauſt. quartâ vel ſextâ quâque horâ ſumend.

The belly is to be kept open by (No. 8.) or any gentle means.

The action of bliſters, if there be no topical inflammation, is extremely uncertain.

If, when the fever is almoſt entirely gone off, the delirium from want of ſleep continues, the ſyſtem being greatly weakened, after all other means of procuring ſleep have been tried and have failed, opiates may be uſed ſometimes with advantage. But their effects are very precarious.

If any exulcerations ariſe in the mouth, in this, or any other fever, either with or without aphthæ, they are cured by

(No. 14.) ℞ Træ. Roſæ. ℥viij. Mel. Roſæ. ℥j. ad ℥ij.
M. Ft. Gargariſmus utatur fæpius.

Or, if they withſtand this, by (No. 11.), if it be not contra-indicated by the ſymptoms of the fever.

The food in the inflammatory ſtate is to be of the kinds marked *(a)*; when the ſtrength diminiſhes, thoſe marked *(b)* may be uſed.

When the fever is entirely removed, relapſes are prevented by (No. 5.)

This fever, after the general inflammation is conquered, ends ſometimes as the violent fever, and in this caſe is to be treated in the ſame manner.

§ 4. *Of the Low Nervous Fever.*

In this kind of Fever the irritability of the body is very great; in conſequence of which, the periods throughout the whole diſeaſe are often irregular.

It attacks people of phlegmatic temperaments; or thoſe weakened by uſing food not ſufficiently nouriſhing for their exerciſe, by great evacuations, long continued uſe of ſtimuli; perſons living in an impure air, &c.

It may be produced by all the cauſes of fever; but it ariſes commonly from affections of the mind, and from cold.

For moſt part at the firſt attack, and in ſome of the following exacerbations, the ſymptoms of the firſt ſtage are few, and thoſe not violent, and they are followed by very ſlight hot fits: the periods, however, increaſe gradually; but it is often the end of the firſt week before the diſeaſe is completely formed, or gives the patient ſo much uneaſineſs as to make him apply for relief. From this time it continues to increaſe conſiderably, and is attended with the ſymptoms of weakneſs, particularly thoſe indicating great irritability, which often ariſe to ſuch a height, as of themſelves, or with the fever, to deſtroy the patient. It happens too, that delirium from irritability takes place, the eyes are moiſt and quick in their motions, the patient is anxious and reſtleſs and without ſleep, his replies to queſtions are quick and with agitation; and this delirium is often fatal. The criſes happen generally in the third week, or later; or if there be no complete criſis, the exacerbations become irregular, ſometimes increaſing for two or three days, ſometimes diminiſhing, ſometimes coming on at various times in the day: in this caſe the diſeaſe is often drawn out to a great length.

Partial ſecretions, irregular affection of the various parts, and irregularity in the types and progreſs, are frequent throughout the whole progreſs of this fever.

If the patient be very weak at the firſt attack, both the ſymptoms of weakneſs and fever are ſenſibly greater at the beginning, and the diſeaſe is much ſhortened.

The patient is to be ſtrengthened, and the cauſes of fever are to be avoided.

The fever at the beginning may often be removed, or ſo much leſſened as to be of little conſequence; *(a)* by the emetic (No. 2.) and draught (No. 3;) or *(b)* by (No. 6*;) or *(c)* even by (No. 4.) or *(d)* by the neutral ſalts with gentle diaphoretics, as

(No. 15.) ℞ Aq. Menth. vulg. ℥j ß.
Alk. V. Fix. Succ. Limon. ſatur. ℈j.
Pulv. Contrayer. comp. gr. xv. ad ℥ ß.
Syr. Croci } a a ℥ß ß.
Aq. Menth. Piper. }
M. Ft. Hauſt. Capt. quartâ quâque horâ.

Of theſe methods (No. 2.) and (No. 6*.) are preferable.

If the head ſhould be much affected towards the beginning, a bliſter applied to it, or to the back, often diminiſhes the whole fever, and relieves this ſymptom.

If by any of theſe means the fever is carried off, it ſhould be prevented from recurring by (No. 5.)

If the fever be not carried off at the beginning, attempts to carry it off afterwards by relaxants, inflammations, or any other remedies, are ſeldom ſucceſsful. It is therefore neceſſary to let the diſeaſe go through its natural progreſs. If there ſhould be delirium from irritability, about a fourth or fifth part of a grain of opium is to be exhibited every ſix or eight hours. If there be partial purging, it is to be ſtopped as in dyſenteric purging, partial ſweating by acids, and hyſteric urine or tears, &c. by Peruvian bark.

A ſtool, if neceſſary, may be procured by gentle laxatives at the beginning.

(No. 16.) ℞ Aq. Menth. Vulg. ℥i. ß.
Rad. Rhei Pulv. gr. x. ad xviij.
Træ Sennæ — } a a ℥j.
Syr. e Cort. Aurant. }
M. Ft. Hauſt. Capt. pro re nata.
Afterwards by clyſters (No. 9.)

When the weakneſs begins to appear in any great degree, the patient is to be ſupported in the ſame manner as in the violent fever: but ſimple ſtimulants are to be given with ſtill greater caution, on account of the irritability.

If at this time any conſiderable remiſſion ſhould appear, the bark as in (No. 11.) may be given every three or four hours, during ſuch remiſſion, with advantage; the ſame medicine may be employed if the ſymptoms of irritability be great, and the ſecretory organs tolerably free.

If the fever, inſtead of wearing itſelf out by a regular progreſs, increaſes ſometimes for ſome days, and diminiſhes alternately but irregularly, Quere, May not an attempt be made to prevent the returns of the exacerbations by (No. 5)?

The food is to be of thoſe articles marked *(a)* *(b)* *(c)* and even *(d)*, if the ſtomach will bear it, and ought likewiſe to be acidulated.

Laſtly, it is neceſſary to be remarked, that theſe fevers are all of the ſame ſpecies, and are only varied by the violence of the firſt ſtage, and by the ſtrength or weakneſs of the patient, which, as they differ under different circumſtances in a great many ways, ſo they produce an almoſt inconceivable variety in the diſeaſe.

§ 5. *Of Intermittent and Remittent Fevers.*

These may happen from all the cauſes of fever, but generally ariſe from cold; eſpecially when produced by moiſture in the air, from ſtagnating water, or thick woods.

They frequently occur in warm climates, where they often have rather remiſſions than perfect intermiſſions.

The periods, even from the beginning, are moſtly violent in

all their ſtages: they are ſometimes perfectly diſtinct at the firſt, but more commonly run more or leſs into one another, and are attended with the ſymptoms indicating ſtrong action of the veſſels, eſpecially in the ſpring, and in cold climates: theſe gradually decreaſe, the periods become more diſtinct and the fever often changes its type, for moſt part into a longer one. In many caſes the intermiſſions become perfect, and continue ſo for ſome time; till the ſymptoms of weakneſs appearing, the fits redouble, anticipate, grow irregular, and leave the patient, or run into one another and deſtroy him.

When a patient is cut off in an intermittent fever, it is often in the firſt ſtage of the paroxyſm.

The weakneſs occaſioned by this diſeaſe is great, and often not to be recovered without difficulty. The fever alſo renders the patient ſubject to dropſies, occaſions tumors of the abdominal viſcera, defluxions on the lungs, and other diſeaſes, which are frequently fatal.

If an *Intermittent* attacks a weak patient, the intermiſſions for moſt part are not perfect even from the firſt, and they become gradually leſs ſo, till at length the patient ſinks.

If one fit of fever attacks the patient ſo that a period is completed in a few hours, and no ſymptom is left, it ſeldom recurs, and never without a freſh cauſe.

When a ſpaſmodic contraction of the *ductus choledochus* occaſions the throwing a quantity of bile into the blood-veſſels, from whence it is ſecreted by the different glands, the intermiſſions are ſometimes rendered leſs perfect.

After an intermittent is cured, either naturally or artificially, it is apt to recur from the ſlighteſt cauſe for many months, but leſs ſo when it has gone through its natural progreſs.

In the prevention of this diſeaſe, the cauſes of fever, particularly cold, are to be guarded againſt. (Vid. the Catarrh.)

For its cure, in habits where there is no great weakneſs, a perfect intermiſſion is to be procured,

(1) By cleanſing the *primæ viæ*; for which purpoſe the emetic (No. 2.) may be given in the intermiſſion; a gentle purgative may likewiſe be uſed.

(No. 17.) ℞ Infuſ. Sen. ℥j ſß.
P. Rad. Rh. ʒj. ad ʒiſß.
Syr. Roſæ
Træ Sennæ } a a ʒij. m.

Capt. Intermiſſ. Temp. ita ut Purgatio ex toto ceſſaverit ante Paroxyſmi Acceſſionem.

(2) If the ſymptoms of ſtrength are great, bleeding will be uſeful for the ſame purpoſe.

(3) By relaxants.

(No. 18.) ℞ Aq. Menth. vulg. ℥j. ſß.
Tart. Vitr. ℥ ſß. ad ʒij. vel Sal. Amm. ʒij. ad ʒj. vel Antim. Tart. gr. ¼ ad gr. ⅓
Aq. Menth. Piper.
Syr. Moror. } a a ʒij. m.

Capt. quintâ vel ſextâ quâque horâ.

The emetic, as above, will likewiſe act in the ſame manner.

It ſometimes happens that a perfect intermiſſion being procured by theſe means, the diſeaſe leaves the patient. But if, notwithſtanding ſuch intermiſſion, the fever continues, the fit is to be prevented,

(1) By medicines removing irritability.

(No. 19.) ℞ Cort. Peruv. Opt. Subt. Pulv. gr. xv. ad ʒij.
Capt. e Cyath. Vin. generoſ. horæ quadrantis ad hor. iv. intervallo ita ut Æger ſumat ʒvi. ad minimum inter duos paroxyſmos.

As great a quantity is to be given at a time as the patient's ſtomach will bear; and the intervals between the doſes are to be as long as poſſible.

The bark is to be omitted during the time the ſubſequent paroxyſm ſhould have continued, and is then to be repeated in the ſame quantity and manner, eſpecially if any ſymptom of the fit ſhould have recurred, provided generally that the paroxyſm has been greatly leſſened. The ſame meaſures are to be purſued in the third period: afterwards the medicine is to be omitted for four or five days, and then returned to for 24 hours; and this is to be practiſed twice or thrice, (at longer intervals each time.)

If there be any ſymptoms of inflammation in the breaſt, they ſhould be removed before the exhibition of the bark.

Symptoms of bile in the blood-veſſels are not to be attended to any farther than as they render the intermiſſions imperfect.

If the bark has been given imprudently, viz. when the patient is ſtrong, and no perfect intermiſſion has taken place, we are to omit it till ſuch intermiſſion is procured by the above means; but even then it acts leſs powerfully than it would otherwiſe have done.

If the bark purges, from five to ten drops of laudanum may be given three or four times a day.

If the patient continues long bound, a ſtool may be procured by a ſmall doſe of rhubarb, or aloes.

If the ſtomach will not bear the powder, the decoction or extract may be uſed; or it may be applied in a clyſter, or even externally, though theſe methods are never ſo ſure of ſucceſs.

If the diſeaſe attacks a weak patient, or has continued till a ſtrong habit is much weakened, the bark is to be given at the time of the beſt remiſſion; it often brings on a ſevere but regular fit, and upon continuing its uſe the fever leaves the patient.

(2) By counteracting the cold fit at the time of its coming on.

(No. 20.) ℞ Aq. Cinnam. Spirit. ℥j. ad ℥ij.
Menth. vulg. ℥j.
Antim. Tart. gr. ſß. ad gr. j ſß.
Tinct. Opii gtt. xx. ad xl.
Syr. Croci ʒij. m.

(No. 20.*) ℞ Aq. Menth. V. ℥ij.
Sal. Alk. Volat. m. gr. xv.
Pulv. Ipec. gr. ij.
Træ Theb. gtt. L.
Syr. Simpl. ʒj. m.

Capt. ante Paroxyſmi Acceſſionem; Æger quoque in Lecto detineatur.

When the diſeaſe is cured, or the fits become ſlight and irregular, the patient is to be ſtrengthened.

When the cure will not ſucceed in a moiſt country, the patient may often be relieved by removing into a dry one.

Chap. II. *Of the* Symptoms, Distinctions, Prognostics, *and* Treatment *of* Inflammations.

IN every *inflammation*, the pulſation of the arteries is increaſed; there ariſe a greater degree and ſenſe of heat; a greater redneſs; an itching, ſoon converted to an acute, and often a throbbing, pain, augmented on the parts being ſtretched; a ſwelling produced by a diſtenſion of the capillary veſſels and the veins, and ſometimes by an extravaſation of fluids; alſo a contraction, and inability of motion, in the muſcular fibres.

More fluids circulate through the part, and more are ſecreted in it when inflamed, than when in its natural ſtate.

The ſenſibility and irritability are increaſed by inflammation, and are produced by it in parts where they did not ſubſiſt before.

Inflammation is produced by external *ſtimuli*, mechanical, chemical, or medical. *a*. Diſtenſion, or endeavour at deſtruc-

tion. *b.* Diviſion of an irritable part. *c.* The neutral ſalts of the blood, or other ſtimulating matter, thrown out or formed on the ſurface of an irritable part.

Theſe cauſes operate more powerfully on habits in which the veſſels have great ſtrength, or are acting ſtrongly; and on parts that are very irritable or ſenſible.

Inflammation (*a*) ſometimes has no effect on the ſyſtem in general; (*b*) ſometimes it produces general inflammation; (*c*) ſometimes ſymptoms of irritation.

(*a*) In habits not very ſtrong, if the inflammation be ſmall, and the pain not violent, or if the part be eaſily diſtended, the ſyſtem is not affected.

(*b*) In ſtrong habits, in inflammations of ſubſtances of parts, or where the pain is great, and the patient not very weak, it produces general inflammation, by ſome called *Inflammatory Fever*; the ſymptoms of which are, a hard, and for the moſt part a ſtrong, full, uniform, and frequent pulſe; blood when taken from the arm more fluid, and continuing longer fluid, ſo that the red globules fall to the bottom, the coagulable lymph coagulating afterwards ſtrongly, and adhering to them, ſo as partly to form a cruſt on the top, called by ſome the *buff*; a frequent reſpiration, attended ſometimes with a cough; a dry white tongue and thirſt; reſtleſſneſs; urine remaining tranſparent without any cloud, or becoming turbid when cold, and ſometimes depoſiting a lateritious ſediment; univerſal redneſs, heat, and ſwelling; watchfulneſs and *delirium*; *ſtupor*, with red, ſwelled, protuberant, and often dull eyes, ſometimes converted into a violent, ſometimes into a low, muttering delirium, often at laſt terminating in convulſions and death; or ceaſing when the inflammation is removed; ſometimes before the termination of the inflammation; ſometimes remaining after it, running out to a great length, and wearing out the patient.

General inflammation differs eſſentially from fever, in as much as the ſymptoms of the firſt ſtage do not neceſſarily precede or accompany it, and as it does not increaſe by exacerbations followed with relaxations, and when excited continues to depend on its cauſe.

It is excited by many cauſes beſides inflammation.

(*c*) Where the pain is very great, or the habit very weak and irritable, or where an irritable part is affected, the ſymptoms of irritation take place, viz. a ſmall, quick, frequent pulſe; frequent reſpiration; ſickneſs; univerſal reſtleſſneſs, and want of ſleep; urine remaining tranſparent when cold; depreſſion of ſtrength; faintings; coldneſs of the extremities, eſpecially when an internal part is affected; delirium, convulſions, or ſpaſmodic contraction of the muſcles, ſometimes terminating in death; or the depreſſion of ſtrength ſimply increaſes till the patient dies; or he is worn out by the long continuance of the diſeaſe.

Symptoms of irritation differ eſſentially from fever, in as much as they leave the patient immediately upon their cauſe being removed. They may be excited by other cauſes beſides inflammation.

Beſides theſe, various other ſymptoms are often produced, when particular parts are inflamed, and their functions thereby deſtroyed or hurt.

If the cauſe of an inflammation be removed, it ſometimes goes off ſoon; ſometimes continues for a long time, or terminates in another diſeaſe.

(*A*) It goes off by,

(*a*) *Simple reſolution*; when upon removing the cauſe, the ſymptoms diminiſh gradually, and at laſt leave the patient.

(*b*) *Reſolution by evacuation*; (1) when the mucous or other glands of the part inflamed, or near it, do, in conſequence of the inflammation, ſecrete a conſiderable quantity of fluid, if it be mucous, at firſt thin and tranſparent, afterwards becoming viſcid, and changing its colour to white, greeniſh, or yellow, ſometimes ſtreaked with blood, and not uncommonly acquiring the conſiſtence and appearance of pus; in this caſe, while the ſecretion is watery, the inflammation of the mucous membrane is increaſed; but as the fluid acquires a proper viſcidity and colour when it is ſaid to be concocted, the diſeaſe gradually diminiſhes, and is frequently cured: (2) when an hæmorrhage ariſes in the part affected, and carries off the inflammation: (3) when a large or long continued evacuation happens from ſome part of the body, and puts a ſtop to the diſtemper.

(*c*) *Reſolution in conſequence of fever*; when a cold fit of fever is produced, and cures the inflammation.

(*d*) *Metaſtaſis*; when an inflammation ariſes in another part, and carries off the primary one.

N. B. In all theſe caſes *calloſities* are ſometimes left.

(*B*) The inflammation continues for ſome time without alteration, or terminates ſoon in ſuppuration, gangrene, or ſchirrus.

(*a*) The inflammation continues for a conſiderable time without greatly increaſing or diminiſhing, and without terminating in another diſeaſe.

(*b*) Suppuration; (1) when a quantity of fluid is thrown out into any cavity, (the inflammation continuing) it ferments, and is converted into *pus*, which afterwards acts as a ferment on the ſolid parts, and gives occaſion for the converſion of the whole into a matter ſimilar to itſelf, the ſymptoms of the firſt diſeaſe going off. Sometimes a membrane is formed round the pus, which prevents it from acting upon the circumjacent parts; but more frequently it likewiſe ferments with them, till it has made itſelf an opening by which it is evacuated. This happens ſooner or later according to the diſtance of the inflammation from the ſkin, or the ſurface of a cavity opening externally; for the parts between them and the original abſceſs are generally deſtroyed, and not the other ſurrounding parts. While this is taking place, the *pus* ſometimes ſeparates the muſcles, and other parts, from one another, by deſtroying the cellular membrane: but for the moſt part the cellular membrane at the edges of the inflamed part becomes impervious.

After the *pus* is evacuated, a freſh inflammation ariſes; more matter is formed on the ſurface of the cavity; a quantity of fleſh grows up and fills it; afterwards a ſcarf ſkin covers the whole, and the part is reſtored, the fleſh which grew up in the cavity being converted into the muſcles, tendons, nerves, blood-veſſels, &c. loſt.

Sometimes the ſurface of the cavity continues to be deſtroyed; the ulcer is enlarged; a portion of the matter is abſorbed, and producing hectic fever, the patient dies; or independent of abſorption he is cut off by ſymptoms of irritation.

(*b*) (2) When a quantity of fluid is converted into pus upon the ſurface of an inflamed membrane, or other part, it ſometimes ferments with the ſolids underneath, and forms an ulcer ſimilar to that already deſcribed.

In inflammation of the ſubſtance of a part, ſuppuration takes place on the beginning of the fourth day: it happens ſooner in children; not ſo ſoon in inflammation of glands; where the inflammation is not violent; where any natural or artificial method of cure has diminiſhed it. Suppuration is known to have taken place in external inflammation, by a fluctuation in the part, by the ſwelling in the neighbouring parts diminiſhing, and in conſequence becoming more pointed in the inflamed part. In large external and in moſt internal ſuppurations, there is horror, rigor, and coldneſs at their beginning, and repeated at uncertain periods, and the miſchief ariſing from the ſwellings preſſing on the neighbouring parts is diminiſhed or removed.

(*c*) Gangrene and mortification: in this caſe the ſymptoms of inflammation go off, and the part becomes paler, or of a

brown colour, flaccid, and at laſt black; the ſcarf ſkin is raiſed up in large puſtules, which contain a ſemiputrid *ichor*; at laſt the whole part putrefies; the ſurrounding parts are affected with eryſipelatous inflammation; and the gangrene and mortification ſpread, until they deſtroy the patient, by affecting a part neceſſary to life, or elſe by producing the ſymptoms of irritation.

This diſeaſe ariſes without any previous inflammation, from preſſure, ligatures on the veins, weakneſs, extravaſation of great quantities of blood, and the application of ſedatives.

A phlegmonous inflammation takes place ſometimes round the gangrened part, and occaſions a ſeparation and an ulcer, nearly ſimilar to that formed by an abſceſs.

(*d*) *Scirrhus and cancer:* when the inflammation is carried off, but a quantity of matter is left in the ſecretory veſſels of ſome gland, occaſioning a hardneſs and ſwelling. This often continues for a conſiderable time without alteration; but ſometimes without any ſenſible cauſe: ſometimes upon the application of a *ſtimulus*, the matter depoſited ferments, and is converted into a peculiar fluid inflaming the part, and producing an ill conditioned ulcer called an open cancer. In this ulcer good *pus* is never formed; but the patient is exhauſted, and deſtroyed by the pain, the evacuation, and the *ſtimulus* ariſing from the cancerous matter abſorbed.

Scirrhus ariſes without any previous inflammation from the proper fluid ſtagnating in the gland, or extravaſation from contuſion, or *venous plethora*.

Simple reſolution takes place when the ſyſtem is not ſtrong, when the inflammation is but ſmall; when it affects the ſkin only, or a ſoft part, or one not very ſenſible.

Reſolution by evacuation is produced (1) when the mucous membrane is primarily or ſecondarily inflamed, or when, in conſequence of the inflammation, the mucous or other glands near the part affected, are ſtimulated to a greater ſecretion; (2) when the capillary veſſels of the inflamed part are ſpread on a membrane conſtantly moiſtened, and in a cavity opening externally; (3) is accidental.

Reſolution in conſequence of fever, happens principally when the inflammation aroſe at the beginning of the hot fit, diminiſhing, but not entirely carrying off the fever: a febrile exacerbation ariſes in the evening naturally, or from ſome new cauſe, and takes off the inflammation.

Metaſtaſis, is accidental. The nearer the ſecond inflammation is to the original one, the more violent it is; or the greater the ſenſibility of the part it affects, the more certainly it carries off the firſt diſeaſe.

(*B*) (*a*) Happens if the ſkin be the part affected, the diſeaſe not violent, and the cauſe be frequently repeated.

Suppuration happens (1) when the cellular membrane, or parts covered with it, are affected; it takes place more readily when the patient is young, or of a ſanguineous temperament, or of a ſtrong habit, or when the diſeaſe happens in the ſpring: (2) when the ſkin is inflamed ſo that the ſcarf ſkin is raiſed from it; or when a mucous membrane is affected, and the inflammation continues, notwithſtanding the increaſed ſecretion of mucus; or in wounds.

Gangrene and *mortification* happen when the part inflamed is irritable, or when there is preſſure, either from the tenſeneſs of the part, the contraction of a muſcle, or external application.

Scirrhus happens when a gland is the ſeat of the diſeaſe, and the inflammation terminates without coming to ſuppuration.

Indications of Cure *in* Inflammations.

In attempting the cure of inflammations, *reſolution* is to be procured, if poſſible.

I. Indication. The cauſes firſt producing the inflammation, and thoſe which afterwards continue it, are to be removed, even if the means employed ſhould increaſe the diſeaſe for the preſent. The method of removing many of the cauſes is obvious. Peculiar means of taking off ſome of them are theſe that follow:

(*A*) Stimulating fluids, formed or ſecreted on the ſurface of an irritable membrane, muſt be prevented from acting,

(*a*) By covering the membrane ſo that they cannot touch it, (1) with expreſſed oils, ſuch as ſpermaceti, oleum amygdalarum, oleum olivarum, ſevum ovillum, axungia porcina, butyrum; or (2) with vegetable or animal mucilages, as infuſum ſeminum lini vel cydoniorum, decoctum radicis althææ, ſaccharum, ichthyocolla.

(*b*) By deſtroying them with præparationes hydrargyri, &c.

(*c*) By evacuating them.

(*d*) By taking off the irritability of the membrane with cortex peruvianus, præparationes plumbi, ſtanni, &c.

(*B*) Diſtenſion of the internal veſſels, is removed, by reſtoring the circulation to the external parts of the body (Vid. Fevers, Ind. V.) By keeping the patient in bed. By the warm bath. Stimulants applied to the ſyſtem are for the moſt part improper.

(*C*) The endeavour to diſtend the capillary veſſels beyond their tone, is avoided by relaxing them with aqua tepida, ſcilicet ad caloris corporis humani gradum, olea expreſſa pura. (Vid. *A. a. j.*)

(*D*) Irritability of the ſkin, and mucous membrane, is removed by cortex peruvianus.

II. Indication. The action of the arteries is diminiſhed.

(*A*) By emptying them. The methods are, (*a*) venæ alicujus majoris in brachio, vel corporis alia aliqua parte ſectio, ita ut quam citiſſime magna ſanguinis copia eximatur: (*b*) Venæ vel arteriæ ſectio, vel hirudinum applicatio ad partem affectam: (*c*) Purging with ſalia neutra, tartarus, manna, caſſia fiſtularis, fructus tamarindorum, radix jalappæ.

(*B*) By the application of ſedatives to the ſtomach, as acidum vitriolicum, muriaticum, limonum; infuſum theæ, ſarſæ; aqua calida; nitrum.

(*C*) By the application of ſedatives to the part, as (*a*) papaver, herbum abſinthii, matricariæ; radix bryoniæ albæ: (*b*) flores roſarum rubrarum; acidum vitriolicum, muriaticum, acetoſum; alcohol; farina avenæ; aqua ſoluta vel commixta: (*c*) Præparationes cupri, plumbi, zinci; alumen.

(*D*) By raiſing an inflammation on the ſkin near the part originally affected, by means of cantharides, ſemina ſinapi, cauterium actuale, acida, alkali volatile, frictio.

III. Indication. Is the management of reſolution by evacuation from the mucous or other glands, of the part, or near it.

(*A*) The evacuation is produced or aſſiſted by ſtimulants, as, errhina, ſialagoga, expectorantia, purgantia, diuretica.

(*B*) (Vid. Ind. 1ſt. *A. a.*)

(*C*) The ſecretion of the *mucus* is to be ſtopped after the inflammation is carried off; (*a*) by ſtrengthening the ſyſtem; (*b*) by applying aſtringents, (1) to the part, as, ſalia & calces metallorum; (2) to the ſtomach, as, gallæ, alumen, &c. opium, balſamum copaibæ, peruvianum, canadenſe, terebinthini.

Where the inflammation cannot be cured by *reſolution*; or when an external inflammation has ariſen in the hot fit of a fever, and has diminiſhed, or entirely carried it off; or when the inflammation has cured or diminiſhed ſome worſe diſeaſe than itſelf; and ſometimes in inflammations occupying glands; *ſuppuration* is to be produced: in order to which,

IV. Indication. The inflammation is to be kept in a proper degree.

(*A*) If it be too violent, and tending to gangrene, it is to be diminiſhed. (Vid. Ind. 2.) (*A. a. c.*) (*C. a.*) (Ind. 1ſt. *C.*)

(*B*) If it be too ſlight, it is to be increaſed by ſtimulants,

(*a*) Applied to the ſtomach, as (1) cortex peruvianus; (2) balſama et reſinæ; (3) belladona, ſolanum, cicuta.

(*b*) Applied to the part, (1) farina lini, fænugræci, oleum lini; (2) galbanum, terebinthinum, thus. Theſe laſt, though ſometimes uſed, are generally too powerful, excepting in phlegmons, going on very ſlowly to ſuppuration.

V. INDICATION. If a gangrene has come on, it is to be prevented from ſpreading, (*A*) By vinum, aromata, &c. (*B*) By cortex peruvianus. (*C*) By ſtimulating the part with oleum terebinthini, ſcarificatio, &c.

VI. INDICATION. The management of a *ſcirrhus*. (*A*) It is prevented by producing *ſuppuration*. (*B*) If it be already formed, and (1) is large, increaſing, and detached, it is to be cut out, or deſtroyed by cauſtics; or (2) if it be ſmall, and continue of the ſame ſize, nothing is to be done; *diſcuticnts* are dangerous.

VII. INDICATION. The management of a *cancer*. (*A*) Good *pus* is produced by (Vid. Ind. 4. *B. a. 3.*) arſenicum: but theſe medicines very ſeldom are efficacious. (*B*) The pain is relieved by deſtroying the ſenſibility of the part with præparationes plumbi, &c.

We ſhall now proceed to ſpeak of internal inflammations.

CHAP. III. INTERNAL INFLAMMATIONS.

§ 1. *Of the Inflammation of the Brain.*

THIS ariſes from an increaſed action of the veſſels in the ſyſtem, produced by hard drinking, anger, and indigeſtible or viſcid food in the ſtomach; from an expoſure of the head to the ſun; or from general inflammation happening at the beginning of a fever, or in any other diſeaſe.

Delirium comes on with watchfulneſs, or reſtleſs and unrefreſhing ſleep, with dreams; loſs of memory; inſenſibility to external objects; the functions of the body are diſturbed; the imagination hurried, and diſcourſe incoherent; the patient picks hairs from the bed-clothes, or hunts flies, which he imagines are in the air.

It may happen from fever, *inflammatory diatheſis*, great irritability, and *mania*, without any topical inflammation of the brain.

There ariſes a throbbing pain in the internal parts of the head, which, if the *meninges* are affected, is acute; if the ſubſtance only, obtuſe, and ſometimes but juſt ſenſible. The eyes for the moſt part are red and ſwelled, tears frequently flow from them, and ſometimes a watery *mucus*, or blood drops from the noſe: the face is often fluſhed. Theſe ſymptoms are attended with more or leſs of general inflammation, according as the *meninges*, or ſubſtance of the brain, are affected. They are followed by *ſtupor* and *delirium*, which ſometimes become violent, and are attended with convulſions; and in any caſe, unleſs ſome natural or artificial means of *reſolution* are applied, the patient for the moſt part is cut off. Sometimes, however, the inflammation goes on to ſuppuration, eſpecially if the ſubſtance of the brain is affected: in that caſe, the ſymptoms abate, a ſtupor only being left; but in proceſs of time, unleſs the *pus* be abſorbed, the whole brain is deſtroyed.

It is prevented by avoiding or counteracting the cauſes.

For the cure, the moſt powerful means of *reſolution* are immediately to be employed.

Fiat V. S. e brachio ad ℥ xij. xx. vel xxx. pro diatheſi inflammatoria, aut corporis viribus, et repetatur pro re nata.

After the ſtrength of the ſyſtem, or general inflammation, are diminiſhed,

Fiat venæ ſectio e vena jugulare, vel arteria temporale; vel temporibus applicentur hirudines.

At the ſame time evacuations from the inteſtines may likewiſe be performed with advantage.

(No. 21.) ℞ Infuſ. Sen. ℥j ſ℈. ad ℥ij.
Sal. Glaub. ver. ℥ ſ℈. ad ℥i ſ℈.
Vel, Tart. Solub. ℥ ſ℈. ad. ℥vj.
Vel, Polychreſt. Rupel. ℥. ſ℈. ad ℥j.
Man. ℥iij.
Tinct. Sen. ℥ij.

M. Ft. Hauſt. purgans. Capt. poſt V. S. et repet. pro re nata.

When the purgative is not operating (No. 4.) or (No. 13.) may be given, but are not to be depended on.

After having diminiſhed the ſtrength of the veſſels,

Applicet. Emplaſt. Epiſpaſt. Capiti raſo.

The food throughout the diſeaſe is to conſiſt only of decoctions of farinaceous ſeeds in water, acidulated.

It is farther to be obſerved, that when an inflammation ariſes at the beginning of a fever, and it, as well as the general inflammation, continues, ſuch fever is alſo to be attended to in the cure of the inflammation, and the treatment varied according to the violence of them.

§ 2. *Of the Angina.*

THIS, which is commonly called the *inflammatory angina*, is an inflammation of any of the parts about the throat, excepting the ſkin and mucous membrane. It ariſes from cold, diſtenſion of the parts; *ſtimuli* applied to them, and the other cauſes of inflammation. It has no peculiar prediſponent cauſe which is known, but is ſometimes epidemical.

The ſymptoms are thoſe common to inflammation; or thoſe ariſing from the paſſage of the air into the lungs, of the food or drink into the ſtomach, of the blood in the jugular veins, or the ſerum in the lymphatics of the neck's being obſtructed.

The common ſymptoms of inflammation are, (according to the part affected), either external ſwelling, with redneſs and pain, gradually increaſing and becoming harder; or ſwelling with redneſs, and pain in the tonſils, *fauces*, *velum pendulum palati*, about the root of the tongue or *pharynx*, gradually increaſing; or, laſtly, a very acute pain in the region of the *larynx*, without any external appearance.

If the mucous membrane be affected, a quantity of thick, viſcid mucus is ſecreted.

More or leſs of general inflammation is produced according to the part affected, or the ſtrength of the patient.

If the *larynx*, *trachea*, or parts adjacent, are inflamed, the paſſage of the air into the lungs is obſtructed, and there ariſe a difficulty of breathing, anxiety about the *præcordia*, ſwelling of the veins of the neck, ſwelling of the face, *ſtupor*, lividneſs about the eyes and in the whole face, *delirium*, depreſſion of ſtrength, a very frequent irregular pulſe, and at length the patient is ſuffocated.

If the muſcles ſerving for deglutition, the tonſils, *pharynx*, or parts adjacent are affected, there ariſe a pain in attempting to ſwallow, with a ſenſe of ſwelling in the throat; a difficulty in ſwallowing; *nauſea*; the food and drink return by the noſtrils, or, getting into the *larynx*, produce violent fits of coughing; at laſt the paſſage of the food and drink into the ſtomach is totally ſtopped up, and the patient is deſtroyed, partly for want of nouriſhment, partly from the ſaline and putreſcent parts of the blood not being waſhed off, and partly from ſymptoms of irritation.

If the lymphatics of the neck are compreſſed, there ariſe *œdematous* ſwellings of the face and other parts of the head.

If the jugular veins are obſtructed, *œdematous* and livid ſwellings ariſe in the face, tongue, throat, and parts adjacent; the eyes become red and protuberant; the patient is affected with a *ſtupor* and *delirium*, and at laſt is cut off.

Swellings about the throat arife from *fcirrhus*, *fcrophula*, and dropfy, as well as from inflammation; as do likewife pain, and difficulty of fwallowing and breathing from catarrh, e ulceration, fpafmodic contraction of the mufcles, and *paralyfis*.

If the patient is not deftroyed by the refpiration, deglutition, or brain's being affected, the *Angina* terminates, as other inflammations, but principally in fuppuration.

When fuppuration takes place the fwelling diminifhes, and the fymptoms are fomewhat relieved; the *pus* opens itfelf a way externally, or internally, and generally produces an ulcer eafily cured; but it fometimes is apt to form *finufes*, or fall into the lungs and bring on exulcerations in them.

Gangrene and mortification in moft parts of the throat are fatal.

It is particularly to be obferved, that as inflammations of thefe parts about the throat may arife independent of one another, as their fymptoms, progrefs, and termination are various, they ought to be confidered as different difeafes.

The cure is beft performed by *refolution*; for this purpofe, 1. Evacuations are to be produced, viz. (*a*) By bleeding from the arm in quantity according to the general inflammation, and repeatedly, until it be greatly diminifhed. (*b*) By purgatives, as (No. 21.) repeated every day for the firft two or three days of the difeafe. (*c*) By bleeding from the part, by opening the jugular veins, or thofe under the tongue, or applying leeches.

2. By producing inflammation upon the fkin.

(No. 22.) ℞ Ol. Olivæ. ℥j.
Alkal. Volat. Cauft. ʒij. ad. ℥j.
Camph. Gr. xxx.
M. Ft. Liniment. inung. Fauces externe fæpius.

After the general inflammation is confiderably diminifhed by evacuation, blifters are to be applied as near the part as poffible, provided the fkin itfelf be not inflamed.

3. If the external inflammation be confiderable, fomentations and poultices are to be applied.

(No. 23.) ℞ Flor. Cham. vel Summit. Abfynth. vel Summit. Centaur. Minor. Manip. ij.
Rad. Bryon. Alb. recent. ℥j.
Folior. Malv. vel Alth. Man. j. contunde et leviter coque in Aq. Font. ℔ iiij.
Colatura utatur pro Fotu ter indies.
Add. Herbis Coctis.
Unguent. Simp. ℥ij
Ft. Cataplafma Part. affect. applicandum.

4. When we are not exhibiting purgatives, or in the intervals of their operation, (No. 4.) or (No. 13.) are ufed with advantage.

5. The inflammation may fometimes be diminifhed, by augmenting the fecretion from the mucous glands of the mouth and throat, and we are to endeavour to prevent the mucous membrane from being affected by the falts of the thin mucus.

(No. 24.) ℞ Aq. Cinnam. Ten. ℥viij.
Oxymel Scillit. ʒ ß.
M. Ft. Gargarifma. Utatur fæpius.

(No. 25.) ℞ Syr. ex Althæa } a a ℥j.
Ol. Amygdalæ }
Conferv. Cynofb. ʒ ß.
M. Ft. Linctus. Capt. Coch. unum parvum frequenter.

6. By fedatives, as (No. 14.)

The air of the room fhould be moderately warm, and the patient ought to avoid fpeaking, and for food to make ufe of barley water, or other farinaceous folutions only.

If the paffage of the air into the lungs be fo much obftructed as to threaten immediate fuffocation, *bronchotomy* is to be performed.

If no fluid can be gotten into the ftomach, the blood-veffels may be fupplied in fome meafure by clyfters.

(No. 26.) ℞ Aq. Font. ℥vj.
Amyl. Alb. ʒiij.
Solve.
Ft. Enema quartâ quâque horâ injic.

If the blood be prevented from returning from the brain, fo as to endanger immediate fuffocation, the patient is to be bled in the jugular veins.

If the inflamed parts fuppurate, the mouth and throat are to be kept moift with

(No. 27.) ℞ Infuf. Sem. Lini ℔j.
Sacch. Alb. ℥j.
Succ. Aur. Hifp. ʒ ß.

And as foon as there is any fluctuation of matter felt, an opening is to be made into the abfcefs.

§ 3. *Of the true Peripneumony.*

This difeafe is produced by cold applied to the fkin, mouth, or ftomach; by general inflammation; by an over diftenfion of the lungs; or by catarrh.

Any folid fubftance falling into the lungs by the *trachea*, or a wound penetrating into them, produces the inflammation, but with different fymptoms.

Thefe caufes act more powerfully in people fubject to inflammation in general; in thofe who have narrow chefts; or who have been formerly affected with *peripneumony*, *aſthma*, or frequent *catarrhs*; where the lungs adhere to the *pleura*, fo as at any time to prevent a free refpiration; or where external inflammations, that were become habitual, are taken off.

The inflammation begins with an obtufe pain in the breaft, excepting where the external membrane of the lungs is inflamed, and then it is acute, fometimes occupying one fide, fometimes both, accompanied with a difficulty of breathing and cough, the air from the lungs being peculiarly hot. There arife a fenfe of fulnefs in the *thorax*; anxiety about the *præcordia*, with reftleffnefs, lofs of appetite and fleep; a frequent pulfe, fometimes hard, but feldom ftrong or regularly full; the tongue is covered with mucus, which is often yellowifh; and there is often turbidnefs in the urine. The difficulty of breathing and fenfe of fulnefs increafe: and a quantity of thick mucus being fecreted, occafions a found as the air paffes through the branches of the *trachea*. If the patient attempts to lie down, there is an appearance of an immediate fuffocation; he is therefore obliged to continue with his head and fhoulders more or lefs elevated. The paffage of the blood through the lungs is obftructed, fo that the veins of the neck begin to fwell; œdematous fwellings affect the lower extremities and fometimes the other parts; the pulfe becomes every way irregular; the face fwells, and is of a dark red colour, efpecially about the eyelids and cheeks; the tongue likewife fwells, and becomes of a dark red; the eyes are dull; *ſtupor* and a low *delirium* fucceed; and the patient is deftroyed from the affection of the brain, or he is fuffocated.

If the fymptoms do not rife to fo great a height, and, at the fame time, no means of *refolution* have been applied or have arifen naturally before the fourth day: or if thofe means are not fufficiently powerful; or if they are not continued until the difeafe is totally carried off, a fuppuration takes place, and is indicated by flight and frequent fhiverings, the pain at the fame time going off gradually; the fenfe of fulnefs and cough, with the other fymptoms diminifhing, and the patient being only able to lie on that fide which was moft affected. If the inflammation be flight or not purely phlegmonous, or has

been diminiſhed by any means of reſolution, the ſuppuration may be retarded even ſometimes as far as to the fourteenth day.

Suppuration, unleſs the abſceſs breaks ſoon into the lungs, or the *pus* is all abſorbed into the veſſels, is generally fatal, producing hectic fever, and pulmonary conſumption.

If the inflammation be very violent, gangrene and mortification ſometimes, though ſeldom, ariſe. In this caſe the breathing is ſomewhat relieved; but the pulſe becomes extremely frequent and weak; the other ſymptoms of irritation come on; the patient ſpits up a blackiſh, fœtid ichor, and is ſoon carried off.

The inflammation of the LUNGS is a diſeaſe of the bronchial artery only.

They who are deſtroyed by acute diſeaſes, are by no means cut off at laſt by an inflammation of the lungs, as has been ſuppoſed.

It ſhould be diſtinguiſhed from difficulty of breathing in fever; from other inflammations in the breaſt; from *catarrh*, *aſthma*, and *peripneumonia notha*, and thoſe difficulties of breathing which happen in chronical diſeaſes.

It admits of a natural cure,

1ſt, By a ſecretion of *mucus* from the lungs, ſpit up at firſt thin, and ſpit up with uneaſineſs, becoming gradually thicker, and of a greeniſh, or yellow colour, often mixed with blood, relieving, and gradually diminiſhing the ſymptoms, ſo as to carry off the diſeaſe before the fourteenth day; or viſcid, and ſpit up with great difficulty, becoming thinner, and altering in the ſame manner.

If there be a great *hæmorrhage* from the lungs, it happens for the moſt part, that either the patient is immediately ſuffocated, or an ulcer is produced.

If the matter ſpit up contains hard maſſes, or is of different colours from what has been deſcribed, although the ſymptoms ſhould be relieved there is danger of an ulcer.

If the ſecretion continues watry, the diſeaſe is ſometimes increaſed by it, or converted into a catarrh.

If the *peripneumony* is not carried off before the fourteenth day, the lungs commonly ſuppurate, although not always.

2d, By an inflammation, or hæmorrhage, ariſing in ſome other part of the body.

The cure is performed (1) by ſimple *reſolution*, or (2) by evacuation from the mucous glands. The firſt is obtained,

(*A*) By emptying the veſſels of the lungs.

(*a*) By bleeding. We are to be ruled as to the quantity of blood taken away, by the ſtrength of the patient. For when from the violence of the inflammation the pulſe is ſmall, frequent, and irregular, it often riſes, and becomes regular after the operation. From the diſeaſe's increaſing, or recurring, it is often neceſſary to repeat this evacuation two or three times.

(*b*) Purging with ſtrong purgatives is improper in inflammations of the thoracic viſcera of the phlegmonous kind, but the body is to be kept open by laxatives.

(*c*) By bleeding from the ſkin of the breaſt.

(*d*) By producing a free circulation in the other parts by (No. 4. or No. 13.)

(*e*) By keeping the patient in an air moderately warm.

(*f*) With this view the ancients applied ligatures to the arms and thighs, to confine the blood in the veins.

(*g*) To theſe methods ſtimulating medicines have been added, ſuch as volatile alkali, to produce ſweating; but although theſe be uſeful in affections of the lungs where there is a flow of blood on them with little phlegmon, they are for the moſt part improper in peripneumony.

(*B*) By inflaming another part; (*a*) by rubbing (No. 22.) on the ſide; (*b*) by bliſters, which are applied with greater advantage to the ſide and back than to the extremities.

For the management with regard to the food, vide the *phrenitis*.

The ſecond method of cure is performed,

(*A*) By increaſing the ſecretion from the mucous glands, by ſtimulants.

(No. 28.) ℞ Aq. Puleg. ℥j ſs.
Oxymel. Scil. ʒj. and ʒij.
Aq. Menth. Piper. ʒj.
M. Ft. Hauſt. Capt. quartâ quâque horâ.

(No. 29.) ℞ Aq. Puleg. ℥j ſs.
Gum. Ammon. gr. x. ad xv.
Syr. Limon. ʒij.
M. Ft. Hauſt. Capt. ut ſupra.

By inhaling the vapour produced from the infuſion of pectoral herbs.

(*B*) By defending the mucous membrane from the ſalts contained in the *mucus* ſo ſecreted, with mucilaginous or oily medicines.

(No. 30.) ℞ Amygd. dccort. ℥j.
Gum. Arabici ℥j ſs.
Mellis — — ℥iv.
Aq. Font. — ℔ij.
M. Ft. S A. Emulſio—Bibat poculum frequenter.

Or, (No. 25.) may be given.

Opiates have ſometimes been uſed, when the *mucus* ſpit up was thin, and the cough troubleſome: but as for the moſt part they increaſe the difficulty of reſpiration, they are commonly hurtful.

(*C*) If, notwithſtanding the ſpitting, the inflammation ſhould increaſe, moderate bleeding is uſeful to prevent the ſuppuration; but the taking away a great quantity diminiſhes or ſtops the ſecretion. The ſame remedy is to be uſed, if much pure blood is ſpit up.

During the firſt days, eſpecially where the patient is ſtrong, the food ought to be the farinaceous decoctions acidulated. To theſe ſhould be afterwards joined preparations of the farinaceous ſeeds, with preſerved juices of fruits, as currant jelly, &c.

The remedies in the firſt method, except the plentiful and repeated bleeding, may be alſo uſed in this; and, on the other hand, thoſe recommended under this head may be uſed along with the firſt; ſo that the only queſtion is, whether the cure is to be principally truſted to the bleeding, or to the evacuation from the lungs by ſpitting.

The firſt method is to be followed in ſtrong, the ſecond in weak patients, and when the diſeaſe is accompanied with the ſymptoms of the firſt ſtage of fever.

The obſtruction to the paſſage of the blood through the lungs, ſometimes retards the flowing of the ſerum from the thoracic duct into the left ſubclavian vein, and produces dropſical ſwelling of the extremities; but theſe go off with the diſeaſe, and ſeldom require any particular treatment.

§ 4. *Of the Pleuriſy.*

IT has been much diſputed, whether this diſeaſe be an inflammation of the *pleura*, or of the external coat of the lungs. It appears moſt probable, that the inflammation ariſes in the *pleura*, and ſpreads from thence to the lungs.

Its *cauſes* are, cold applied to the ſkin; ſudden and great diſtenſion of the *pleura* in inſpiration; drinking cold liquors after being heated by violent exerciſe. The pleuriſy, and moſt other inflammations, ariſe frequently in the hot fit of fever, moſt commonly in the firſt period, ſometimes in the ſecond, and leſs frequently in the third or ſubſequent; either from

the *inflammatory diathesis* alone, or from a *stimulus*, too slight to affect people in perfect health.

Adhesions of the *pleura* to the lungs affecting the breath, and the causes which render people liable to peripneumony, have the same effect with regard to the pleurisy.

When a pleurisy, or other inflammation, arises in the hot fit of fever, it is preceded by *horror* and *rigor*, cold, frequency of the pulse, and several of the other symptoms of the first stage. These are followed by the symptoms of the second stage, together with those of general inflammation, after which, the pain, and other symptoms of the inflammation in the side or part affected, take place; and the symptoms of the first stage of fever commonly leave the patient, those of the general inflammation continuing. Sometimes the symptoms of the first stage of fever are only relieved. In this case, anxiety about the *præcordia*, transparent urine, particular evening *paroxysms*, &c. continue along with the inflammation, produce a different progress and termination of the disease, and require a variety in the treatment.

When the inflammation of the *pleura* comes on, whether it be the original disease, or preceded by the symptoms of fever, it begins with an acute pain in the side, commonly above the short ribs, sometimes towards the back (when it is less violent) increasing greatly on inspiration, diminishing on expiration, and from thence producing a difficulty of breathing. The inspirations are short, the ribs kept as much at rest as possible, and the diaphragm and muscles of the *abdomen* move considerably.

In all difficulties of respiration carried to a height, the patient is obliged to have his body more or less in an erect posture; the shoulders and clavicles are raised; the nostrils move, and the mouth is opened.

The difficulty of breathing in a pleurisy produces a cough, which is short, suppressed, and sometimes dry; but at other times is attended with a spitting of *mucus* from the lungs, at first thin, and proceeding afterwards exactly as in the peripneumony, and relieving or curing the disease in the same manner.

If the patient be not affected with general inflammation, before this inflammation, it is always brought on in a few hours; and its symptoms are sometimes so severe as to destroy the patient. The difficulty of respiration also increases, sometimes to so great a degree as to prevent the blood from passing through the lungs, and the brain is compressed; or he is suffocated with the same symptoms as in the peripneumony.

If gangrene and mortification take place, the pain ceases suddenly, without any apparent cause: the pulse is very frequent, quick, small, weak, and often irregular; *delirium*, with convulsions, come on; and the patient is certainly destroyed.

If he does not die in any of these ways, and if the disease be not relieved by the spitting, or by some other natural or artificial method, matter is formed; which is shown by irregular coldness and shiverings, the pain going off, or becoming slight and obtuse. If the matter points externally, a fluctuation is felt on the part affected; if the pus is contained in the cavity of the *thorax*, it is felt between the lower ribs, and the patient cannot lie on the opposite side. If any means of *resolution* have been applied, so as to diminish the inflammation, and a suppuration nevertheless comes on, it often does not begin till late in the disease, sometimes not before the fourteenth day. This termination is most commonly fatal.

Sometimes, instead of a formation of matter, there is an extravasation of *serum* and coagulable lymph into the cavity of the *thorax*, attended nearly with the same symptoms, and equally fatal.

It is cured naturally by a spitting, and the other means enumerated in treating on the peripneumony.

If this, or any other inflammation, begin with the symptoms of the first stage of fever, and they remain after the pain has arisen, sometimes a crisis happening in the fever, both diseases are carried off; or when the inflammation is diminished by any natural or artificial means, it frequently happens that the fever continues, increases, and is attended with weakness, till the patient die.

If the inflammation go off by *resolution*, the *pleura*, and external membrane of the lungs, generally adhere. Slight inflammations of this, and other membranes, are often attended with no other symptoms but a degree of soreness, nor any consequence but adhesions.

It should be distinguished from other inflammations of the breast, *diaphragm*, intercostal muscles, intestines, and liver; from spasmodic pain in the side, or intestines; and from rheumatism of the side.

As in the pleurisy, the *inflammatory diathesis*, or general inflammation, is greater than in most topical ones, it yields better to evacuations, especially to bleeding. To this, therefore, in general we trust principally for the cure; and in the case of a strong habit, take away from twenty to thirty ounces of blood at once; repeating the blood-letting, if the disease continues, to twelve, ten, eight ounces or less; according to the circumstances, as long as the pulse is hard, unless the symptoms of the first stage of fever have continued: in this case, such a quantity of blood must not be taken away, nor the bleeding so often repeated.

All the other remedies recommended in the peripneumony are equally applicable in the inflammation of the *pleura*; and are to be used in aid of the bleeding from the system in general.

Cupping-glasses, with and without *scarification*, have been applied in both diseases, sometimes with advantage; but the cold air, to which the skin is exposed during the operation, often overbalances the good effect of it.

The food is to be the same as in the peripneumony.

When the symptoms of the first stage of fever precede this, or any other inflammation, and remain after it takes place, bleeding often carries off the general inflammation; but the inflammation and fever continue. In this case, further evacuation is of no use, and therefore we must proceed in the cure by the other methods recommended in each inflammation: in this, for example, by expectorants, relaxants, blisters, &c. If the fever should continue, and the symptoms of weakness come on, the strength must be supported, as has been shewn in the end of fevers, notwithstanding some little pain remaining in the inflamed part.

§ 5. *Of the Inflammation of the Intercostal Muscles.*

This disease has been called the *spurious* pleurisy. It arises nearly from the same causes, is attended almost with the same symptoms, and is to be cured in the same manner.

Its difference from the pleurisy just now described, appears in these particulars: it may be produced by external causes; a swelling appears externally with pain on the parts being touched; there is less pain on inspiration, and of consequence not so great a difficulty of breathing; the cough is for the most part dry; the general inflammation does not arise in so great a degree; the lungs are not so apt to be affected; the patient is never suffocated; and there is but little danger from suppuration.

It is seldom or never cured by a spitting; but on the other hand, fomentations and poultices are applied to the part, with much greater effect than in the pleurisy. Purgatives may also be used with greater freedom.

§ 6. *Of the Inflammation of the Mediastinum.*

This disease is also in many things similar to the pleurisy: its causes are the same. The pain strikes obliquely from the

ſternum through the breaſt to the back: there is a difficulty of breathing, and cough, attended ſometimes with a ſpitting. Theſe ſymptoms, however, are not ſo violent as in the pleuriſy; nor is the pain on inſpiration ſo much increaſed, or the *inflammatory diatheſis* ſo great; ſuppuration is with greater difficulty avoided; and, when it happens, is commonly fatal. It is to be cured in the ſame manner as the pleuriſy.

§ 7. *Of the Inflammation of the Pericardium.*

This diſeaſe alſo has many things in common with the inflammation of the *pleura*; but the pain is deeper ſeated, and is not ſo much increaſed upon inſpiration. If the heart is affected, the pulſe becomes ſmall, irregular, and intermittent, with immenſe anxiety. The patient falls into *ſyncopes*, and is ſoon deſtroyed. It is to be treated alſo as the pleuriſy.

§ 8. *Of the Paraphrenitis, or Inflammation of the Diaphragm.*

This ariſes from the ſame cauſes as the inflammation of the *pleura*. The pain is very violent and deep-ſeated in the lower part of the breaſt, or under the ſhort ribs; or ſtriking between them and the back: the belly is drawn up, and kept as much at reſt as poſſible; the reſpiration is exceſſively quick, ſmall, and difficult, and performed principally by the muſcles of the breaſt; the patient is frequently affected with ſickneſs and hiccough; the pulſe is for the moſt part very frequent, ſmall, hard, and often irregular; there is great anxiety; the other ſymptoms of irritation come on, and death frequently enſues. If this does not happen, the progreſs, termination, and manner of treatment are nearly the ſame as in the pleuriſy.

Of theſe inflammations in the breaſt, that of the *pleura* near the fore-part of the ribs, and that of the lungs, are the moſt frequent.

The inflammation of the *pleura* is almoſt always attended with ſome degree of the inflammation of the lungs; ſometimes all theſe parts are inflamed together: but more commonly only one at a time in the ſame patient.

§ 9. *Inflammation of the Inteſtines.*

Inflammation of the exterior coats of the *Inteſtines* (of which the ſymptoms and manner of treatment are here laid down) differs greatly from that of the interior, villous, or mucous membrane: this laſt being attended with dyſentery, or *aphthæ*. (Vide the *Dyſentery.*)

It is brought on by external cold, fever, indurated *fæces*, heavy or hard bodies lying in the inteſtines, introſuſceptions, adheſive ſtimulants, ſpaſmodic contraction of the inteſtines, *hernias*, and wounds.

The ſymptoms are a pain in the belly, occupying different parts according to the inteſtine affected; but fixed to the place in which it aroſe at firſt. It is extremely acute, except when the diſeaſe ariſes from a wound, and then it is ſometimes hardly ſenſible; it is generally equable, ſometimes however increaſing by fits, and ſometimes diminiſhing a little. For the moſt part the whole belly is affected, at the ſame time, with ſpaſmodic pains and flatulency. The pulſe becomes ſmall, hard, frequent, quick, and often at laſt irregular and intermittent. Coldneſs of the extremities, together with a ſudden and great proſtration of ſtrength take place. The muſcular fibres of the inflamed part contract, ſo that nothing can paſs through; and ſometimes the *ſphincter ani*, in ſuch a manner that a ſmall pipe can with difficulty be introduced into the *rectum*. Flatulencies in the ſtomach, ſickneſs, violent retchings, and vomiting, are frequently produced. The tongue is dry, with great thirſt, and the urine tranſparent, and ſometimes pale, in ſmall quantity, and diſcharged with difficulty. The breathing is quick, the patient bending forward and compreſſing his belly, the abdominal muſcles being often ſpaſmodically contracted; and from the irritation the patient is cut off, ſometimes ſimply, ſometimes with delirium and convulſions.

The inflammation frequently terminates in gangrene and mortification, in which caſe the pain goes off, and the patient appears to himſelf for a little relieved; but the pulſe continues frequent, ſmall, and often irregular, and the extremities cold; and he is cut off.

If it be left to itſelf, this diſeaſe kills ſometimes in ten or twelve hours, and almoſt always before the end of the third day; ſo that there is ſeldom any ſuppuration. But if the inteſtines ſhould ſuppurate, the pain diminiſhes, and is converted rather into a ſenſe of diſtenſion; irregular cold fits, with the other ſymptoms of internal ſuppuration, ariſe; and the contraction of the muſcular fibres of the inteſtines, the great frequency of the pulſe, and other ſymptoms, go off.

There is a greater chance of a ſuppuration's taking place in the colon than in the *duodenum*, *jejunum*, or *ileum*.

The abſceſs may break either into the cavity of the *abdomen*, or into the inteſtinal canal. In the firſt caſe it is generally fatal, producing a hectic fever; in the ſecond, the *pus* is evacuated by the *anus*, ſometimes at firſt pure, afterwards mixed with the *fæces*, gradually diminiſhing if the ulcer heals, and the patient is reſtored; or a conſiderable quantity of matter continues to be diſcharged, a hectic fever is produced, and he ſinks.

At the beginning of the diſeaſe, after the pain has continued for a few hours, ſometimes a great ſecretion takes place in the inteſtines; the villous membrane is alſo affected with inflammation, and it is converted into a dyſentery: on the other hand, when in an inflammatory dyſentery the ſecretion is imprudently checked by aſtringents, this kind of inflammation often ariſes.

It ſhould be diſtinguiſhed from the ſtone in the kidneys or ureters, from inflammation of the kidneys, and other abdominal *viſcera*; from the pleuriſy, and other inflammations of the *thorax*; and particularly from ſpaſmodic pains in the inteſtines, and obſtruction of the paſſage through them where there is no inflammation.

It is to be cured by the immediate application of the moſt powerful means of *reſolution*; we are therefore to bleed to the quantity of 12 or 16 ounces, notwithſtanding the ſmallneſs of the pulſe, and ſeeming weakneſs: for the pulſe becomes fuller, and the proſtration of ſtrength goes off when the inflammation is diminiſhed; as, on the other hand, they are increaſed by ſtimulants: the bleeding is to be repeated at ſhort intervals till the pulſe becomes ſoft.

Purgatives are contra-indicated by the contraction of the inflamed part; and when they have been given, and have not purged, they have often evidently increaſed the pain, and other ſymptoms: but evacuations from the inteſtines by means of clyſters, are made with advantage, and (No. 9.) may be thrown in every two or three hours till a ſtool is procured.

Relaxants have not ſo frequently been exhibited internally as in other inflammations: nevertheleſs, when uſed, they are of great ſervice. (Vid. No. 13. 14.)

The circulation is to be brought to the ſurface of the body by the warm bath, or fomentations applied to the belly: but great care is to be taken leſt cold from the air or moiſture in coming out of the bath, or changing the fomentations, ſhould do more miſchief than the remedy does good: theſe are alſo uſeful when the *anus* is much contracted, ſo that clyſters cannot be given.

Narcotic and ſedative fomentations (No. 33.) are alſo uſeful.

Some degree of inflammation of the ſkin of the belly has been raiſed by cupping-glaſſes with benefit: but bliſters have not been commonly employed.

If theſe means ſhould fail of ſucceſs, opiates ſometimes cure, by taking off the contraction, eſpecially when joined with relaxants.

(No. 31.) ℞ Aq. Menthæ Vulg. ℥i ſ℈.
Syr. Diacod. ℥ij. ad vj.
Tart. Antim. gr. ½. ad gr. ſ℈.
M. Fiat Hauſtus.

The food, both during the inflammation, and for ſome days after it is cured, ought to be farinaceous decoctions, or moiſt preparations of the farinaceous ſeeds, as panada, &c.

§ 10. *Inflammation of the Stomach.*

This ariſes nearly from the ſame cauſes as that of the *inteſtines*, excepting introſuſception, hardened *fæces* and *hernia*; and it is more liable to be produced by acrid ſubſtances.

The ſymptoms are for the moſt part the ſame in both diſeaſes, excepting the ſituation. In this caſe the pain occupies the region of the ſtomach; and even the mildeſt things thrown down increaſe it greatly, and at the ſame time bring on the ſickneſs and vomiting: the diſeaſe is altogether more acute; and, unleſs the moſt powerful means of relief be immediately employed, proves fatal.

It is cured by the ſame method as the inflammation of the inteſtines; excepting only that we can ſeldom exhibit any internal medicines, on account of the great irritability of the ſtomach.

§ 11. *Inflammation of the Rectum.*

It is ſeldom ſo acute as that of the *duodenum*, *jejunum*, or *ilium*, or ſo apt to produce ſmallneſs of the pulſe, or coldneſs of the extremities, or to affect the ſtomach; neither is there ſuch a ſtricture as to render the inteſtine impervious, and it more frequently terminates in ſuppuration.

The cure is the ſame, except that purgatives are uſed with advantage, and laxatives ought always to be employed.

§ 12. *Inflammation of the Subſtance of the Liver.*

This is produced by the common cauſes of internal inflammation, and by obſtruction of the hepatic ducts, or *ductus communis choledochus*, and is more common in warm climates.

It ariſes ſometimes at the beginning of a fever, as other internal inflammations. In this caſe it is preceded by the ſymptoms of the firſt ſtage, and the fever for the moſt part continues.

The inflammation begins with an obtuſe pain in the region of the liver, which is often but juſt ſenſible. This pain gradually increaſes, but is never very acute, if the membranes are not affected; nor is it accompanied by any great degree of general inflammation. The pulſe, therefore, at the beginning is not at all altered, when the patient is free from fever; and frequently but very little till the time of ſuppuration. The ſwelling when large, or when the convex part is affected, is viſible externally, and occaſions a difficulty of breathing, with a cough, but ſeldom any conſiderable ſpitting: when the concave part is inflamed, if near the ſtomach, it brings on ſickneſs, thirſt, hiccough, vomiting; or if near any conſiderable hepatic duct, or the *ductus communis choledochus*, it prevents the paſſage of the bile into the *duodenum*, and a jaundice takes place. But in all other caſes of inflammation of the liver, the quantity of bile thrown into the *duodenum* is increaſed, and the evacuations become bilious.

All the terminations of inflammation may poſſibly happen in this diſtemper; but by much the moſt common is ſuppuration, which is attended by the ordinary ſigns of internal ones, together with a fluctuation, which is ſometimes to be felt when any part of the liver, immediately under the teguments, is affected; the preceding ſymptoms of the diſeaſe at the ſame time diminiſh, or go off entirely.

When the abſceſs is conſiderable, a ſufficient quantity of matter is abſorbed to produce a hectic fever.

The *pus* opens to itſelf a way (1) into the inteſtines, by deſtroying the coats of an hepatic duct, or a part of the *duodenum*, or (2) into the cavity of the belly, or (3), if the liver adheres to the *peritonæum*, through the integuments of the *abdomen*.

(1) In the firſt caſe, ſeveral purulent or ichorous ſtools are immediately brought on, and the matter afterwards continues to come away with the *fæces*.

(2) In the ſecond, the ſenſe of weight, and the ſwelling (if any there were) diminiſh, or go entirely off; the inteſtines are ulcerated; pains in the belly, and dropſical ſymptoms come on, and, together with the hectic fever, kill the patient. When the *pus* is contained in the *abdomen*, it ſometimes, although very ſeldom, gets through the external integuments, particularly at the rings of the muſcles.

(3) In the laſt caſe there is an ulcer opening externally.

In whatever way the *pus* is evacuated, unleſs the patient is aſſiſted by medicine, a hectic fever is generally produced, and he dies.

Sometimes after inflammations of the liver, on opening the body, collections of water, without any appearance of *pus*, have been found between the ſubſtance and external membrane.

It ſhould be diſtinguiſhed from inflammation of the *pleura*, diaphragm, muſcles of the *abdomen*, and ſpaſmodic pain.

The cure is performed by bleeding, bliſters, relaxants, &c. as in other internal inflammations; but the ſymptoms at the beginning not alarming the patient, it is often too late before the remedies are employed; and from the ſlightneſs of the general inflammation, evacuations having leſs effect, this diſeaſe frequently terminates in ſuppuration, which, however, is to be avoided, if poſſible.

For this purpoſe we are to bleed to twelve or fourteen ounces any time before the fifth day; eſpecially if there be general inflammation: and the bleeding is to be repeated, if the general inflammation continues, or the patient is relieved but not cured.

If there be a free paſſage for the bile into the *duodenum*, purgatives are alſo to be given. (Vid. No. 21.)

In other caſes relaxants (Vid. No. 13, 43) and bliſters applied to the part, are principally to be depended on, and in all are uſeful.

If it be too late for the application of theſe remedies, or if they fail, and a ſuppuration takes place; as ſoon as we know this from the ſymptoms, (No. 11.) is to be taken four or five times a day, increaſing the quantity of the bark, ſo that the patient ſhall take from three drachms to half an ounce every 24 hours.

If the abſceſs points externally, we are to open it as ſoon as poſſible; provided it appears from the immobility of the ſwelling that the liver adheres to the *peritonæum*; and the doſe of the bark is to be increaſed to ℥i ad ℥ij, every 24 hours, till a good ſuppuration and granulation comes on. The medicine is to be uſed in the ſame manner, if from the purulent or ichorous ſtools we judge that the abſceſs has broken into the *duodenum*.

Mercury has been given with the ſame intention, in as great quantity as could be taken without ſalivating the patient: but the bark appears to me to be preferable, eſpecially if the caſe be recent.

When an abſceſs breaks into the cavity of the *abdomen*, the ſame means may be uſed, but the diſeaſe is commonly fatal.

§ 13. *Inflammation of the Membranes of the Liver.*

It arises from the same causes as inflammation of the substance, but the symptoms differ as follows; the pain is more acute, it is attended with general inflammation, resembles more a pleurisy of the right side when the convex part is affected, and is to be treated nearly in the same manner as that disease.

§ 14. *Inflammation of the Cellular Membrane under the Psoas Muscle.*

This is produced by the common causes of internal inflammation, and also by strains and bruises, which are not suspected to have done any mischief.

It agrees very much, excepting for the situation, in its symptoms, progress, and termination, with the inflammation of the liver: i. e. the pain is situated in the back, for the most part rather lower than the region of the kidneys: both it, and the other symptoms of the inflammation are slight, and seldom attended with a great degree of general inflammation: the disease commonly terminates in suppuration, notwithstanding which, the pain sometimes continues, falling gradually lower: in other respects the usual symptoms of internal suppuration arise, such as irregular coldness, hectic fever, &c.

The *pus* makes its way through the *cellular membrane*, sometimes into the cavity of the *abdomen*, when it is fatal, (Vid. Inflammation of the Liver) sometimes externally in the thigh, a little on the outside of the lymphatic glands in the groin; sometimes it appears in the loins; or dissects along the attachments of the abdominal muscles to the spine of the *ileum*, and forms a *tumor*; with fluctuation in the hip; or it passes down into the *pelvis*, and gets to the *perinæum*, or resembles the *hæmorrhoides*; often producing *caries* in the bones of these different parts, and pain on moving, or inability of motion in the muscles.

When the tumor and fluctuation appear, the matter may be commonly forced back by pressure; and when the abscess is opened, a large quantity of it runs out; it is likewise afterwards pressed out by moving the muscles of the parts affected.

It should be distinguished from inflammation and stone in the kidneys or *ureters*, *buboes*, *hæmorrhoides*, and inflammation and suppuration of those parts where the *pus* in this disease makes its appearance externally.

It is to be treated in the same manner as inflammation of the liver, (except for the situation,) both in the state of inflammation and suppuration.

§ 15. *Inflammation of the Kidneys.*

This disease is not common, as a determination of fluids to the kidneys occasions an increased secretion of urine, sometimes mixed with blood, which prevents the inflammation.

It arises from the common causes of internal inflammations, or from external injury. A stone in the kidney produces inflammation, but most commonly of the internal membrane and *tubuli uriniferi* only.

The inflammation begins with a pain in the region of the kidney, (i. e. in the back, near the articulation of the short ribs, higher up on the left side than on the right) often shooting down by the *ureter* to the bladder, and by the spermatic chord to the testicle. The urine is pale, its evacuation frequent, and in small quantities at a time, performed with difficulty, and with a sense of heat and pain: there is sometimes external redness. The leg of the side affected is seized with *stupor*; and the pain is increased upon standing, walking, coughing, lying on the opposite side, or in any other case where the kidney is moved, or the surrounding parts extended. The pulse is hard and frequent, and as the pain increases, often becomes small, quick, and sometimes intermittent, with coldness of the extremities, cold sweats, sickness, vomiting, fainting, *delirium*, convulsions, &c. as in the inflammation of the intestines, although not in so great a degree, or arising so soon in the disease.

It admits of a natural cure, viz. the urine grows high coloured, is secreted in greater quantity, and at last is copious, thick, and mixed with mucus, relieving, and gradually diminishing the pain and other symptoms, till the patient's health is restored.

It may also go off by *metastasis*, &c. as other internal inflammations: or it may terminate in gangrene and mortification, which, in the interior parts of the body, are almost constantly fatal, and nearly with the same symptoms, (Vide the Pleurisy.) In this case there is likewise an alteration of the colour of the urine, accompanied with *fætor*; or the inflammation may go off, and leave a *scirrhus*, which is known from the patient's being relieved, although the natural cure has not taken place, nor any symptom of suppuration appeared; from a sensible hardness sometimes continuing in the part; a *stupor* in the lower extremities on the side affected; and a diminution of the secretion of urine.

Or the kidney may suppurate, which is indicated by the common symptoms of internal suppuration.

The abscess breaks (1) into the *pelvis*; (2) into the cavity of the *abdomen*; (3) or lastly, externally.

(1) In the first case, the sense of weight, and distension of the kidney (if any there were), goes off suddenly, and, at the same time, the urine is mixed with *pus*, which subsides to the bottom in a great quantity upon the breaking of the abscess, but afterwards in less.

If the matter is white, thick, and not fœtid, the ulcer sometimes heals; otherwise a hectic fever comes on, and the patient is cut off: or, lastly, the ulcer may continue a long time without proving fatal. The ulcer generally heals soon, or not at all.

(2) If it break into the cavity of the *abdomen*, it kills. (Vide the Inflammation of the Liver.)

(3) If it open externally, the urine comes away with the *pus*, and an ulcer is formed of very difficult cure.

Inflammation of the kidney should be distinguished from a stone obstructing the ureter, from inflammation of the *psoas muscle*, and other adjacent parts, and from inflammation, and spasmodic or other pains, in the intestines.

The cure is to be performed by the medicines commonly used in internal inflammations; to which may be added the following.

(1) Gentle diuretics.

(No. 32.) ℞ Sem. Lini ℥ ß.
Sem. Petrosel. ʒ ß.
Aq. Font. Bullient. ℔ j.
Infundantur simul per Hor. ß. et cola.
Colatur. Adde Succ. Limonum et Sacch. Alb. q. s. ad gratam Acedinem Dulcedinemque.
Bibat Poculum frequenter.

A moderately warm *semicupium* may also be used to promote the secretion of urine.

(2) Mild laxatives and clysters. (Vid. No. 8, 9.)

(3) If there should be any external symptoms, fomentations and poultices may be used. (Vide No. 23.)

Lying on the back, as it prevents the passage of the urine into the bladder, is to be avoided.

If the kidney should suppurate, the treatment is to be nearly the same as in suppurations of the liver. (Vid. *Inflammation of the Liver.*) And the patient is also to take infusion of lin-

ſeed, or decoction of althæa root for his common drink, after the abſceſs is broken, in order to dilute the urine, and prevent it from ſtimulating the ſurface of the ulcer, which would hinder the cure.

Some have propoſed the exhibition of the balſams of trees, to promote the granulation; but the bark appears to me to be preferable.

The management of the food, &c. in theſe ſuppurations, is to be the ſame as in the pulmonary conſumption.

§ 16. *Inflammation of the Bladder.*

The inflammation of the exterior coats of the bladder differs from the abraſion, exulceration, or inflammation of the internal, or mucous membrane.

It is produced by the cauſes of internal inflammation; by the rubbing, or preſſure of a ſtone; external hurts; and by ſtrictures in the urethra.

The neck of the bladder is thicker than any other part, and more expoſed to injury from the ſtone and bruiſes. The ſtone in the bladder, however, more commonly produces an inflammation, or abraſion of the mucous membrane than this diſeaſe.

The inflammation begins with a violent pain in the region of the bladder, *i. e.* in the *perinæum*, or in the belly, immediately above the *pubes*, deep ſeated, and ſometimes attended by a redneſs in theſe parts. If the neck be the part affected, there is a retention of urine, together with a conſtant *ſtimulus* to its evacuation; if the bottom be the part diſeaſed, there is a continual dribbling, with great efforts to throw out a larger quantity at a time, which the patient conceives to be contained in the bladder. Theſe ſymptoms are accompanied with frequent attempts to expel the *fæces*, with which the *rectum* appears to the patient to be always loaded; theſe increaſe the pain very much, particularly when any *fæces* are actually contained, and eſpecially if they be hard. The pulſe is frequent and hard, the extremities become cold, there is immenſe anxiety and reſtleſſneſs, with ſickneſs, vomiting, delirium, and the other ſymptoms of irritation, as in the inflammation of the inteſtines, and the patient for the moſt part is cut off in a ſhort time.

It alſo frequently terminates in gangrene and mortification; the pain goes off, but the other ſymptoms continue, and the patient dies ſoon after. Or it may be carried off by an increaſed ſecretion of *mucus* from the internal membrane, gradually relieving the ſymptoms; or by a *metaſtaſis*. Or, if the diſeaſe ſhould not be ſo violent, eſpecially when the neck of the bladder is the part affected, it may proceed to ſuppuration, moſt of the ſymptoms going off; uncertain rigors and coldneſs taking place; and a difficulty in making water, or a total retention of it, with a conſtant irritation to its evacuation, or a *teneſmus*, with a ſenſe of weight, (as the abſceſs occupies the neck or *fundus*) remaining till the *pus* is evacuated.

The matter may make its way into the bladder, and come away with the urine, leaving an ulcer there: or into the cellular membrane, and from thence externally by the *perinæum*, after deſtroying the circumjacent parts in its paſſage, and producing a *ſinous* ulcer; or it may get through the *peritonæum* into the *abdomen*, when it generally brings on fatal ſymptoms. The ulcers in the bladder and *perinæum* are of difficult cure.

It ſhould be diſtinguiſhed from inflammations of the circumjacent parts, and from retention of urine produced by other cauſes.

It is to be cured by the common means of *reſolution* in internal inflammations; as bleeding, relaxants, &c. Theſe are to be employed immediately on the appearance of the diſeaſe, and proſecuted with vigor, or it will ſoon be fatal. There ſhould be added gentle laxatives, or clyſters to keep the belly open, eſpecially the firſt; as clyſters by preſſing on the bladder, when a part near the *rectum* is inflamed, may be detrimental, and ſhould therefore only be uſed when there are indurated *fæces*.

(No. 9.) but in ſmaller quantity, is proper in this caſe; otherwiſe (No. 8.) may be exhibited twice a day, or oftener, as there may be occaſion.

If there ſhould be external ſymptoms, fomentations and poultices are to be applied; taking care that they do no hurt by their preſſure, and that the cloths or herbs be not too moiſt, leſt the water ſhould run upon the linen and bed clothes.

(No. 33.) ℞ Flor. Cham. Manip. ij.
Folior. Rut. vel Matricar. Manip. j.
Capit. Papaver. Alb. ſem. dempt. ℥j.
Rad. Alth. recent. ℥j.
Optime contundantur et coquantur in Aq. Font. q. ſ. per Minut. v. Decoctum utatur pro fotu, et Herb. Coct. pro cataplaſmate, addend. unguent. ſimpl. ℥ij.

℞ Capit. Papav. Alb. ſem. dempt. ℥iv. coque ex Aq. Font. ℔. ij. per decem minut. Dein adde Spt. Vin. rect. ℔ ß. Exprimendo cola pro uſu.

If there ſhould be no external ſymptoms, the ſkin of the belly and *perinæum* is to be rubbed with (No. 22.), which is preferable to bliſters, on account of the inconvenience of their application.

The drink ſhould be mucilaginous decoctions; and, if the urine be retained from a ſtricture in the neck of the bladder, only in ſmall quantities.

In this caſe, too, it is neceſſary to evacuate the urine by art, to avoid gangrene and mortification; but this ſhould be done with great caution. If, notwithſtanding the uſe of theſe remedies, and after ſufficient evacuation, a ſpaſmodic contraction and pain ſhould continue; opiates, as in inflammations of the inteſtines, may ſometimes be uſeful.

If the bladder ſuppurate, the *pus* is to be evacuated as ſoon as poſſible, and the remedies already recommended in ulcers of the kidneys are to be employed.

§ 16. *Inflammation of the Womb.*

This ariſes from the common cauſes of internal inflammations, tearing, bruiſes, external *ſtimuli*, and obſtructions of the *menſtrua*, or *lochia*. It happens frequently after abortions, and child-birth, eſpecially when the *lochia* are prevented from coming on, or are ſtopt by cold, or any other cauſe; and is then attended with ſymptoms different from thoſe which appear when an *uterus*, not lately impregnated, is inflamed, and either alone or mixed with inflammation of the peritoneum, or the inflammation of the peritoneum happening after child-birth has been called puerperal fever.

In this caſe, there is a pain at the bottom of the belly, more diſtended, and for the moſt part neither throbbing, nor conſtantly very acute; the pulſe is frequent, eſpecially after child birth, often ſmall, ſometimes irregular, and in ſtrong habits, and after early abortions, hard; the patient is affected with *delirium, ſubſultus tendinum*, and the other ſymptoms of irritation which prove fatal; or the womb gangrenes, and mortifies, and the patient ſinks. When the womb has not been lately impregnated, the pain is more conſtant, bounded, and throbbing, the pulſe hard, full, and ſtrong, with the other ſymptoms of general inflammation; or, if the diſeaſe riſes to a greater height, it is ſmall, and very frequent, with the other ſymptoms of irritation; ſuppuration is alſo more liable to happen. In both caſes, as different parts of the womb are affected, there is ſtrangury; or ſuppreſſion of urine; or *teneſmus*, and pain in going to ſtool; or pain in moving the lower extremities; or ſwelling and heat, which may be felt upon introducing the finger into the *vagina*, the *os tincæ* being ſhut: univerſal reſtleſſneſs, thick urine, and pain from external preſſure, take place; and, if it ſhould happen in an impregnated *uterus*, an abortion follows.

It may be naturally cured by the *menſtrua*, or *lochia*, break-

ing out plentifully; or after child-birth, or abortion, by the patient's falling into a conſtant, equal, gentle, long-continued ſweat. Or it may terminate in gangrene and mortification, with the uſual ſymptoms of internal ones, and kill.

Or it may ſuppurate, with the common ſymptoms, and the abſceſs formed may break into the cavity of the *uterus*, bladder, or *rectum*, or externally, by the *perinæum*, or into the cavity of the *abdomen*. In this laſt caſe it is fatal, and in the others leaves ulcers difficult of cure.

Or it may be cured by *metaſtaſis*.

Or it may leave a *ſcirrhus* behind.

Inflammation of the womb in delicate or weak women after child-birth, where there is no hardneſs, but great frequency of the pulſe, is for the moſt part fatal. The only remedies we can employ in this caſe, are the keeping the patient in bed moderately warm, exciting, if poſſible, a gentle, conſtant ſweat, by *farinaceous* decoctions in ſmall quantities at a time, but frequently repeated; and applying antiſpaſmodic fomentations, and poultices, as (No. 33.) to the lower region of the belly, and external parts of generation. Bleeding increaſes the weakneſs without diminiſhing the inflammation; relaxants produce great ſweating or purging, without relief; and all very conſiderable evacuations are hurtful. The belly not having hitherto been rubbed with ſtimulants and antiſpaſmodics, it is worth while to try them, and (No. 22.) may be uſed: but bliſters, beſides the inconveniency of their application, are apt to render the pulſe more frequent. In abortions, and labours, where the patient has not been ſo much weakened, when the pulſe is hard and not very frequent, it is uſeful to take away blood, but this evacuation cannot in general be often repeated with advantage; and therefore the cure is afterwards to be committed to relaxants (No. 4.), and antiſpaſmodic fomentations and poultices (No. 33.), taking care that the firſt produce no purging, and keeping the patient in bed, moderately warm. When the *lochia* have ſtopped, ſtimulating *emmenagogues* have ſometimes been uſed, in many caſes, with manifeſt diſadvantage, and ſeldom with good effect.

If the pain continues in theſe caſes, notwithſtanding the above treatment, opiates may ſometimes be given with ſucceſs, as in inflammations of the inteſtines.

When the inflammation attacks a womb not lately impregnated, the common remedies uſed in internal inflammations are to be employed, according as the diſeaſe is attended with general inflammation, or the ſymptoms of irritation.

We are always to guard againſt preſſure on the part affected, whether that preſſure be external, or ariſe from urine contained in the bladder, or from *fæces* in the *rectum*: in the ſecond of theſe caſes this may be done by the catheter; and in the third by clyſters, which, after labours, where the patient is weak, ſhould conſiſt almoſt ſolely of watery fluids.

The food, when the patient is much reduced after labour, muſt be animal broths; otherwiſe *farinaceous* decoctions.

If the *uterus* ſhould ſuppurate, we are to endeavour to procure an exit to the *pus* as ſoon as poſſible; which however can hardly be done, except when it points in the *perinæum*, where poultices of bread, milk and oil, are in this caſe to be applied; and as ſoon as any fluctuation is felt, the abſceſs is to be opened.

In addition to what has here been ſaid on internal inflammations, it is neceſſary to obſerve, that inflammations alſo ſometimes ariſe in the other abdominal *viſcera*; but being attended with ſymptoms ſimilar to thoſe already treated of, excepting for the ſituation, requiring a ſimilar treatment, and happening but ſeldom, they are not here enumerated.

Chap. IV. Inflammations *of the* Mucous Membrane.

§ 1. *Of the Catarrh.*

A Catarrh is an inflammation of, or greater ſecretion from, the mucous membrane of the noſe, eyes, throat, mouth, or lungs, and properly ſhould be divided into different diſeaſes. It ariſes generally from cold, ſometimes from the paſſions of the mind, perhaps alſo from *ſtimuli*.

The effects of cold according to its different application, are various; *viz.* When the ſkin is expoſed to it gradually, and not to ſuch a degree as to kill by its ſedative power, it produces a contraction of the external veſſels, and an increaſe of the internal circulation and ſecretions, and checks the cutaneous perſpiration, but for the moſt part no diſeaſe enſues: on the contrary, it gives greater ſtrength to the whole habit: ſometimes, however, ſcaly eruptions take place on the ſkin; troubleſome ulcers in the extremities, difficulty of breathing with cough, and a great ſecretion of mucus in the lungs, where they have been weakened by frequent or long catarrhs, eſpecially where the cheſt is narrow; and in very irritable parts (as the ſkin in children) eryſipelatous inflammations enſue.

When the change from heat to cold is ſudden, it is often followed by rheumatiſms, catarrhs, diarrhœas, and dyſenteries; inflammations, particularly internal ones, fevers, &c. and frequently ſuch changes are attended with no bad conſequences.

Cold has ſometimes theſe effects, when applied for a few minutes; at other times it fails, unleſs it be continued longer. The danger is often as great, and ſometimes even greater, when a part only of the body is cooled.

It is not the abſolute, but relative degree of cold, that brings on theſe diſeaſes; for, whatever the preſent heat be, a ſudden diminution is dangerous, and more ſo when the thermometer is high; and, *cæteris paribus*, the greater the change, the greater the effect.

More people are affected by it in the ſpring and autumn than in winter or ſummer, on account of the great difference, at theſe ſeaſons, of the temperature of the air, in the day and night, in places expoſed to the ſun, or in the ſhade, and in ſubſtances more or leſs compacted.

Cold may be communicated by the air, or by any ſolid or fluid matter, or it may be generated on the ſurface of the body; but it does not act in all caſes with equal power.

The more readily any ſubſtance communicates its heat, the greater are its effects, and *e contrario*. Hence cold metals, ſtones, and moiſt clothes, eſpecially of a firm texture, &c. are dangerous.

The vapours ſurrounding the body defend it from the external atmoſphere. Hence cold air in ſtreams does more miſchief than when at reſt.

Cold is generated, (1) By evaporation. Hence moiſture on the ſkin, and clothes, is extremely hurtful, and eſpecially when the water is pure; as ſome ſubſtances united with it, neutral ſalts, for example, in ſea-water, diminiſh its volatility, and conſequently its bad effects; whilſt others, as eſſential oils, ſtimulate and counteract it. (2) By the ſolution of water in air. Hence winds that have paſſed over large continents, or high hills, having but little water chemically combined, readily diſſolve the matter of the inſenſible perſpiration, and any moiſture that may be on the ſkin, and are apt to produce diſeaſes; neither are people thoroughly defended from this air in houſes eſpecially thoſe who have been much affected with rheumatic pains. Hence alſo, if water be mechanically mixed with air (which in this caſe is commonly ſaid to be moiſt), the heat of the body makes a ſolution take place immediately upon its ſurface, which again generates cold, and keeps down the heat of the vapours immediately ſurrounding the ſkin: an atmoſphere therefore containing it in this ſtate is likewiſe dangerous.

Air chemically dry, blown over any moiſt place, diſſolves the water, and becomes cold. Hence the eaſt wind here, and ſimilar ones in other countries, are by much the coldeſt.

Air, into which water has juſt evaporated (as, for example,

in a chamber of which the floor or walls are moiſt) is cooled both by the ſolution and evaporation of the water, and alſo by the ſolution of it on the ſurface of the body; and is from theſe circumſtances extremely apt to bring on a diſeaſe.

An equal expoſure to cold affects ſome perſons much more than others; and the ſame man at one time more than at another.

Thoſe of more irritable habits are more ſubject to be injured by it. Hence, if any one has been ſurrounded by warm bodies for a conſiderable time, as in hot climates, or in the ſummer, eſpecially when it is long, or if he has been warm in bed, or covered every where with clothes, &c. diſeaſes, and thoſe of the worſt kinds, as fevers and dyſentery, are very apt to riſe, even from ſlight applications of cold.

If the circulation be greatly increaſed in the external parts, and the cauſe of this increaſe has ceaſed, and cold be applied, it is ſeldom that a man eſcapes; and if a cold fluid, eſpecially without *ſtimulus*, be taken into the ſtomach, it has the ſame effect as if it were applied to the ſkin. Hence, drinking cold water after being heated with exerciſe, and then continuing at reſt, or bathing under the ſame circumſtances, or any other like expoſure to cold, or going from a room heated to a great degree, into the open air, &c. is extremely dangerous.

If a man has been in a very hot atmoſphere, and comes ſuddenly into the cold, or if from a moderate heat he expoſes himſelf to a very cold medium, it is ſeldom that any miſchief enſues.

A man runs a great riſk of catching cold, when the powers of circulation are weak; as after evacuations, when the ſtomach is empty, when he has been fatigued with exerciſe or attention of the mind, when the ſtrength has been reduced by diſeaſe, &c.

Thoſe unaccuſtomed to changes in the temperature of the air, and thoſe in whom cold hath already produced diſeaſes, are more liable to be affected.

Expoſure of a part of the body unaccuſtomed to cold, is very apt to do hurt.

Coldneſs acts more powerfully when joined with anxiety, fear, and the other paſſions of the mind, in which the force of the circulation is diminiſhed, or the external veſſels contracted; and alſo with putrid vapour, or air partly unfit for reſpiration.

Cold contracts the external veſſels, throws a greater quantity of blood on the internal, and obſtructs the cuticular perſpiration; but its effects are not in proportion to the contraction, or obſtruction, but to the quickneſs of the change of the circulation, the irritability of the habit, and univerſality, firmneſs, and continuance of the contraction.

We may prevent it from having any bad effect, by avoiding or counteracting it.

It may be avoided by covering the body with clothes of a looſe texture, as flannels, callicoes, &c. and wearing them next the ſkin where there is great danger: and by taking care not to expoſe it, in thoſe circumſtances, where cold is moſt liable to affect it.

It may be counteracted, (1) By increaſing the force of the circulation by ſtimulants, as wine, &c. or exerciſe. Hence, when a man is actuated by any of thoſe paſſions which increaſe the circulation, as courage, enthuſiaſm, &c. any degree of cold almoſt can be borne without detriment. (2) By ſtrengthening the ſyſtem. (3) By diminiſhing the irritability by opium, bark, living in a colder atmoſphere, &c. (4) By gradually accuſtoming the body to bear changes from heat to cold, which ought never to be ſuch as will bring on any diſeaſe.

Catarrhs are apter to ariſe from cold, in the ſpring and winter, in variable and cold climates, and in variable weather; and they happen more readily to people who have narrow cheſts, or long necks, or ſuch as have formerly been affected with them, eſpecially if tubercles are left in the lungs; or to thoſe of lax habits, or whoſe parents were ſubject to this diſeaſe.

Sometimes the inflammatory ſymptoms precede the increaſed ſecretion: in which caſe it has been called a *hot catarrh*. Sometimes the ſecretion of the mucus is increaſed at the beginning, the inflammation coming on afterwards, but ſeldom in ſo great a degree; when it is ſaid to be a *cold catarrh*.

In the firſt caſe the ſymptoms, according as the different parts are affected, are a redneſs, heat, foreneſs, and ſenſe of diſtenſion in the eyes and eyelids, there being at the ſame time a great ſecretion of tears, and of watery *mucus*, containing neutral ſalts, which running down the cheeks ſometimes ſtimulate and inflame them. When the noſe is affected, there is a ſenſe of ſtuffing and ſwelling in the noſtrils; an alteration in the voice, and a loſs of ſmell; and if the inflammation runs high, a thin *mucus* is ſecreted which produces heat, foreneſs in the noſtrils, ſneezing, and ſometimes inflammation with excoriation of the upper lip; or, falling backwards into the throat, *trachea*, or lungs, it inflames them. Theſe ſymptoms are now and then attended by a ſwelling of the noſe, or of the whole face, with a degree of languor and ſtupor, and a deafneſs, foreneſs of the ears, and running from them. When the throat is the part diſeaſed, the tonſils and other parts are red, ſore, and hot, accompanied with a ſecretion of watery mucus which ſtimulates, and occaſions a conſtant, troubleſome, tickling cough; ſometimes the whole mouth is ſore; there are little excoriations of the tongue, and a conſtant flow of ſaliva, with foreneſs of the ſalivary glands, and the lips are inflamed and excoriated. When the *larynx* or *trachea* are affected, a foreneſs is felt in them, attended with hoarſeneſs, and for the moſt part with a troubleſome, tickling cough. In the lungs, this diſeaſe produces a foreneſs, tightneſs, and ſenſe of ſtuffing in the breaſt, with difficulty of breathing, and violent cough, with which either nothing or only a watery mucus is at firſt ſpit up, and which produces foreneſs under the *ſternum*, and in the ſides, and ſometimes head-ach, ſickneſs, and retching.

Sometimes all theſe parts are affected at once, but frequently one only at firſt, the diſeaſe ſpreading from thence to the others.

It is attended with more or leſs of general inflammation, according to the ſtrength of the patient, or violence of the diſeaſe; the natural evening *paroxyſm* of fever is alſo increaſed, and with it all the ſymptoms; and this, together with the cough, often deprives the patient of ſleep, eſpecially in the fore part of the night, going off in the morning with a gentle moiſture on the ſkin.

In weak or ſcorbutic habits (as they have been called) the pulſe becomes frequent, but not often hard; the appetite is loſt, and there is great increaſe of the evening *paroxyſm* of fever.

Sometimes the diſeaſe is preceded by, or accompanied with, a fever.

In the cold *catarrh* the ſecretion of the mucus comes on firſt; there is therefore a running from the noſe; but the matter is not watery; but viſcid, though thin, and not very ſtimulating; or the ſame kind of *mucus* in the throat produces a cough, by which it is thrown off, and ſometimes *nauſea*; or in the lungs a cough with ſpitting, (which is much more conſiderable after ſleeping), but no great foreneſs or ſenſe of ſtuffing. Theſe are followed in a day or two by the inflammatory ſymptoms, but not in a great degree; nor is the whole ſyſtem often much affected.

There are in this diſeaſe all the varieties imaginable, from the moſt partial, to the moſt univerſal; from the ſlighteſt to the moſt violent; from the moſt inflammatory to the leaſt inflammatory; from the whole ſyſtem being not at all, to its

being very much affected, according to the cauſe producing the diſtemper, or the habit of the patient.

The ſymptoms already enumerated are followed by a ſecretion of *mucus* in greater quantity, becoming viſcid, if it was not ſo at the beginning, and loſing its *ſtimulus*; and if the inflammation be great, ſometimes growing white or yellow, and being now and then tinged with blood: as this goes on the other ſymptoms gradually abate, the ſecretion diminiſhing, and the *mucus* returning to its natural colour and conſiſtence, till the diſeaſe is cured.

When the patient is in a cold atmoſphere the cough is for the moſt part more troubleſome; the other ſymptoms are alſo prevented from being carried off, and the diſeaſe is prolonged; and if he is ſuddenly expoſed, a freſh exacerbation enſues, and it runs through the ſame courſe: by either of theſe it may be continued during the winter, and, going off in the ſummer, recur upon the return of the cold weather, and from the ſlighteſt cauſe become habitual; and now and then the ſecretion is ſo conſiderable, that it weakens the patient to a great degree, and ſometimes kills.

If the inflammation be great, it ſometimes runs deeper than the mucous membrane, and *angina* or *peripneumony* come on; and if there be *inflammatory diathesis*, and the cough be very violent, a pleuriſy may be produced.

Or an *hemoptoe* may ariſe: or an excoriation and exulceration of the lungs; and, of conſequence, pulmonary conſumption may take place, eſpecially where there are tubercles. Or there may be all the appearances of the mucus being converted into pus, and producing an exulceration, the matter ſpit up perfectly reſembling pus, and the patient dying hectic. Or it may be cured by *metaſtaſis*, eſpecially by eruptions about the mouth.

It is much apter to terminate ill in thoſe naturally diſpoſed to be affected, and when cured it often leaves adheſions of the lungs to the *pleura*, or *tubercles*.

It is to be diſtinguiſhed from *angina*, *peripneumony*, the eryſipelatous or ulcerous ſore throat, venereal and other exulcerations in the throat, pulmonary conſumption, hooping-cough, *aſthma*, and other difficulties of breathing, and inflammation of the mucous membrane preceding or accompanying the ſmall-pox or meaſles.

The cure is performed, 1. By weakening the ſyſtem, by evacuation according to the general inflammation, or the ſtrength of the patient.

If therefore there ſhould be conſiderable *inflammatory diathesis*, and eſpecially if the breaſt be the part affected, we are to bleed from ℥xii to xvi, and repeat the operation if the hardneſs of the pulſe, &c. continue: but if the inflammatory ſymptoms be not great, and do not affect the whole habit, it is unneceſſary; and when the patient is weak, and the ſecretion thin, and in great quantity, it is even ſometimes hurtful.

Purging alſo diminiſhes the inflammation, and may be likewiſe uſed when the ſecretion is too great.

(No. 34.) ℞ Tamarind. ℥iij.
Coque in Aq. Font. ℥vj. per v. minut.
Colatur. Adde
Sal. Cathart. Glaub. ℥vj. ad x. vel
Polychreſt. Rupell. ℥iiij. ad vj.
Mann. ℥ß.
Tinct. Sen. ℥iij.
Ft. Potio Purgans. Capt. mane ij. vicibus, intervallo horæ ß.

When the *inflammatory diathesis* is not very conſiderable, or where it has been diminiſhed by bleeding, after the purgative in the evening an opiate may be uſed.

(No. 35.) ℞ Aq. Cinnam. ℥jß.
Sp. Cinnam. ℥iij.
Syr. Diacod. ℥ß. ad ℥j.
Antim. Tart. gr. ½ ad gr. ß.
Ft. Hauſt. Capt. H. S.

If the inflammatory ſymptoms ſhould continue, or the ſecretion be ſtill too great, the purgative, and, when proper, the opiate, may be repeated after a day's interval.

2. By taking off the inflammation when it occupies the breaſt, eſpecially if there be any acute pain, by means of bliſters applied as near to the part principally affected as poſſible; or when the throat is ſore, or there is hoarſeneſs, by uſing (No. 22.)

3. By promoting the ſecretion where it is not ſufficient. (Vide the *Peripneumony* and *Angina*.)

4. By giving mucilaginous medicines to cover the mucous membrane, and allay the cough.

(No. 36.) ℞ Sem. Lini ℥ß.
Aq. Bull. ℥iv.
Infunde ſimul per hor. Dein adde
Aq. Bull. ℥xx.
Syr. Limon. ℥ij.
Colaturæ bibat. cyath. calid. frequenter.

(No. 37.) ℞ Aq. Puleg. ℥jß.
Sperm. Ceti ʒiß.
Vitelli Ovi q. ſ.
Syr. Pect. ℥iij.
Ft. Hauſt. quartâ quâque horâ ſumend.
Or (No. 25. 30.) may be uſed.

When the complaint is ſlight, theſe mucilaginous medicines are often ſufficient for the cure.

5. By reſtoring the circulation to the ſkin by relaxants (No. 4. 13.) which are uſeful in all caſes; and where the inflammatory ſymptoms are much diminiſhed, or have not come on, opiates are added to them with advantage.

(No. 38.) ℞ Opii gr. iij.
Extr. Gent. gr. x.
Antim. Tart. gr. ij.
Ft. Pil. viij. Capt. unam ter indies.

When the inflammation is great, the patient ſhould be confined to vegetable farinaceous food, and the drink ſhould be mucilaginous warm infuſions, or decoctions, acidulated; and he ought to be confined to a room moderately warm: but in ſlighter caſes this is not neceſſary.

Nothing contributes more to the cure than avoiding expoſure to cold, eſpecially in thoſe circumſtances where it has the greateſt effects on the ſyſtem; and this precaution is particularly neceſſary in thoſe naturally liable to the diſeaſe, or where it hath continued long, or when there have been frequent relapſes.

If it be drawn out to a great length, and the ſecretion hath weakened the patient, ſtrengthening remedies are to be employed; and riding on horſeback in a pure dry air is frequently of ſervice; but theſe are only to be practiſed when there is little or no inflammation. Reſinous pectoral medicines have ſometimes been given here alſo with ſucceſs.

(No. 38*.) ℞ Gum. Myrrh. Pulv. ℈j.
Ft. Pulvis ter die ſumendus.

§ 2. *Of the Eryſipelatous or Ulcerated Sore Throat.*

This diſeaſe is more common in the latter part of the autumn than at any other time of the year, and frequently attacks children and people of lax habits. It is often, but not always, produced by expoſure to infectious vapour; when it is not, it moſt probably ariſes from cold, in habits prediſpoſed to the diſeaſe.

It begins ſometimes with *rigor*, and *horror*, and coldneſs; but theſe ſymptoms, as well as thoſe affecting the whole ſyſtem, during the progreſs of it, ſeem rather to ariſe from irritation than from a regular fever. The ſymptoms of inflammation in the throat are at firſt a fiery redneſs, ſometimes without much ſwelling, ſometimes with a pretty conſiderable, but puffy one, which does not prevent the ſwallowing or the breathing in any great degree, and is attended with a ſtiffneſs of the neck. This is ſoon followed by whitiſh ſloughs, not riſing above the ſurface of the membrane, and for the moſt part ſurrounded by a redneſs, which, according to the diſeaſe, is in all the degrees from a very florid colour to almoſt a black; the ſloughs change gradually to an aſh-colour, and ſometimes to a blackiſh one, giving an offenſive ſmell to the breath, ſpreading and running deeper till the patient is cut off. In this caſe, the parts on diſſection have rather the appearance of rottenneſs than of an animal putrid maſs; or the ſloughs fall off, leaving ulcers, which either fill up and ſkin over, or are covered with freſh ones; ſometimes alſo the patient recovers without any ſenſible ſeparation.

At the ſame time, if the diſeaſe be violent, the mucous membrane of the other parts of the body is affected, and ſickneſs, vomiting, and ſometimes purging, come on at the beginning; theſe generally leave the patient in about 24 hours; but if they continue they add very much to the danger: the eyes are alſo red and watery, the membrane of the noſtrils is inflamed, a watery ſtimulating fluid runs from it, and ſometimes hæmorrhages enſue, which are often fatal if they ariſe the third or fourth day, or afterwards: there are alſo inſtances of the *vagina*'s being inflamed and exulcerated, and of the *menſtrua* coming on, although it be not their uſual period. After a day or two, the ſkin of the extremities, and of the throat externally, is often affected with eryſipelatous inflammation, and little eruptions take place, relieving the ſickneſs, purging, and other ſymptoms, ariſing from the mucous membrane of the inteſtines being diſeaſed.

Theſe are accompanied by ſymptoms of irritation, in a greater or leſs degree, according to the diſeaſe. When ſevere, it moſtly begins with *rigor* and *horror*, coldneſs followed by heat, frequency of the pulſe, reſtleſſneſs, anxiety, heavineſs of the head, and pain in the forehead. To theſe ſucceed the ſymptoms of the inflammation, moſt of the others continuing; the pulſe ſeldom becomes hard, full and ſtrong; but often exceſſively frequent and ſmall: the evening paroxyſm of fever is very conſiderable, and is often attended by *delirium*, even ſometimes the firſt night after the attack; in the morning the patient falls into a moderate ſweating, and is ſomewhat relieved; but the ſymptoms in general increaſing, he is, in many caſes, carried off on the fourth or fifth day, a remarkable obſcurity of the eyes coming on ſome hours before his death; otherwiſe the throat begins gradually to put on a better appearance, and, all the ſymptoms diminiſhing, he is cured. When the diſeaſe is very ſlight, the ſyſtem is hardly affected.

It is to be diſtinguiſhed from the *catarrh*, *angina*, other exulcerations, and *aphthæ*.

With regard to the cure, as this inflammation ariſes in lax and irritable habits, and is not accompanied with general inflammation, but with the ſymptoms of irritation; evacuations, eſpecially by bleeding or purging, are not only uſeleſs, but detrimental. It is alſo to be obſerved in the treatment, that the ſloughs, which are a ſpecies of gangrene, often appear before any medicines are applied.

At the beginning a gentle emetic may be exhibited with advantage, eſpecially if there be vomiting and purging.

(No. 39.) ℞ Infuſ. Flor. Cham. ℥iv.
Antim. Tart. gr. ſß. ad gr. j.
Solution. bibat calidam, ſuperbibendo Infuſ. Flor. Cham.

The patient is alſo to be kept in bed moderately warm. If the purging continues, it is neceſſary to check it by ſtimulants or opiates. The action of the veſſels is to be kept up by ſtimulants.

(No. 40.) ℞ Aq. Cinnam ℥j ſß.
Aq. Nuc. Moſch. ℥ij.
Pulv. Contr. ſimpl. gr. viij. ad ℈j.
Syr. Limon. ℥iij.
M. Ft. Hauſt. tertiâ vel quartâ quâque horâ ſumend. cum pulv. (No. 6.)

But it is a more ſucceſsful practice to exhibit as large a quantity of bark as the patient's ſtomach will bear, at leaſt an ounce in 24 hours, and it ſhould be exhibited in ſubſtance if poſſible at the interval of every hour or two hours.

Wine, as old hock, may be given along with the drink, which ought to be acidulated, if it does not produce a purging.

The volatile liniment may alſo be applied externally to the throat with good effect; and bliſters have been employed with advantage.

In the mean time the throat is to be waſhed with acid and aſtringent gargles: which may alſo be thrown in by a ſyringe, when the patient cannot uſe them himſelf.

(No. 41.) ℞ Tinct. Roſæ. ℥viij.
Acidi Vitriol. gutt. x.
Aluminis ℥ij ſß.
Tinct. Myrrhæ ℥j.
M. Ft. Gargariſma. Utatur ſæpius.

The food may conſiſt of the ſubſtances marked (Fevers, Ind. 1ſt. *A. a. b. c.*)

§ 3. *Of the Cholera Morbus, Diarrhœa, and Dyſentery.*

Thoſe purgings which are attended with a degree of inflammation in the inteſtines, are here to be treated of. A purging may be brought on by purgatives, acidity, or putreſcency of the ſubſtances contained in the *primæ viæ*; too great a quantity of bile; *pus*, either from an abſceſs, or ſecreted from the blood-veſſels; laxity of the glands of the inteſtines; general weakneſs; the periſtaltic motion of the inteſtines going on too quickly; and no inflammation of the mucous membrane taking place, it may go off without any bad conſequences; or weaken the patient, and cut him off, without terminating in dyſentery.

Thoſe who have been rendered weak or irritable by a hot or long continued ſummer, or by living in a warm climate, or in putrid vapour, are peculiarly liable to this diſeaſe.

It is produced by cold, or putrid vapour, or ariſes as a partial evacuation in fever, or from a purging from any cauſe, if it has either continued long, or happened in a habit prediſpoſed; or it begins with phlegmonous inflammation of the inteſtines.

When the whole *primæ viæ* are conſiderably affected at the beginning, ſickneſs, pain, flatulency, and diſtenſion of the belly come on, and are accompanied by frequent vomitings and painful purging of bile, and of all the other fluids ſecreted into the inteſtines, together with the ſymptoms of irritation, viz. a frequent and ſometimes ſmall and unequal pulſe, heat, great anxiety and thirſt, and after ſome time cold ſweats and ſpaſmodic contractions of the extremities; the patient ſinks ſometimes in 24 hours, and it is called the *cholera morbus*.

If, on the other hand, the diſeaſe be very ſlight, and not attended with much inflammation, there is a copious purging of all the fluids ſecreted into the inteſtines, with little pain, ſickneſs, or even loſs of appetite, or alteration in the pulſe; and if the patient avoid freſh expoſure to the cauſes, theſe ſymptoms leave him in two or three days, the *feces* acquiring

their former conſiſtence, and the evacuations becoming leſs frequent.

If it be in a middle degree, and does not take place as a partial evacuation in fever, it comes on with external coldneſs, loſs of appetite, and ſometimes ſickneſs and vomiting. Theſe are attended by flatulency, frequent, copious, thin evacuation of bile, and of all the other fluids ſecreted into the inteſtines; dryneſs of the tongue and thirſt; a frequent, but not a hard, and full pulſe; and there is generally at firſt but little pain. In a day or two, however, the ſtools begin to be leſs copious, become frothy, and are preceded by conſiderable pain, and no bilious matter or *faces* are evacuated (excepting now and then), but they become ſlimy, often ſtreaked, or mixed with blood, and fœtid; and there is the appearance of fat, and often hard maſſes, and ſometimes concretions of coagulable lymph, reſembling the internal coats of the inteſtines; and it appears, from diſſection, that the diſeaſe has left the upper part of them, and that it now occupies the *colon*, *rectum*, and the end of the *ileon*. To theſe ſymptoms are added *tenefmus*, (that is, a frequent, but fruitleſs, attempt to evacuation) and now and then a ſoreneſs about the *anus*, and an appearance of *pus* in the ſtools: there is alſo in ſome caſes ſtrangury; and in others *aphthæ*, ſpreading through the whole inteſtinal canal to the throat, eſpecially after the diſeaſe has continued ſome time.

The ſymptoms of irritation, together with the evacuation, ſometimes weaken and cut off the patient in a week or two, and that even when they were ſlighſt at firſt; ſometimes, again, they diminiſh, and the diſeaſe runs out to a much greater length; ſwellings of the belly, dropſical ſymptoms, and thoſe commonly attending weakneſs, coming on before his death; but now and then the purging gradually goes off, and he is naturally cured.

The lower part of the *colon* and *rectum* may alſo gangrene and mortify; in which caſe the pain is relieved, but the other ſymptoms continue and increaſe, the matter evacuated becomes blackiſh, ichorous, and exceedingly fœtid, and death ſoon follows.

Although the diſeaſe at firſt hath nearly the violence of the *cholera morbus*, it may end in a *dyſentery*; which may alſo be brought on by purgings ariſing from any cauſe, the ſtools growing frothy, and the other ſymptoms following. In the firſt caſe it is more acute, and ſoon terminates fatally; in the laſt it often runs out to a great length, and ſometimes goes off.

When a *dyſentery* comes on in the ſpring, or in cold climates, there is often a tendency to phlegmonous inflammation, and it begins with an acute pain in the belly, which is ſoon followed by a purging, in which the evacuations are leſs frequent, the pain is much more acute, and attended with hardneſs, frequency and fulneſs of the pulſe, and the other ſymptoms of general inflammation; theſe continue for ſome time, and the diſeaſe afterwards proceeds as before.

If it takes place as a partial evacuation in fever, it is preceded by the common ſymptoms of fever, generally thoſe of a violent one, the purging coming on (as already deſcribed) on the firſt, ſecond, or third, and ſometimes on any other day, and the patient being exhauſted by both diſeaſes is ſoon carried off. Sometimes the fever has the appearance of an intermittent or remittent; the purging being more frequent in the remiſſions, and either ſtopping or diminiſhing in the exacerbations. Sometimes alſo the fever is relieved, and, if the patient be not exhauſted, gradually goes off.

Diarrhœas often come on in the *criſis* of fevers, the fever leaving the patient, and the *diarrhœa* ſtopping in a day or two of itſelf; and ſometimes purgings, without any dyſenteric ſymptoms, happening towards the end of fever, weaken and kill the patient.

Exulcerations have been ſometimes found on diſſection in the inteſtines of thoſe who were long afflicted with the diſeaſe, but only inflammation in recent caſes.

In the autumn, after hot or long ſummers, and in warm climates, care is to be taken to avoid cold in thoſe circumſtances in which it is moſt liable to affect the ſyſtem; and in camps, the vapour from putrid *faeces*. If there be great danger, the bark may be uſed. (Vide No. 1.)

A moderate uſe of ſour fruits in warm ſummers and hot climates tends alſo to prevent the diſeaſe.

In the cure of *cholera morbus*, if the vomiting, purging, and other ſymptoms be very ſevere, chicken-broth without ſalt, decoction of barley, ſolution of gum arabic, or any other mucilaginous fluid, is to be drunk plentifully, to prevent the inflammation from being increaſed by the efforts, or by the neutral ſalts in the matter ſecreted, until the patient is ſufficiently reduced to render the exhibition of opium ſafe. If they be not in ſo great a degree, a ſmall quantity of emetic tartar (gr. $\frac{1}{4}$ ad gr. ſſ.) or ſome other relaxant, may be given diſſolved in part of the liquor, and repeated in three or four hours: or, if the vomiting be not very troubleſome, from 20 to 30 grains of rhubarb may be taken with advantage, the patient drinking ſome of the abovementioned liquors.

When the ſtrength is reduced by the evacuation, and the *primæ viæ* cleared of feculent matter by this treatment, the vomiting and purging are to be ſtopt by opiates, and (No. 3, 13.) may be uſed; but if the patient ſhould be ſo much weakened by the evacuation, and irritation, before any aſſiſtance is called in, as to be in danger of ſinking, they are to be exhibited immediately. In both caſes the opiate is to be repeated in a ſmaller doſe at ſix or eight hours intervals, for two or three days, taking care to keep the inteſtines free from feculent matter by procuring one evacuation every twenty-four hours, if it does not take place naturally.

Diarrhœas, when not attended by ſickneſs, fever, irritation, or pain, and when they have not continued long, only require the *primæ viæ* to be cleared by a purgative increaſing the periſtaltic motion, ſuch as

(No. 42.) ℞ Aq. Menthæ Vulg. ℥iſſ.
Sp. Nuc. Moſch. ℥iij.
Pulv. Rhei ℈j. ad ʒſſ.
Syr. e Cort. Aur. ℥ij.
M. Ft. Hauſtus. Capt. ante merid. vel horâ ſomni.

The patient ſhould uſe food of eaſy digeſtion, and avoid expoſure to cold.

If they be attended with any of the above ſymptoms, or continue above two or three days, they are to be treated in the ſame manner as dyſenteries.

Evacuation by bleeding is detrimental in *dyſentery*, except when it is the natural cure of a phlegmonous inflammation of the inteſtines, and attended with hardneſs, fulneſs, and ſtrength of the pulſe.

The *primæ viæ* are to be cleared both of the feculent matters, and fluids ſecreted into them; theſe, as in all other caſes of increaſed ſecretion where the glands are inflamed, being very apt to ſtimulate and putrefy.

When the ſtomach is much affected, an emetic is to be exhibited; and it ought to be managed in the ſame manner as has been directed in fevers, as we wiſh it here alſo to exert its relaxing power, and throw the circulation upon the ſkin.

A purgative is alſo to be given, and we ſhould chooſe thoſe which act principally by increaſing the periſtaltic motion of the inteſtines, as it is not a greater ſecretion which is required, but an evacuation of the matters already contained. Although rhubarb does not purge ſo copiouſly, yet, as it clears the *primæ viæ* better, it is preferable to moſt others. We rather chooſe

therefore to continue to employ it with the older phyſicians, than give it up, as ſome late practitioners have done, not conſidering the above intention, nor the progreſs of the diſeaſe after its operation, but merely the copiouſneſs of the evacuation. It may be given as in (No. 42.)

While the diſeaſe continues, it is to be repeated frequently for the ſame purpoſe, and alſo to prevent any thing's being retained in the upper part of the inteſtines, where the periſtaltic motion is now going on too ſlowly.

After the operation of the purgative, we are to endeavour to throw the circulation on the exterior parts of the body by relaxants.

(No. 43.) ℞ Pulv. Ipecac. gr. i. ad gr. ij.
Vel ℞ Sacchar. Alb. gr. v.
Antim. Tartar. gr. ¼ ad gr. ſß.
Ft. Pulv. Capt. quartâ quâque horâ.

The inteſtines are at the ſame time to be defended by mucilaginous medicines, and the ſecretion checked by gentle aſtringents.

(No. 44.) ℞ Gum. Arabici ℥ij.
Solv. in Aq. Hord. ℔ij. Adde
Syr. Limon. ℥ij.
Bibat pro potu.

(No. 45.) ℞ Aq. Font. ℔ij.
Corn. Cerv. Calc. et Præp. ℥ij.
Gum Arab. ℥ij.
Coque, ut Gum. ſolvatur, et bibat poculum frequenter.

Mucilaginous clyſters, (as No. 27.) take off the ſtimulus ariſing from attempts to evacuation, when little or nothing is contained in the lower part of the inteſtines; which ſtimulus is ſometimes the ſole cauſe of the continuance of the diſeaſe. When injected every eight or twelve hours, they are now and then ſufficient for the cure; and are in all caſes uſeful.

It is alſo of conſiderable uſe to avoid, as much as poſſible, any attempt to go to ſtool; and if there be foreneſs about the anus, it ſhould be rubbed with *unguent. ſimplex*, or any other expreſſed oil that is juſt fluid in the heat of the body. Or if the other ſymptoms are greatly diminiſhed, and this continues, an opiate may be added to the mucilage in the clyſter.

Stimulants applied externally to the belly have been found uſeful in relieving the pain.

(No. 46.) ℞ Spt. Vin. Rectif. ℥viij.
Ol. Menthæ ʒij.
Sapon. Venet. ʒ ſß.
Solve. Ventri applicentur lintea calida, linimento hocce madefacta, ter quaterve indies.
Vel ℞ Empl. com. ℥ij.
Ol. S^n^. Carui ʒij.
Gum. Galb. ʒj.
Ft. Empl. ſuper alutam extendendum, et abdomini applicandum. Interdum additur Opii ʒj.

At the ſame time the patient ſhould be kept in as pure air as poſſible, provided that it be always moderately warm, and that he be not expoſed at any time to cold, eſpecially in thoſe circumſtances in which it is moſt liable to affect the ſyſtem.

The food ought to conſiſt of preparations of farinaceous vegetable ſubſtances.

If, notwithſtanding the treatment already propoſed, the purging ſhould go on, ſo that there is danger to be apprehended from the weakneſs, or irritation; aſtringents, and particularly opiums, may be given along with the other medicines, and from ⅓ to half a grain of it may be taken every eight hours: but when they are employed at the beginning, eſpecially alone, they ſtop the ſecretion, but leave the inflammation, and death enſues either from the ſymptoms of irritation, or now and then from gangrene and mortification of the inteſtines.

If the diſeaſe ſtill continues, and the ſymptoms of irritation are not very violent, the opium is to be exhibited alone, or ſpices are to be joined to it; or other aſtringents may be employed; ſuch as

(No. 47.) ℞ Cort. Simarubæ ℥ ſß.
Coque in Aq. Font. ℔i. ſß. ad ℔i.
Colaturæ capt. cochl. ij. tertiâ quâque horâ.
Vel ℞ Extract. Ligni Campeach. ʒij.
Ft. Pill. xx. Capt. tres vel quatuor ſextâ quâque horâ.

Or aſtringents, ſpices, and opium may be given together. Or opiates or aſtringents may be added to the mucilaginous clyſters. But it is to be obſerved, that it is the ſecretion we wiſh to ſtop by theſe aſtringents, and not the evacuation of the matters already contained in the inteſtines: for this reaſon the purgatives ought to be repeated, even during the uſe of the aſtringents.

In recent caſes we may expect the cure to ſucceed quickly; but in thoſe of longer continuance, a perſeverance in the proper remedies is neceſſary, eſpecially if the inteſtines ſhould be exulcerated; and then indeed the diſeaſe is frequently fatal.

If a dyſentery ſhould ariſe with acute pain, the evacuations not being frequent, and the pulſe hard, full and ſtrong as before deſcribed, we are to bleed copiouſly and repeatedly, and exhibit purgatives, which will produce copious evacuations, ſuch as neutral ſalts, and apply fomentations to the abdomen (No. 33.) till the hardneſs of the pulſe and other ſymptoms of general and phlegmonous inflammation ceaſe: afterwards we are to proceed as before directed.

A dyſentery accompanying a fever is alſo very dangerous, as, either diſeaſe being cured, the other may continue, and as both together may ſoon weaken and kill. We are to endeavour to take off the fever, by the remedies already pointed out at the beginning of a violent one, and afterwards to treat the diſeaſe as a ſimple dyſentery, being more cautious in employing aſtringents.

After the purging is ſtopt, the patient often becomes coſtive; and if he be ſuffered to continue in that ſtate for two or three days, he is apt to relapſe; the belly is therefore to be opened by bitter purgatives.

After the diſeaſe is cured, the bark may be employed to reſtore the ſtrength. It is alſo ſometimes of uſe during the purging when it has continued long, and the ordinary ſymptoms of weakneſs appear.

§ 4. *Of the Venereal Diſeaſe.*

Although the venereal diſeaſe be not confined to the mucous membrane, yet as the principal ſymptoms at the beginning depend on inflammation or exulceration of this part of the body, it may be treated of here without impropriety.

It is always propagated by an infection; the firſt appearance of which in *Europe* was in *Spain*; it was afterwards carried to *Naples* in 1494, and from thence it ſpread almoſt inſtantaneouſly over *France*, *Germany*, *Great Britain*, &c.

The venereal matter muſt be applied in a fluid ſtate; 1ſt, either to ſome part of the body where the mucus is loſt, as it is in the parts of generation, (which are generally firſt infected), or about the nipples, lips, *anus*, &c. or, 2dly, to a wound or ulcer; or it may paſs from a mother to a child, although commonly in this caſe it adheres to the ſkin, in the paſſage through the *vagina*.

It almoſt always occaſions a converſion of the *mucus* of the part, or of the fluids of the ulcer or wound, into a matter.

ſimilar to itſelf; and when a ſufficient quantity has been thus produced, it brings on an inflammation in the mucous membrane or glands, or in the wound or ulcer, and it is afterwards ſometimes abſorbed into the general ſyſtem of veſſels, but very ſeldom before: the firſt ſymptoms therefore appear in the part where the infection was received.

When it is mixed with the ſoft *mucus*, it produces, 1ſt, an inflammation, and great ſecretion from the mucous glands, in which caſe, it is not often abſorbed into the general ſyſtem; and the diſeaſe is called a *gonorrhœa*. Or, 2dly, one or more little eryſipelatous inflammations, followed by ſmall watery puſtules, which break, and ulcers called chancres are formed; after which it is commonly abſorbed in two or three days, as it generally is, when a wound or ulcer are at firſt infected: this alſo happens ſometimes in a *gonorrhœa*, and always when a child receives it from its mother; and the diſtemper is called the *Lues Venerea*.

The *urethra* and *vagina* are for the moſt part affected with *gonorrhœa*, and the *glans*, prepuce, *labia pudendi*, *perinæum*, *anus*, nipples, lips, &c. with chancres; although either may take place in any of thoſe parts.

Moſt people are infected by the venereal matter mixing with, and being retained in, the *mucus* of the *urethra* or *vagina*, or upon the *glans*, *prepuce*, or *labia pudendi*, from which it cannot be waſhed off by the urine, on account of the inſolubility of the *mucus* in water; and the ſymptoms do not appear till after twenty-four hours, nay, ſometimes not till after three weeks from the time of receiving the infection, but moſt commonly they ariſe in four, five, or ſix days.

A *gonorrhœa* from the *urethra* in a man begins with an uneaſineſs about the parts of generation, together with an appearance of a little whitiſh matter about the orifice of the *urethra*, a little ſwelling, and ſometimes redneſs there, and a ſlight pungency upon the evacuation of urine. The whitiſh matter ſoon increaſes in quantity, the inflammation about the end of the *urethra* becomes more evident, and for the moſt part there is now a tenſion, and hardneſs through the whole of it, a ſwelling of the *lacunæ*, and a ſenſation of ſtricture in the *penis*, particularly on erection. The matter ſtill increaſes, flows out, and grows thinner, loſes its adheſiveneſs, and is of a yellow or greeniſh colour. There is now always a redneſs about the end of the canal, often a pain from the diſtenſion of the *urethra* during the evacuation of urine, and a much ſeverer one towards the orifice, from its *ſtimulus*, with an increaſe of the redneſs, juſt after it is evacuated. The inflammation prevents the extenſion of the *urethra* in erection, ſo that the *penis* is at that time curved downwards with great pain, which is increaſed if it be raiſed towards the belly; and the *ſtimulus* occaſions it often to be erected, eſpecially when warm in bed, and ſometimes prevents ſleep, or awakens the patient, and now and then produces involuntary emiſſions of the *ſemen*.

Sometimes the matter is very thin or ſtreaked with blood, all the inflammatory ſymptoms are more violent, and the patient is affected with ſtrangury. The prepuce alſo is ſometimes inflamed about the end, and cannot be drawn back, which is called a *phymoſis*; or, being drawn behind the *glans*, cannot be returned, which is called a *paraphymoſis*, when the inflammation is increaſed by the ſtricture, and now and then gangrene and mortification are produced; or the whole of it is affected with œdematous ſwelling, alſo called *phymoſis*. In all theſe caſes ulcers are apt to ariſe, eſpecially in the two laſt.

Thus the inflammation continues to increaſe, generally for about a week or two; but it admits of a natural cure, for the *mucus* waſhes off the venereal matter faſter than it is formed, until at laſt the infection is totally carried off. While this is taking place, the ſymptoms continue nearly the ſame for ſome time; they afterwards begin gradually to decreaſe, the erections are neither ſo frequent, nor with ſo much pain; there is neither ſo much inflammation, nor pain from the evacuation of urine; the matter becomes thicker, whiter and adheſive, gradually diminiſhes in quantity, becomes irregular often towards the laſt, pieces of *mucus* having a fibrous appearance being mixed with the urine; at laſt the running ceaſes, and the inflammatory ſymptoms at the ſame time gradually decreaſing, leave the patient. Or, the infection being carried off, the ſecretion continues, but in a ſmaller quantity, thicker, and whiter, and with much leſs inflammation, for months, or ſometimes for years, for the moſt part going off at laſt; or, not being carried off, the ſymptoms continue, although commonly with leſs inflammation than at the beginning. Or exulcerations may be produced, the matter abſorbed, and the *lues venerea* brought on, particularly when any freſh cauſe of inflammation is applied, when the diſeaſe continues long, or the infected *mucus* is ſuffered to remain between the *glans* and prepuce. Or an abſorption may ſometimes, although ſeldom, happen without external exulceration, and be attended with the ſame conſequence.

A *gonorrhœa* from the *vagina* and *urethra* in women begins with a heat, itching, and uneaſineſs, about the parts of generation, followed by a redneſs about the orifice of the *urethra* extending to the mouth of the *vagina*, a running ſimilar to that already deſcribed, with pain for the moſt part upon the evacuation of urine, as alſo in ſitting when the parts are preſſed upon, and in walking, or upon the *vagina*'s being diſtended. It has otherwiſe the ſame progreſs and terminations as in men, except that the ſymptoms are ſometimes increaſed after menſtruation. But if the diſeaſe affect the *vagina* only, the inflammatory ſymptoms are often very trifling; or, if they make their appearance at the beginning, they go off, ſo that the patient is hardly ſenſible of any other inconvenience but the running.

A *gonorrhœa* from any of the external parts, very ſeldom happens; when it does, (as from the *glans*, for inſtance) it begins with redneſs and ſwelling, the ſurface is ſometimes covered with a whitiſh cruſt, ſimilar to *aphthæ*, and there is afterwards an oozing of a matter like that from the *urethra*, the inflammation at firſt increaſing: the infection however is gradually waſhed off, and the progreſs and terminations are nearly the ſame as before deſcribed.

Gonorrhœas may alſo ariſe in the eyes, and noſtrils, with ſymptoms ſimilar to thoſe above-mentioned, except for the part affected.

When a *gonorrhœa* continues long, it ſometimes produces a ſtricture in the part, particularly in the *urethra* in men, ſo as to occaſion a difficulty in the evacuation of urine, often attended with great pain, the water flowing out in a ſmall ſtream, or only by drops; and now and then it alſo produces a degree of inflammation, and a diſpoſition to contraction in the bladder, and, the *urethra* alſo contracting, the ſtoppage is increaſed: this generally goes off with a ſecretion of *mucus* from theſe parts, but it may have the other progreſſes and terminations of an inflammation of the bladder; and often no ſuch affection takes place, or, if it does, it goes off, and the ſtoppage and pain continue for years.

A ſimilar ſtricture takes place in the *urethra* in women, but not near ſo frequently, and alſo in the *vagina*, preventing its diſtenſion; it happens likewiſe in the end of the prepuce in men, which it prevents from being drawn back after all the other ſymptoms are gone off.

The neighbouring parts, particularly the teſticles, glands in the groin, and ſometimes the *perinæum*, are alſo ſubject to phlegmonous inflammation from ſlight *ſtimuli*, ſuch as motion in exerciſe, preſſures, &c.

The teſticle inflames with the common ſymptoms of ſwell-

ing, pain, heat, hardneſs, redneſs, &c. the running for the moſt part at the ſame time diminiſhing or ceaſing.

The progreſs to ſuppuration, gangrene and mortification, and *ſcirrhus*, is alſo the ſame as in other inflammations of theſe glands; and it admits of a natural cure, for the running may again increaſe, the pain, ſwelling, &c. decreaſe, and at length they may leave the patient, the ſwelling and hardneſs often continuing for a conſiderable time.

The lymphatic glands in the groin likewiſe ſometimes inflame, even when there is no abſorption of the matter; but this caſe can only be diſtinguiſhed from thoſe where there is, by the event, which is not to be waited for.

The inflammation of the *perinæum* is attended with the common ſymptoms of that diſeaſe.

The venereal *gonorrhœa* ſhould be diſtinguiſhed from that in which there is no infection; from the *fluor albus*, and other increaſed ſecretions from the different parts ſubject to this diſtemper; from involuntary emiſſions of the *ſemen*; ulcers in the urinary paſſages and increaſed ſecretions from their mucous *membrane*, from a ſtone, or any other cauſe.

When the *lues venerea* begins with a chancre, there is at firſt a little eryſipelatous inflammation, with itching on the *glans*, prepuce, *labia pudendi*, &c. followed by one or more ſmall puſtules, filled with a tranſparent fluid, becoming ſometimes white; theſe break, and a ſmall but ſpreading ulcer is formed, ſometimes painful, generally inflamed, ſore, and unequal at the bottom, often with hard, protuberant, aſh-coloured edges covered with whitiſh ſloughs, and of difficult cure.

They ſhould be diſtinguiſhed from little excoriations or ulcers, produced either by rubbing the parts, or by the matter which ſometimes is accumulated about them when they are not kept clean; or by the *fluor albus* on the *labia pudendi* or thighs in women, or on the *glans* and prepuce in men: theſe, when they ariſe from coition, appear immediately, and are of eaſy cure, or go off of themſelves in a few days.

If the diſeaſe begins with an ulcer in the *urethra*, without *gonorrhœa*, which it very ſeldom does, there is a ſoreneſs, and diſpoſition to the evacuation of urine, with pain on its being evacuated, and an oozing of a ſmall quantity of a thin, watery fluid; and ſometimes a *gonorrhœa* follows.

If an ulcer or wound are infected, they inflame, and ſpread with ſoreneſs, or pain, and inequality of their ſurface; they are often covered with whitiſh ſloughs, and have aſh-coloured edges.

If children receive the infection from their mothers, they now and then are born with ſymptoms of the diſeaſe, as inflammations of the ſkin, *gonorrhœa*, &c. but for the moſt part there is no appearance for ſeveral days; in about a week however, eruptions, with browniſh ſcabs degenerating into ulcers, ariſe about the angles of the mouth, or other parts of the head, or over the whole body.

It is not certainly known, if there be at any time an abſorption in a *gonorrhœa* without exulceration; but ſometimes in long-continued ones the infectious matter gets into the ſyſtem, perhaps from an ulcer in the *urethra*.

From the ulcers, wherever they are, the matter is abſorbed by the lymphatics, and ſometimes as it paſſes along inflames them, and there is a redneſs, hardneſs, and ſoreneſs in their courſe to the firſt lymphatic gland; often however there is no appearance of this kind.

Whether there be or not, an inflammation of the firſt glands they paſs through, called a *bubo*, is often produced, which, as the parts of generation are moſt commonly firſt infected, is generally in the groin; it begins with ſoreneſs to the touch, hardneſs and ſwelling of the glands; theſe ſymptoms increaſe, and are attended with pain, eſpecially on moving, redneſs of the ſkin, and the other ſymptoms common to inflammation. It ſometimes terminates quickly in ſuppuration, ſometimes, like other inflammations of glands, it ſuppurates very ſlowly, ſometimes terminates in ſcirrhoſity, very ſeldom in gangrene. If it ſuppurates, when the abſceſs formed from it breaks, or is opened, the ulcer is generally venereal; I believe, always ſo. The ulcer is ſometimes dangerous from its diſpoſition to ſpread and form ſinuſes, and from its vicinity to large veſſels; and it is often cured with difficulty.

It ſhould be diſtinguiſhed from other inflammations of theſe glands brought on by external *ſtimuli*, as rubbing, &c. or by ſtimulating fluids, as *pus*, cancerous matter, &c. paſſing through them; and from an abſceſs following inflammations of the cellular membrane below the *pſoas* muſcle, and from ruptures.

Whether a *bubo* ariſes or not, the matter continues its courſe through the lymphatics into the blood-veſſels.

When the venereal matter gets into the ſyſtem, it generally produces inflammations and ulcers in ſome part of the body, moſt commonly in the mucous membrane or ſkin; but ſometimes it may continue for many years before it has any effect; now and then it never makes its appearance; and for the moſt part it has been abſorbed for ſome time before any ſymptoms take place.

If it be ſecreted in the glands of the mouth or throat, it inflames the membrane and occaſions ulcers, attended with the common ſymptoms of ulceration in thoſe parts, ſuch as hoarſeneſs, pain, and difficulty in ſwallowing, &c. and ſimilar to the other venereal ones already deſcribed: theſe ulcers ſpreading, the bones become carious, and openings are made from the mouth to the noſe, the palate being deſtroyed; and the noſe itſelf ſinks, its cartilages and bones alſo being eaten away.

If ſecreted on the ſkin, it produces reddiſh or purpliſh ſpots; or an eruption covered with browniſh ſcabs, often degenerating into venereal ulcers, which, if they happen in the palms of the hands, ſoles of the feet, or about the *anus*, have often the appearance of fiſſures in the ſcarf ſkin, oozing out a thin matter with great foreneſs and pain.

If ſecreted in the eyes, inflammation and exulceration ariſe there, with loſs of ſight; if in the ears, the like inflammatory ſymptoms are brought on, (although ſeldomer) with deafneſs and *caries* of their bones.

Although the parts of generation were not the firſt parts infected, the diſtemper ſometimes appears there and about the *anus*, but not always.

Ulcers of the lungs are now and then the conſequence, and pulmonary conſumption. Sometimes too there is ſwelling of the lymphatics and other glands.

Or it affects the *periоſteum* and bones, and brings on pains in them; eſpecially on the body's being heated, and during the natural evening paroxyſm of fever, which they render more evident, going off with it in the morning with ſweat; the *periоſteum* ſwells, and becomes hard, with an appearance of ſwelling in the bones, and ſometimes they do ſwell, at others become ſoft or carious.

Sometimes before the matter gets into the ſyſtem, or at any other time of the diſeaſe, excreſcences ariſe on the *glans*, prepuce, *labia pudendi*, *anus*, &c. either where there have been ulcers, or without any previous exulceration; they are of various figures, are called warts or by other names, and are generally red and ſoft, ſometimes hard and callous, ſeldom painful.

Various other anomalous ſymptoms are alſo brought on by the infection or irritation; but theſe, if the diſtemper is not cured, are at leaſt for the moſt part prevented, from the general knowledge and uſe of mercury, and are not ſo often ſeen now, although the infection has loſt none of its virulence, as has been ſuppoſed.

Theſe are habits which will bear up againſt the diſeaſe for

many years; whilſt, in others, the appetite is loſt, the pulſe rendered more frequent, the evening paroxyſm of fever increaſed and continued through the day time, dropſical ſwellings of the legs, ſwelling of the *abdomen*, and other ſymptoms of weakneſs and irritation come on, and the patient ſinks.

Venereal ulcers, eruptions, pains, &c. ſhould be diſtinguiſhed from thoſe ariſing from other cauſes.

When the infection is communicated by the matter's being mixed with the mucus of the *urethra*, *vagina*, *glans*, prepuce, &c. if no running, ulcer, or puſtule have as yet appeared, it may be waſhed off, and the diſeaſe for the moſt part prevented by

(No. 48.) ℞ Calcis cum Kali puro ʒj.
Solve in Aq. Font. ℔ j. et cola per Chartam.

Some of the above ſolution is to be mixed, by a little at a time, with a cup full of water, till it be ſtrong enough to waſh the *mucus* from the mouth without giving much pain. Fill a ſyringe with this liquor, and inject it into the *urethra*, or *vagina*, retaining it there for about a minute; then add to the remainder of the liquor a tea-ſpoonful of the ſolution, and waſh the *glans*, prepuce, *labia pudendi*, &c. Laſtly, inject, and waſh with a little pure water, milk-warm.

The *gonorrhœa* may be cured, 1ſt, By aſſiſting the natural cure. 2dly, By injections. 3dly, By mercury alone. Or the ſucceſs of the two firſt methods may be enſured by it.

The *natural cure* is aſſiſted, 1ſt, By diminiſhing the inflammation by bleeding, if the patient be ſtrong or plethoric, the pulſe full and hard, and the chordee frequent and painful; from ʒxij to xx of blood may be taken away, but the operation ſeldom requires to be repeated, and the frequency and pain of erection are the only ſymptoms we can hope to relieve by it, and that too in the caſes now deſcribed; for in others (the inflammation being kept up by the *ſtimulus* of the matter and the urine) it has no effect, or it is detrimental, eſpecially if the habit be irritable.

2dly, By drinking plentifully of mucilaginous watery fluids acidulated (as No. 32. without the Sem. Petroſel.) to dilute the urine, and prevent its neutral ſalts from ſtimulating and increaſing the inflammation.

3dly, By the application of emollient fomentations, and poultices.

4thly, By injecting oily or mucilaginous fluids into the *urethra* or *vagina*, and by rubbing them on the *glans*, prepuce, *labia pudendi*, &c. as

(No. 49) ℞ Sev. Ovil. Curat. ʒi. Ol. Olivæ. ʒij.
M. Liquefcant leni calore, tempore utendi.

5thly, By increaſing the ſecretion a little, by ſuch gentle purgatives as procure only two or three evacuations a day. Severe purging often augments the inflammatory ſymptoms, brings on ſtrangury and exulcerations, gives occaſion to inflammation of the teſticles and other neighbouring parts; or it ſtops the running before the infection is waſhed off, and the *gonorrhœa* either returns in a few days, or exulcerations take place. Long-continued purging is apt to weaken the ſtomach and inteſtines, to hurt the digeſtion, to produce obſtinate gleets, and leave hypochondriacal ſymptoms, particularly in irritable or melancholic habits.

6thly, By avoiding exerciſe, ſalt, ſpices, and too much animal food, eſpecially at the beginning, when there is a great deal of inflammation.

If with the above treatment the inflammatory ſymptoms diminiſh, the running becomes thicker, and, at the end of four or five weeks, leaves the patient, there is then no reaſon to ſuſpect the ſyſtem to be infected.

If any of the preparations of mercury deſcribed below, be uſed with the above remedies, their effects are rendered more certain.

2dly, The ſubſtances to be uſed in the *cure by injections* are,

(No. 50.) *(a)* ℞ Aq. Font. ʒviij.
Gum. Arab. ʒvj.
Calomel. ʒ ſs. M.

(b) ℞ Aq. Roſæ ʒi.
Hydrarg. mur. gr. j. Solve.

℞ Solution. præſcript. gutt. xxx ad lx.
Aq. Roſæ ʒi. M.

If this injection be employed, we are to begin with it weak, and gradually to increaſe its ſtrength, ſo that the patient ſuffers but little pain after it is evacuated: a piece of ſoft linen rag is to be kept between the *glans* and prepuce during its uſe.

(c) ℞ Aq. Roſæ. ʒij.
Ceruſſæ acetatæ gr. v ad x. Solve.

(d) ℞ Ol. Olivæ ʒij.
Hydrargyri Saliva vel Mucilagine Gum. Arab. extinct. ʒj. ad ʒiij. M

Preparations of copper, zinc, and vegetable aſtringents, have alſo been employed by ſome people. A little of one of theſe injections is to be thrown into the *urethra* or *vagina* at firſt four times, afterwards three times, and at laſt once in twenty-four hours, and kept there for about a minute.

No previous treatment is required except bleeding. (Vide the firſt method in the natural cure.)

We ſhould always exhibit mercury at the ſame time, in the manner recommended in the *lues venerea*.

If a ſenſe of ſtricture towards the bulbous part of the *urethra* ſhould be felt, or if the running ſhould not ſtop in a fortnight, notwithſtanding the uſe of the injection, it ſhould be left off; but the mercury ſhould be continued, the inflammatory ſymptoms being kept off by the bark: if the *gonorrhœa* does not ſtop in a fortnight more, recourſe muſt be had to the injection. The mercury is to be exhibited for a week or two longer, if the ſymptoms do not go off in that time. Bark may alſo be given at the beginning, to the quantity of an ounce in 24 hours for a day or two, and afterwards to ʒiij; having firſt bled the patient, if his habit be plethoric, or his pulſe hard. Should the diſeaſe be carried off by the injection in a few days, it is nevertheleſs ſafer to perſiſt in the uſe of the mercury for a month; but it is not always abſolutely neceſſary.

Omitting the injection once or twice will often make it fail of curing, when it would have otherwiſe produced that effect.

The 1ſt, 2d, and 4th remedies recommended in the natural method, are to be uſed in this, which, for the moſt part, cures ſooner, with much leſs pain, and with as great ſafety, provided mercury be uſed, as the former; and patients treated in this manner are leſs liable to inflammation of the teſticles, or of the glands of the groin, or to chancres or ſtrictures.

3dly, The cure *by mercury* is performed, 1ſt, By bleeding, if the patient be plethoric. 2dly, By the 1ſt, 2d, 3d, 4th and 6th remedies, recommended in the natural method of cure. 3dly, If at the beginning the inflammation be troubleſome, an ounce of bark is to be given every 24 hours till it abates, and afterwards 3 drachms. 4thly, Mercury is to be employed internally, as in the *lues venerea*.

When there is any ulcer, or any ſymptom of the matter's having been abſorbed, the patient cannot be cured with ſafety and certainty, unleſs mercury be exhibited. The preparations of mercury to be uſed are,

(No. 51.) ℞ Terebinth. Venet. ʒij. Hydrargyri ʒj.
Terantur ſimul, quamdiu Guttula vel minima appareat, dein adde Unguent. ſimpl. ʒxiv.

Turpentine is here preſcribed, becauſe we are more certain of extinguiſhing the mercury with it, than with any other ſubſtance (excepting balſam of ſulphur, which is fœtid), although it is ſometimes apt to produce little pimples on the ſkin, which are however of no material conſequence.

From one drachm to three of this ointment is to be rubbed thoroughly into the thighs, arms, or legs, every other night, beginning, if a ſalivation is not intended, with ʒj. ſʃ the firſt time; and, if the mouth is not at all affected, increaſing it to ʒi. ℈ij. the ſecond; and gradually afterwards by gr. x. at a time, as long as the mouth will bear it. If it be intended, we begin with ʒij. every other night, and increaſe or diminiſh the doſe, ſo that the patient ſhall ſpit from ℔. ij to ℔. iv every 24 hours.

(No. 52.) *(a)* ℞ Hydrargyri ʒj.
Terebinth. Venet. ʒj. ſʃ.
Terantur ſimul, quamdiu Guttula Hydrargyri appareat, addendo Guttas aliquot Olei Terebinthini, ſi opus ſit. Dein cum q. ſ. Pulv. Glycyr. fiant Pillulæ lxxx. capt. j. vel ij mane et veſp.

(b) Hydrarg. calcinat. gr. j. ad iij. Extract Gentian. q. ſ. Ft. Pillula. capt. veſp.

If either of the above preparations ſhould purge the patient,

(No. 53.) ℞ Opii gr. ½ ad gr. j
Antim. Tart. gr. ½ ad gr. ſʃ.
M. Ft. Pillula. capt. mane et veſp.

The compounds of mercury and acids are much more uncertain remedies than the above, and ought never to be uſed, unleſs the patient be in a ſituation where he runs the greateſt riſque of catching cold. When they are given, it may be in the following form:

℞ Spt. Vini dilut. (Angl. *Proof* dicti) ℥ ſʃ.
Hydrarg. mur. gr ſʃ. ad gr. j.
Solve. Capt. mane et veſp.

Whatever preparation we employ, we ſhould give it in ſuch a manner, and in ſuch a doſe, as to produce hardneſs, fulneſs, and moderate frequency of the pulſe, with as little ſenſible evacuation as poſſible; for the mercury cures ſooner, and with greater certainty, when the ſtrength is but little, than when it is much reduced by it. Therefore, unleſs the caſe be very urgent, we are to begin with ſmall doſes at firſt, and afterwards gradually to increaſe them; giving opium and antimony, and now and then a ſmall doſe of rhubarb, if the inteſtines are affected; and omitting the medicine for two or three days, if there be ſymptoms of ſalivation, till theſe are gone off.

The ſymptoms of approaching ſalivation are, a diſagreeable taſte in the mouth, and ſoreneſs of the gums or ſalivary glands.

The ointment ſhould always be employed in bad caſes; but in ſlighter ones, in *gonorrhœas*, and where there is great riſque of catching cold, the mercury may be uſed internally.

It is ſeldom or never neceſſary to ſalivate a patient, unleſs he be ſo irritable, that the ſmalleſt doſe of mercury immediately affects his mouth; or unleſs the diſeaſe be proceeding ſo faſt, that it would be hazardous to wait till it was checked by the remedy given in ſuch a manner as to avoid ſalivation; or excepting when we cannot truſt to his uſing it regularly. On the contrary, ſalivation rather renders the effect of the medicine uncertain.

The precautions neceſſary to avoid ſalivation, are, 1ſt, Exhibiting the mercury as has juſt been deſcribed: 2dly, Taking care not to ſtimulate the ſalivary glands, either by rubbing the ſkin over them, and keeping it too warm with flannel, or by any ſtimulus in the mouth: 3dly, Avoiding ſudden expoſure to cold. It is to be obſerved, that the patient is rendered irritable by the uſe of the mercury. Hence cold applied in the circumſtances in which it is apt to produce diſeaſes (vide the *Catarrh*) brings on ſalivation, dyſentery, or rheumatiſm; and the *ſtimulus* of the mercury being directed to the ſalivary glands, or inteſtines, produces in them greater inflammation than that which takes place in a ſalivation from mercury alone, or in a dyſentery from cold alone. It is by no means neceſſary, however, to confine him to a cloſe, warm room, except in a ſalivation; it is ſufficient if he wear flannel or cotton next his ſkin, and carefully avoid a moiſt atmoſphere, or rain, and the evening air: on the contrary, the air of a cloſe room often, nay, ſometimes that of a large town, prevents the healing of venereal ulcers, or even the deſtruction of the infectious matter by the mercury, and the patient cannot be cured unleſs he be removed into a freer air, or into the country.

If, notwithſtanding theſe precautions, a ſalivation ſhould come on, we know of no remedy which will remove it with any degree of certainty, although ſulphur, camphire, and purgatives, have been recommended for this purpoſe. If, therefore, the caſe be urgent, the beſt way is to let it go on, uſing the mercurial ointment as before deſcribed: and we ſhould confine the patient to a room where there are no ſtreams of air, but which, at the ſame time, is not too warm: he ſhould be clothed with flannel, and no food ought to be given him but what is of eaſy digeſtion and good nouriſhment. If the ſymptoms are increaſing ſlowly, the mercury ſhould be omitted till the ſalivation goes off, and afterwards recurred to.

The mercury, whether we ſalivate or not, ſhould be continued four or five weeks, even if the ſymptoms ſhould leave the patient before that time.

It ſhould be continued till all the ſymptoms are gone off, except, 1ſt, When a *gonorrhœa* remains with little inflammation. (Vide the *Gonorrhœa Benigna.*) 2dly, When the patient is much reduced by it, and there are ulcers which do not put on the appearance of healing. In this caſe, it is to be left off, and the patient ſtrengthened, and the common means of curing ulcers not venereal, are to be employed: if theſe do not ſucceed, he is to return to the uſe of the mercury. 3dly, When ulcers covered with fœtid ſloughs appear, and ſpread exceedingly faſt; in this caſe bark, and the other remedies for gangrene and mortification, are to be made uſe of. 4thly, When only rheumatic pains remain, theſe, often ariſing from the mercury itſelf, are to be cured by preparations of antimony and ſarſaparilla.

If by the imprudent uſe of mercury, or expoſure to cold, a ſalivation with great inflammation of the ſalivary glands and mouth is brought on, it is to be omitted, and the common antiphlogiſtic remedies uſed, till theſe ſymptoms are carried off. If dyſentery ſhould be brought on, we are to take away from ℥xij to ℥xvi of blood, afterwards to give a doſe of rhubarb; laſtly, to ſtop the purging by (No. 53.) leaving off the mercury for a day or two.

If rheumatiſm is produced, it is to be treated in the manner directed in that diſeaſe.

If the mercury ſhould occaſion general inflammation to a degree which may be dangerous, from ℥xij to ℥xvj of blood are to be taken away.

If there be venereal ulcers of any kind, bark may be given with advantage along with the mercury, to the quantity of ℥ ſʃ every 24 hours, but we are to bleed firſt, if the patient be of an inflammatory habit, or plethoric. The ſame medicine may alſo be uſed in all caſes where the patient's ſtrength is in danger of being too much reduced by the mercury.

If there be eruptions, or pains in the bones, decoctions of woods containing reſinous ſubſtances, and relaxants, are of conſiderable uſe.

(No. 53.) ℞ Rasur. Lig. Guaiac. ʒiij. Coque in Aq. Font. ℔. iv. ad ℔. ij.

Colaturæ adde Antim. Tart. gr. ⅔ ad gr. i ſS. Divid. in partes iij. Capt. unam mane, alteram poſt pranſum, tertiam H. S. quotidie.

Guaiacum, ſarſaparilla, and ſome other remedies, have ſometimes cured the diſeaſe without mercury, particularly in warm climates; but they are never to be truſted to alone.

If the patient be not ſalivated by the mercury, he may uſe ſuch animal food as is of eaſy digeſtion; but he is to avoid ſalt, ſpices, and wine.

If there be an œdematous *phymoſis*, from ʒj to ʒiſS of bark is to be given every 24 hours until the inflammation abates, and afterwards ʒſS: mercury likewiſe is always to be exhibited in this caſe. *Phymoſis* from ſtricture alone, frequently goes off with the other ſymptoms. In every kind of *phymoſis*, milk and water is to be injected between the *glans* and the prepuce, three or four times a day; and if a very painful ulcer ſhould be formed there, and ſhould not give way to bark and mercury, the prepuce ſhould be ſlit open, or, if that be not ſufficient, entirely cut off.

In the *paraphymoſis* the prepuce ſhould be cut, emollient fomentations and poultices applied, and the other antiphlogiſtic remedies employed; and mercury is always to be exhibited.

Inflammation of the teſticle is to be treated as any other external phlegmonous inflammation; the teſticle is to be ſuſpended by proper bandages; fomentations and poultices (No. 33.) are to be applied. Purgatives, as evacuants, are uſeful, if they re-produce the *gonorrhœa*; and ſtrong vomits, where the conſtitution will bear them, ſometimes carry off the inflammatory ſymptoms immediately.

(No. 54.) ℞ Hydrarg. vitriolat. gr. iij. ad v.
Pulv. Glycyr. gr. xx. M.
Vel, Antim. Tart. gr. iij. ad v. Pulv. Ipec. gr. viij.
Ft. Pulv. Emet. capt. veſp. ſuperbibend. Aq. calid.

When the inflammatory ſymptoms are gone off, mercury ſhould always be uſed, and, if a hardneſs remain, the poultices are to be continued, and the ſkin of the *ſcrotum* rubbed with volatile liniment two or three times a day; and no other means are to be uſed to ſtop the running.

If a ſtricture ſhould remain in the *urethra*, and produce inflammatory ſymptoms, theſe are firſt to be taken off by the common antiphlogiſtic remedies: after they are taken off, or where they are not preſent, the ſtricture is to be removed by *bougies*; and if the infection has not been deſtroyed, mercury is to be uſed. If, after all the other ſymptoms are gone off, the end of the prepuce remains ſo ſeveral weeks ſo contracted as to prevent coition, it is to be cut open.

If recent chancres be the ſymptoms of the *lues venerea*, they may often be cured by cutting off the ſurface, or deſtroying it by cauſtics; but the mercury ſhould nevertheleſs be continued for a month. The ſame external applications are to be uſed to venereal ulcers, as to others of difficult cure.

A *bubo*, if it be juſt beginning, may ſometimes be prevented from ſuppurating: 1ſt, By bleeding when the habit is plethoric or inflammatory. 2dly, By immediately rubbing as much mercurial ointment on the patient's thighs as he can bear without ſalivation. 3dly, By the application of poultices and fomentations (No. 33.) 4thly, By the application of mercurial plaſters. 5thly, By *ſaccharum ſaturni*, according to ſome practitioners; but I am always afraid of any ſalt of lead when it lies long upon a part.

If a *bubo* does not ſuppurate, and be not totally diſperſed, ſome of the venereal matter may remain in the gland, till ſome *ſtimulus* occaſion its abſorption, when the diſeaſe may be propagated over the whole ſyſtem. This happens, however, very rarely, and the matter may remain in the part for years together before it makes its appearance.

If the *bubo* be already large, with a good deal of inflammation, it is better to promote its ſuppuration by the application of poultices of bread and milk; and ſome practitioners, ſuppoſing that it prevents the matter's paſſing into the ſyſtem, have judged it preferable to do this always; but, as the infection is now to be deſtroyed by mercury, it is more eligible to prevent a patient from ſuffering unneceſſary pain. When the ſuppuration is completed, the ſkin covering the abſceſs is to be penetrated, either by the knife or cauſtic, and the ulcer is to be treated as other venereal ones.

If there be excreſcences any where, the infection is firſt to be gotten rid of by a long courſe of mercury; towards the end of which they are to be cut off, and the part below deſtroyed by cauſtics, as far as it is of the texture of the excreſcence; and when the ſloughs have ſeparated, the ulcer is to be treated as a common one.

Eruptions, and pains in the bones, which cannot be cured by mercury, antimony, ſarſaparilla, or guaiacum, ſometimes give way to the warm bath.

§ 5. *Of the Gonorrhœa Benigna, or Gleet.*

This is an increaſed ſecretion from the mucous glands of the *urethra* without infection. It may remain after the venereal matter has been deſtroyed or waſhed off in a venereal *gonorrhœa*; or it may ariſe from general weakneſs, ſevere purging, exerciſe, frequent coition, cold, and intoxication with wine, and eſpecially in thoſe who have had long and frequent *gonorrhœas*.

When it remains after the infection has been carried off in a venereal *gonorrhœa*, the running is commonly thicker, whiter, often adheſive, and incapable of communicating the infection; the inflammatory ſymptoms are greatly diminiſhed, but they do not go off entirely. When it takes place from any other cauſe, it begins with a running nearly ſimilar to that in a venereal *gonorrhœa*, but generally leſs in quantity, and is not attended with ſo much inflammation, and is never infectious. In both caſes the inflammatory ſymptoms may, by expoſure to any of the cauſes, be increaſed to as great a degree as when there is infection; but they go off of themſelves in a few days, and ſometimes the running with them.

The running ſometimes ceaſes of itſelf, in a week or two; ſometimes it continues for years without any detriment to the patient, and now and then we meet with a caſe where it weakens him, brings on involuntary emiſſions of the ſemen, and at laſt kills.

If it aroſe from a venereal *gonorrhœa*, and mercury has not been uſed at all, or not in a ſufficient quantity, or if there be a ſuſpicion of infection, it is beſt to begin by enſuring the deſtruction of the venereal matter, by a mercurial courſe.

It is to be ſtopped in weak habits by the internal uſe of ſtrengthening and aſtringent remedies.

(No. 55.) ℞ Cort. Peruv. ʒij.
Nuc. Gall. ʒij. Caryoph. Arom. ʒſS.
Infunde in Vin. rubr. Luſit. ℔j. per Horas xlviii. Cola. Dein infund. in Aq. Font. ℔j. per Horam, et cola. Colaturas miſce, et capt. Æger Coch. iv. ter quaterve indies.

The other methods of ſtrengthening the ſyſtem may alſo be uſed; but it is to be obſerved, that the cold bath ſometimes increaſes the running.

Reſinous aſtringents, as *balſamum copaibæ*, exhibited three or four times a day, ſometimes ſucceed; but care ſhould be taken to

avoid exciting general inflammation by them in inflammatory habits.

The injections recommended in the venereal *gonorrhœa* continued for two or three weeks, ſometimes put a ſtop to the diſeaſe. Or mercurial ointment may be rubbed externally along the courſe of the *urethra* two or three times a day. By one or other of theſe methods we can for the moſt part cure this diſtemper; but it will continue ſometimes notwithſtanding our beſt endeavours, and perhaps go off of itſelf at laſt.

§ 6. *Of the Yellow or Weſt India Fever.*

This fever is called by the Spaniards *vomito preſto*; by the French, *maladie de Siam*, and *la fievre de matelot*; and the ingenious Boiſſier de Sauvages terms it *typhus icterodes*. It chiefly attacks the Europeans, and more eſpecially thoſe who have too much indulged themſelves in the free uſe of wine and ſpirits, and violent exerciſes, and expoſed themſelves to the heat of the ſun or the evening damps.

It comes on with faintneſs, ſickneſs, and giddineſs, and is ſoon after ſucceeded by a rigor, with a head-ach and a high fever, flushing in the face, redneſs and burning heat in the eyes, thirſt and anxiety, oppreſſion at the præcordia, frequent ſighing, difficult reſpiration, and bilious vomitings; the pulſe is quick, high, ſoft, and throbbing; never hard. In ſome it is exceſſive quick and full, attended with a difficult reſpiration.

Bleeding freely is generally neceſſary, and that muſt be proportioned to the ſtrength of the patient; though it is very rarely found to be of any uſe after the third day. During the operation, the phyſician ſhould apply his finger to the patient's pulſe, and if he finds it flag, he ſhould immediately deſiſt; but if, on the contrary, it ſhould become more free and full, he may be more liberal in the evacuation. But it is always better to repeat it than to draw too much at once. After bleeding give a gentle vomit of oxymel; and the ſame evening throw up a clyſter, if the belly be coſtive; and make a thorough evacuation in the inteſtinal canal, by giving ſmall and repeated doſes of ſaline purges or emetic tartar. When the primæ viæ have been well cleanſed, immediate recourſe ſhould be had to the cortex, in large and repeated doſes. If the ſtomach will not bear the bark in ſubſtance, a ſlight decoction or cold infuſion of it may be tried. The time of giving this febrifuge is upon the very firſt remiſſion, or when a plentiful diaphoreſis enſues.

But where the bark cannot be complied with, give as follows:

℞ Rad. Serpen. Virg. ʒij.
Croc. Anglic. ʒſs. Infunde in aq. bullient. ℥x. per horam unam; colatur ℥vj. Adde
Aq. Menth. vulg. ʒij. Vin. Madeirenſ. ʒiv.
Syr. croc. ʒi. Elix. vitriol. acid. q. ſ. ad gratum ſaporem; et ſumat cochl. ij. omni horâ, vel ſecundâ quâque horâ.

Or give repeated doſes of alkaline ſalts in freſh lime-juice, or the like, and let them always be ſwallowed during the act of effervescence.

If putrid bile predominates,

℞ Mann. ʒij. Tamarind. condit. ʒi.
Tartar. vitriol. ϑſs. Solve in ſeri lactis ℥vj. Colat. Adde
Tinctur. Senæ ʒſs.
M. Sumat cochl. iij. et rep. coch. unum poſt horas duas niſi alvus priùs reſponderit.

This ſimple procedure often anſwers very well in this diſeaſe: in the beginning give freely of tamarind beverage; and, as the fever decreaſes, a little wine may be allowed. Towards the cloſe, give elix. vitriol. in the decoct. cort. or in mint or ſnake-root tea.

The vomiting attending this diſeaſe often eludes all the art of the phyſician. Sometimes a decoction of toaſted bread drunk in ſmall quantities, with two or three drops of tinct. Thebaic. in each draught, has been found very uſeful. Cataplaſms of bread ſoaked in red wine, with a few drops of tinct. Thebaic. may be applied to the pit of the ſtomach. The ſaline draughts may alſo be tried in the act of effervescence. If theſe ſhould fail, a bliſter may be applied to the region of the ſtomach.

If a delirium, coma, or watching come on, the head and temples ſhould be ſhaved, and bathed with warm vinegar; the hands and feet ſhould likewiſe be fomented with the ſame liquor; and the pediluvium, with warm water impregnated with vinegar, ſhould at the ſame time be made uſe of.

Prevention.

As the *yellow fever* is ſo fatal to ſtrangers on their firſt arrival in the Weſt Indies, it may not be amiſs to lay down ſome general rules for their ſecurity, by way of prevention.

As ſoon, therefore, as they get into the warmer latitudes, if they be plethoric, they ſhould loſe ſome blood, and take once or twice a week, for a fortnight, a little cooling phyſic, ſuch as ſalts and manna, or a little ſea-water. Their diet ſhould be ſparing, and they ſhou'd refrain from ſalt meat as much as poſſible. Their drink ſhould be rum and water made weak, which may be acidulated either with the vegetable or mineral acids; and wine may be allowed in moderation. They ſhould keep as much upon deck, to enjoy the pure air, as the weather will admit of.

When they arrive on ſhore, they muſt be very careful of not indulging too much either in eating or drinking; and particularly in not expoſing themſelves to the heat of the ſun or the night air; as an error in theſe things is often of the moſt fatal conſequence. Their food ſhould be ſuch as is eaſy of digeſtion, and let it conſiſt chiefly of vegetables and ſubacid fruits. For drink, rum and water, or wine and water. And, above all, let the body be kept gently open, once in ſix or ſeven days, in the manner directed above, for eight or ten weeks, till the conſtitution be ſomewhat inured to the heat of thoſe burning climes.

§ 7. *Of the Scarlatina Anginoſa, or Scarlet Fever.*

This fever takes its name from the ſcarlet efflorescence which appears on the ſkin of the whole body, not riſing above the ſurface, attended with heat, dryneſs, and itching. After two, three, or four days, the efflorescence diſappears, the cuticle peels off, and there remains a kind of branny ſcales diſperſed over the body.

Where the diſeaſe appears in this ſimple ſtate, there is little required from art but the kindly warmth of the bed, confining the patient to diluent drinks, and giving a gentle cathartic or two at the cloſe of the diſtemper.

But the ſcarlet fever ſometimes puts on a very malignant appearance. It then attacks with a chillineſs, languor, ſickneſs, and oppreſſion; theſe are ſucceeded by great heat, nauſea, and vomiting, with a ſoreneſs in the throat, a ſmall quick pulſe, and a frequent and laborious breathing. The tonſils appear inflamed and ulcerated, though not much ſwelled; and on the third day the efflorescence appears, but without any relief. When it proves fatal, it generally terminates by a ſuffocation before the ſixth day.

This dangerous kind of the ſcarlet fever requires great caution and judgment in the method of cure. Bleeding can hardly be ordered with ſafety; but if inflammatory ſymptoms ſhould prevail ſo as to indicate that evacuation, it muſt be made by applying cupping-glaſſes betwixt the ſhoulders, and repeating the operation as occaſion requires. The ſame precaution is alſo neceſſary in promoting ſtools; for antimonials,

which are frequently ſo ſucceſsful in other fevers, in this frequently bring on violent and dangerous purging: however, the body, if coſtive, muſt be kept open by gentle and emollient clyſters. A bliſter ſhould be applied between the ſhoulders, and another round the throat if neceſſity requires it. If a putreſcent diatheſis be highly predominant, the chief dependance muſt be on the cortex, joined with ſnake-root and cordials. If the bark ſhould run off by ſtool, three, four, or five drops of tinct. Thebaic. may be added to each doſe.

§ 8. *Of the Eryſipelas.*

The eryſipelas is a ſuperficial inflammation, caſed by a ſharp, hot, acrid humour in the blood; and begins with a ſhivering, loſs of ſtrength, and may ariſe from a too ſudden cooling after great heat. Vulgarly it is termed St. Anthony's fire; and is called by ſome a *blight*.

It is attended with heat, redneſs inclining to yellow; and often with ſcurf and ſmall pimples: and when in the face, with tumour and ſometimes watery bliſters, a difficulty of breathing and drowſineſs. Great attention is required in the cure of this diſorder.

If attended with much fever, which it frequently is, bleeding is requiſite; but in the common milder ſort, gentle lenient purging will be ſufficient, but muſt be repeated. There is not, perhaps, an acute diſtemper, which allows of theſe purges more freely than this, more particularly where the ſwelling has ſeized the head and face. After which,

℞ Aq. puræ ℥iſ℈. Nitri gr. vi. Pulv. contrayerv. c. ℈ſ℈.
Syr. croc. ʒi. F. hauſtus ſextâ quâque horâ ſumendus.

When it is in the face, attended with a low pulſe and a degree of malignancy, bliſter the nape of the neck, or between the ſhoulders, and give the following cordial draught:

℞ Aq. puræ ℥iſ℈. Aq. alexet. ſpirituoſ. ʒij.
Confect. card. Pulv. contrayerv. c. āā ℈i.
Syr. croc. ʒi. ut f. hauſtus ſumendus ſextâ quâque horâ.

Once a day, or every ſecond day, a ſtool or two muſt be procured.

Beware of topical applications; yet camphirè, perhaps, would be no contemptible medicine here, preſcribed to be uſed both internally as well as externally.

Flannels wrung out of a ſtrong decoction of elder-flowers, with the addition of a little of the liniment ſaponac. and applied warm, often afford ſpeedy relief. When a thin watery humour weeps from the little veſications attending the eryſipelatoſe inflammation, it may be the ſafeſt and the beſt, to apply a piece of ſmooth linen rag over them, impregnated with flour or dry meal; and all greaſy and reſinous applications are to be carefully avoided.

§ 9. *Of the Miliary Fever.*

The miliary fever takes its name from the puſtules or bladders, reſembling in ſhape and ſize the ſeeds of millet. There are two kinds of miliary eruption, the white and the red, termed by medical writers *purpura alba*, *& purpura rubra*; but the two are often intermixed. It begins with a ſhivering, followed by a proportional degree of heat; a depreſſion of ſpirits; a pulſe ſometimes quick and weak, at other times rather depreſſed and hard; an oppreſſion about the præcordia; a frequent ſighing; terror after ſleep, and pale urine. On the third or fourth day the eruption appears chiefly on the neck, breaſt, and back, being generally preceded by a profuſe ſweat of a ſouriſh ſmell, and a pricking or tingling ſenſation in the ſkin, eſpecially in the fingers, and an itching in thoſe places where the puſtules are moſt numerous. After the eruption is completely out, the ſymptoms ſubſide, the urine becomes higher coloured, and the pulſe more calm, ſoft, and full. In about ſeven days the eruptions dry and peel off.

If the febrile ſymptoms run high, bleeding in the beginning, before the eruption, will ſometimes be neceſſary, which muſt be proportioned to the different circumſtances of the patient's caſe; and then,

℞ Suc. limon. ℥ſ℈. Sal. corn. cerv. ℈ſ℈.
Vin. antim. gut. xxx. ad lx. Aq. pur. ℥j.
Syr. balſ. ʒij. ut f. hauſtus, quartâ quâque horâ ſumendus, pro re nata.

If, on the contrary, the fever ſhould appear of the low nervous kind, cordial medicines are indicated, and wine whey may be allowed for drink; but the patient muſt not be kept too warm.

When a violent pain in the head, coma, or delirium attend, a bliſter ſhould be immediately applied betwixt the ſhoulders.

Sometimes the miliary fever is complicated with ſymptoms of a putrid nature, and the eruptions even mixed with petechiæ. When this happens, the cortex and wine are the chief remedies.

§ 10. *Of the Iſchuria, or Suppreſſion of Urine.*

A total ſuppreſſion of urine is called by authors *iſchuria*; when partial, *ſtranguria*; and when the latter is attended with great heat in the urine, it is termed *dyſuria*. When they proceed from caruncles or ſtones in the urethra, they will be diſcovered by paſſing the catheter or the bougie. They are often occaſioned by ſpaſms and inflammations on the neck of the bladder.

Bleeding, fomentations, and clyſters, muſt be purſued.

℞ Decoct. commun. pro clyſt. ℔ſ℈.
Balſam. copaiv. (v. o. admixt.) ʒij. Ol. olivar. ℥ij.
Tinctur. Thebaic. ʒi. F. enema; et repetatur pro re nata.

℞ Aq. fontan. ℥i. Spirit. nitr. dul. gutt. xxx.
Aq. nuc. moſchat. Ol. amygd. āā ʒij.
Tinctur. Thebaic. gutt. v. ad xx. Syr. ex alth. ʒi. F. hauſt.

If the ſuppreſſion ſtill continues, repeat the bleedings, have recourſe to the warm bath, and give ſolutions of gum Arabic, &c. Sometimes the introduction of the bougie, firſt oiled, may aſſiſt much in removing theſe complaints by its ſlight irritation, and gently dilating the paſſages.

If a painful diſcharge of urine ariſes from *caruncles* in the urethra, they are moſt effectually removed by bougies, which ſhould at firſt be uſed with lenity and caution; and if on their firſt introduction (being previouſly ſmeared with oil) any inflammatory ſymptoms come on, bleed and purge, and confine the patient to his bed; and when theſe complaints are gone off, let him continue to uſe them conſtantly till the diſorder be removed.

Our next taſk will be to treat of Chronic Diseases, and of ſuch others as could not be claſſed properly among the Acute; but this ſubject we are under the neceſſity of introducing at the commencement of our next volume.

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END OF THE FIFTH VOLUME.